(2)

A REVIEW OF THE ARMY'S BRAC INSTALLATION ASSESSMENT METHODOLOGY

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	AUGUST 1992	FINAL (JANUARY 1992 to AUGUST 1992)

4. TITLE AND SUBTITLE
A REVIEW OF THE ARMY'S BRAC INSTALLATION ASSESSMENT METHODOLOGY

5. FUNDING NUMBERS

6. AUTHOR(S)
REYNOLDS, STEPHEN; TAYLOR, RICHARD; RYECZEK, STEPHAN

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
U.S. ARMY ENGINEER STRATEGIC STUDIES CENTER
CASEY BUILDING #2594
FORT BELVOIR, VA 22060-5583

8. PERFORMING ORGANIZATION REPORT NUMBER
CETEC-ES-R-92-5

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. ARMY BASE REALIGNMENT AND CLOSURE OFFICE
ATTN: DACS-DMB
THE PENTAGON
WASHINGTON, DC 20310-0200

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION IS UNLIMITED

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

This study will assist the Army Base Realignment and Closure Office as it reviews the process used by the Army during the 1991 round of base realignment and closure deliberations (BRAC 91). The objective of doing this assessment is to refine and improve the process prior to the commencement of the next round of realignment and closure deliberations (BRAC 93), which is scheduled to begin in October 1992. The key issue areas examined in this report are:

- measures of merit used for BRAC 91
- categories used to divide installations into comparable groups
- attributes used to measure military value
- data sources used to obtain quantitative information about installations
- decision analysis technique used in the installation rating process

14. SUBJECT TERMS
BASE CLOSURE, MILITARY INSTALLATIONS, DECISION ANALYSIS

15. NUMBER OF PAGES
248

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19 SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNLIMITED

A REVIEW OF THE ARMY'S BRAC

INSTALLATION ASSESSMENT METHODOLOGY

Prepared by
Engineer Strategic Studies Center
U.S. Army Corps of Engineers

August 1992

ACKNOWLEDGMENTS

This study was prepared by the U.S. Army Engineer Strategic Studies Center (ESSC) under the direction of Mr. Stephen Reynolds, Project Director. Mr. Richard Taylor was the Project Manager and principal author. Mr. Stephan Ryeczek was the Project Analyst and coauthor. Major Dale Bleckman also contributed outstanding analytical support. Ms. Kacey Carroll and Mrs. Pat Zarwel provided editorial support for this study.

ESSC would like to thank the members of the Army BRAC Office for their solid sponsor support. In particular, ESSC thanks Mr. John Nerger, Major Kevin Maguire, and Captain Chuck Fletcher for actively assisting the ESSC BRAC study team.

DISTRIBUTION

	No. of Copies
Headquarters, Department of the Army, ATTN: DACS-DM(TABS), Washington, DC 20310-0200	25
Under Secretary of the Army, Washington, DC 20310-0102	1
Assistant Secretary of the Army, (Installations, Logistics & Environment), Washington, DC 20310-0110	2
Assistant Secretary of the Army, (Financial Management), Washington, DC 20310-0103	1
Assistant Secretary of the Army, (Manpower and Reserve Affairs), Washington, DC 20310-0111	1
Assistant Secretary of the Army, (Research, Development & Acquisition), Washington, DC 20310-0103	1
Headquarters, Department of the Army, ATTN: DACS-DPZ-A, Washington, DC 20310-0200	1
Headquarters, Department of the Army, ATTN: DACS-DME, Washington, DC 20310-0200	1
Headquarters, Department of the Army, ATTN: DAEN-ZCZ-A, Washington, DC 20310-2600	2
Headquarters, Department of the Army, ATTN: DAMO-ZB, Washington, DC 20310-0400	1
Headquarters, Department of the Army, ATTN: DALO-PLZ-A, Washington, DC 20310-0500	1
Headquarters, Department of the Army, ATTN: DAPE-ZB, Washington, DC 20310-0300	1
Headquarters, Department of the Army, ATTN: DAJA-AL, Washington, DC 20310-2200	1
Commander, U.S. Army Forces Command, ATTN: FCCS, Fort McPherson, GA 30330-6000	1
Commander, U.S. Army Training and Doctrine Command, ATTN: ATCS, Fort Monroe, VA 23651-5000	1
Commander, U.S. Army Materiel Command, ATTN: AMCCS, Alexandria, VA 22333-0001	1

Commander, Military Traffic Management Command, ATTN: MTCS, Falls Church, VA 22401-5050	1
Commander, U.S. Army Health Services Command, Fort Sam Houston, TX 78234-6000	1
Commander, U.S. Army Pacific Command, ATTN: APCS, Fort Shafter, HI 96858-5100	1
Commander, U.S. Army Miliary District of Washington, ATTN: ANCS, Fort McNair, Washington, DC 20319	1
Commander, U.S. Army Information Systems Command, ATTN: ASCS, Fort Huachuca, AZ 85613-5000	1
Commander, U.S. Army Corps of Engineers, ATTN: CECS, Washington, DC 20314-1000	1
Commander, U.S. Army Corps of Engineers, ATTN: CESI, Washington, DC 20314-1000	1
The Auditor General, 3101 Park Center Dr., Alexandria, VA 22301-1596	2
Department of the Army, Office of the Inspector General, ATTN: SAIG-ID, Washington, DC 20310-1742	1
Army Logistics Management College, ATTN: AMXMC-LS-S, Fort Lee, VA 23801-6050	1
National Defense University, Information Resources Management College, ATTN: IRMC, Fort McNair, Washigton, DC 20319-6000	1
The Pentagon Library, ATTN: Army Studies, The Pentagon, Room 1A518, Washington, DC 20310	2
Defense Technical Information Center, ATTN: DTIC-FDAC, Cameron Station, Alexandria, VA 22304-6145	2
Defense Logistics Studies Information Exchange, U.S. Army Logistics Management Center, Fort Lee, VA 23801	2
Director, U.S. Army Topographic Engineering Center, Fort Belvoir, VA 22060-5546	3
Commander/Director, U.S. Army Engineer Strategic Studies Center, Fort Belvoir, VA 22060-5583	17
TOTAL	80

CONTENTS

Figure **Page**

Section

I. INTRODUCTION

1. **PURPOSE.** This study reviews, analyzes, and recommends improvements to the installation assessment methodology the Army uses in its Base Realignment and Closure (BRAC) process.

2. **SCOPE.** This study--

a. Examines the effectiveness of the BRAC measures of merit used by the Army in BRAC 91[1] to measure military value.

b. Analyzes the validity of the installation categories used in the Army BRAC 91-Phase I process.

c. Measures the suitability of the attributes used by the Army in the BRAC 91-Phase I process.

d. Evaluates the suitability of installation data used by the Army in the BRAC 91-Phase I process.

e. Reviews the decision analysis method used to evaluate the military value of Army installations during BRAC 91-Phase I.

f. Provides recommendations to improve the installation assessment process for Army BRAC 93.

3. **BACKGROUND.**

a. **The BRAC Process.** There are ongoing efforts to close or realign unneeded military bases as part of wide-ranging efforts to balance the U.S. budget, trim DOD, and reduce the operating costs of U.S. military forces. The most recent statutory effort by Congress to accomplish this task was the passage of *Public Law 101-510 (Defense Base Closure and Realignment Act of 1990)*. This law is an effort to ensure a timely, independent, and fair process for closing and realigning U.S. military installations. This statute requires the Secretary of Defense to submit a list of proposed military base closures and realignments to an independent Base Closure and Realignment Commission. This commission met in 1991 and will meet again in 1993 and 1995. Each service supports DOD with an assessment of its military base posture and its respective recommendations for closure.

b. **The Army BRAC Process.** The Army takes a three-phase approach to the task of providing realignment and closure recommendations to the DOD BRAC Office and BRAC Commission (**Figure 1**). The Army proponent for BRAC actions is the Director of the Army Staff, Management Directorate, Base Realignment and Closure Office (henceforth referred to as

---

[1] *Report to the Secretary of Defense on Base Closure and Realignment* (Department of the Army, 1 April 1991).

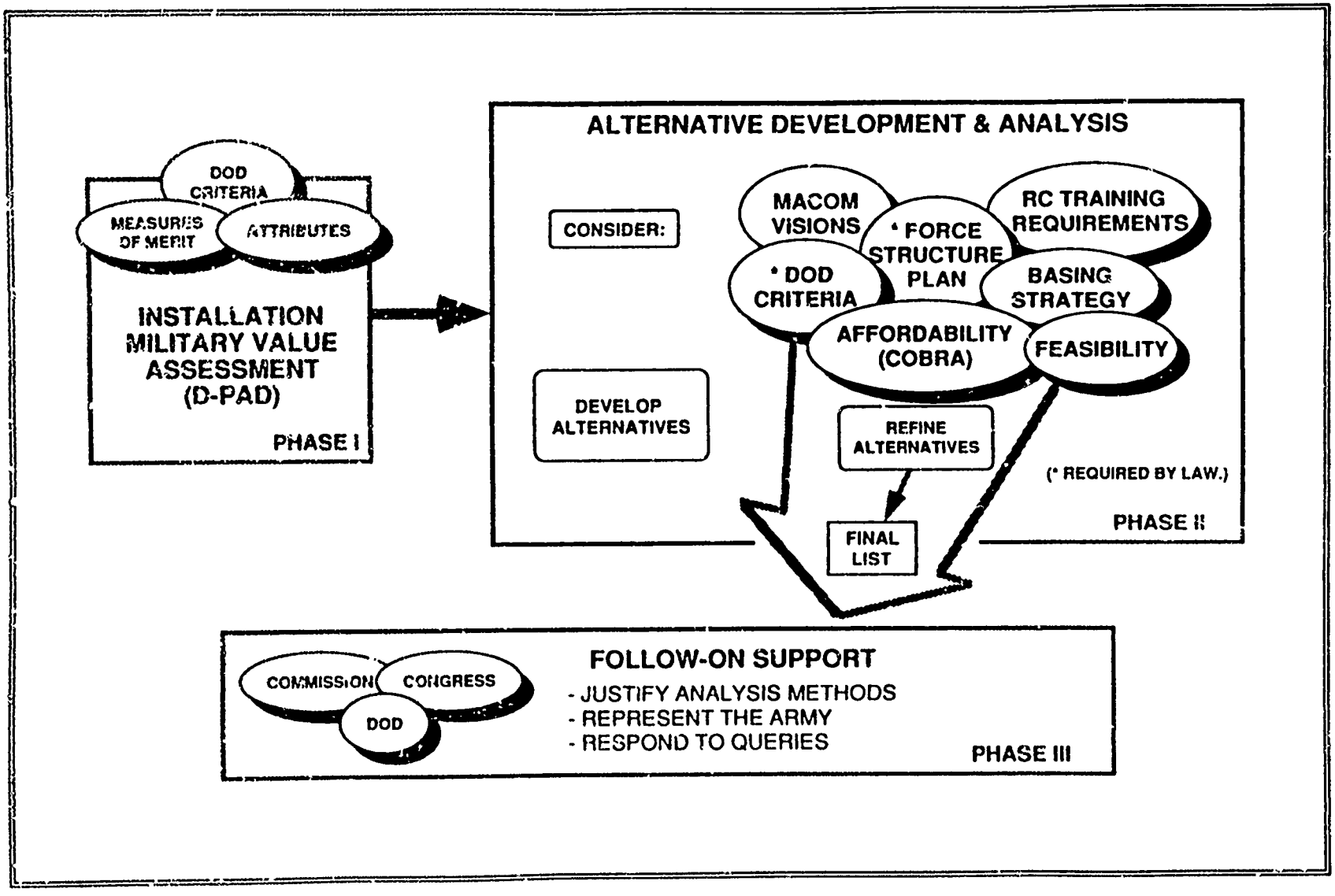

Figure 1. ARMY BRAC PROCESS

the Army BRAC Office). To carry out the data collection and analysis for each round of the BRAC process, the Army formed the Total Army Basing Study (TABS) group. The TABS group is composed of the Army BRAC Office staff supplemented by DA and MACOM staff personnel. In Phase I, the TABS group evaluates Army installations in quantitative terms to determine their relative military value using measures of merit which relate directly to the DOD criteria. In Phase II, the Army identifies reasonable BRAC alternatives using the Joint Chiefs of Staff (JCS) Force Structure Plan; Army Stationing Visions; an installation category capacity analysis; the Phase I military value evaluations; and MACOM visions of the future. The Army then assesses the feasibility of potential BRAC alternatives by considering the return on its investment, and impacts on the local economy and the environment. Phase III begins after submission of the list to the BRAC Commission and includes provision for analytical support to the commission.

c. **BRAC 91-Phase I: Installation Assessment Process.** The objective of the Phase I process in BRAC 91 was to determine the relative military value of Army installations (**Figure 2**). The TABS group began its deliberations with several initial steps. In steps 1 through 3, the TABs group reviewed and interpreted congressional, DOD, and Army guidance and determined the measures of merit to be used to find the military value of an installation. The TABS established five measures of merit: mission essentiality, mission suitability, operational efficiencies, expendability, and quality of life (step 4). The TABS also established many of the weights and outlined the attributes that support these measures of merit. These measures of merit linked the DOD selection criteria for selecting the military bases for closure or realignment. Following these initial steps, the TABS group began the task of allocating installations within categories (steps 5 and 6). Next, the definition and the assignment of attributes were coordinated and finalized (step 7). Once the attributes were finalized, the following step was to identify and collect appropriate data for the attributes selected in each installation category (step 8). The final step taken was to calculate the military value of each installation through a decision support software package called *Decision Pad (D-PAD) (step 9)*.

4. **ORGANIZATION.** This study consists of a main paper with supporting annexes.

a. **Main paper.** The main paper has three distinct sections:

(1) ***Section I***: Introduction-- provides the reader with an overall feel for our BRAC study topic.

(2) ***Section II***: Evaluation-- provides a summarized discussion of ESSC's analysis of the Army BRAC 91-Phase I process. This discussion focuses upon five BRAC areas identified for improvement by ESSC. These discussions are based on the detailed analysis found in the annexes of this report.

(3) ***Section III***: Results--contains important findings and offers recommendations to resolve the problems identified in the findings.

b. **Annexes.** There are five annexes that support the main paper. These five annexes contain detailed discussions on areas that ESSC identified for examination and improvement:

(1) *Annex A*: Measures of Merit--examines the validity of the Army's BRAC measures of merit and how they impact upon the BRAC installation assessment process.

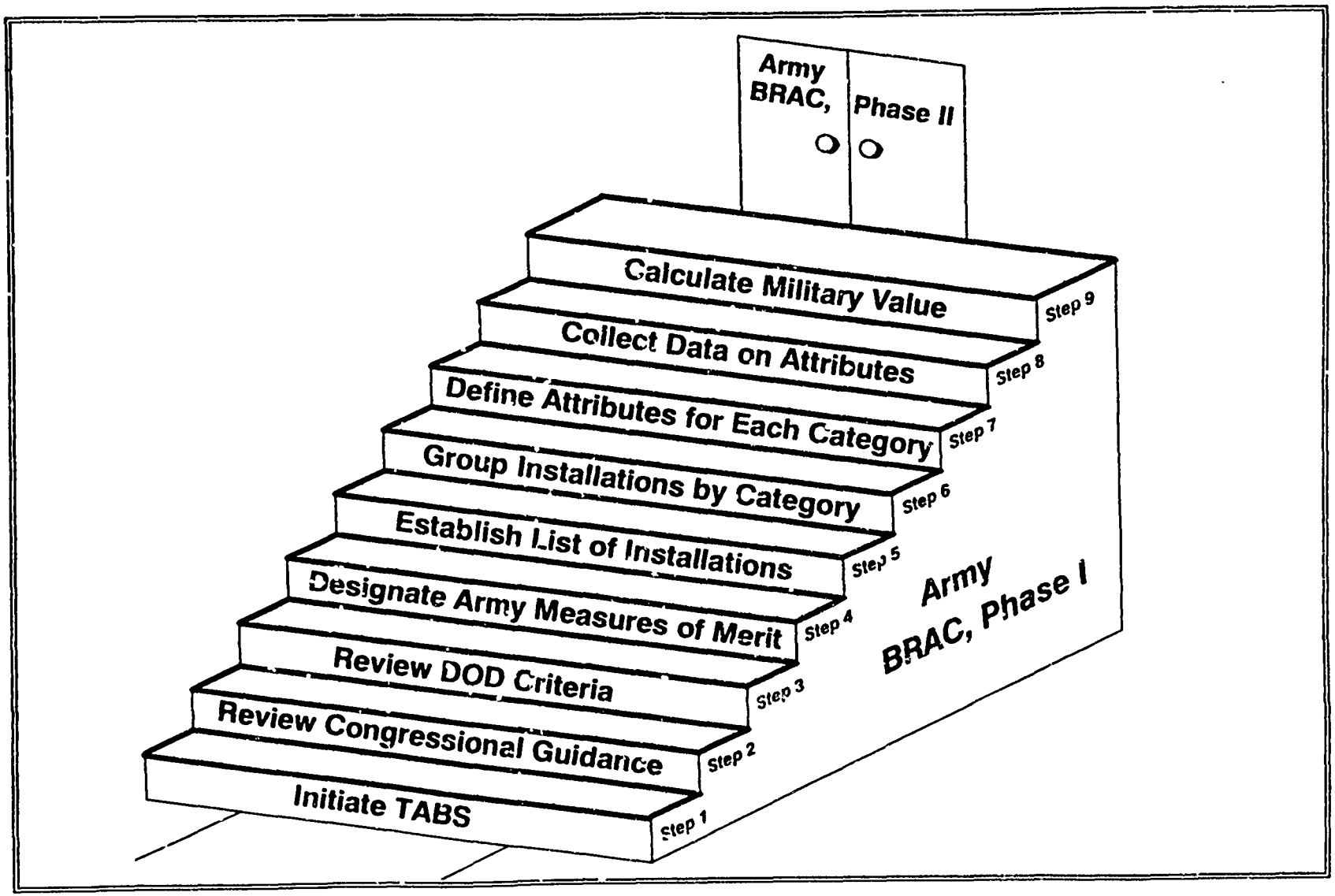

Figure 2. ARMY BRAC 91-PHASE I PROCESS

(2) ***Annex B***: Installations and Categories--examines the selection and allocation of Army installations into categories.

(3) ***Annex C***: Attributes--discusses improvements to the sets of attributes used to measure the military value of Army installations.

(4) ***Annex D***: Installation Data--discusses the adequacy and accuracy of the data sources used in the BRAC process.

(5) ***Annex E***: Installation Rating Process--discusses the logic, analytical techniques, and decision tools used in the Army BRAC-Phase I process.

5. **APPROACH**. ESSC uses a structured approach throughout this study of the Army's BRAC installation assessment process. Our examination is divided into five major stages:

a. **Stage One: Study Request and Scope**. In October 1991, the Army BRAC Office asked ESSC to examine its BRAC-Phase I methodology and recommend improvements where needed. ESSC conducted several feasibility meetings with the staff of the Army BRAC Office to determine the best time to begin the study. ESSC personnel estimated that a full-time team could be put together in the early part of 1992. The ESSC Commander and Director agreed in principle to conduct the study, and in January 1992, tasked a 3-person study team to address the concerns of the Army BRAC Office. The ESSC BRAC team met with members of the Army BRAC Office on 15 January 1992 to begin the study on a full-time basis, further define the objectives of the study, discuss BRAC issues, and scope out various study problems.

b. **Stage Two: Research and Data Collection**. After the 15 January 1992 study coordination meeting, ESSC constructed a detailed Project Management plan that included a research and data collection period designed to further define various BRAC issues. ESSC gathered BRAC study reports and documents written and published by a wide array of Federal, DOD, and Army organizations. ESSC also collected basic study information through phone conversations, video-teleconferences, on-site interviews, and issue workshops from a wide range of BRAC subject matter experts (**Figure 3**). These interviews allowed ESSC not only to collect baseline information and confirm basic BRAC issues, but also to identify other areas where BRAC methodology improvements could be made.

c. **Stage Three: Assessment and Evaluation**. ESSC finalized its initial research and data collection phase with a preliminary BRAC issues assessment. This preliminary assessment focused on determining the dominant or key BRAC issues for further evaluation. As mentioned earlier, ESSC obtained many comments and suggestions for improvements from interviews. All of them could not be analyzed in detail within this study . Therefore, our assessment phase is designed to assess the data collected, evaluate its applicability, and identify key BRAC issues for analysis. Simply put, our stage three acts as a screening process for key issues. ESSC returned to the Army BRAC Office on 30 March 1992 to provide them with a project update. The objective of this update was to obtain their approval of the key BRAC issues ESSC identified for further analysis. As agreed to in that meeting, the following are the key BRAC issues that this study report focuses on: measures of merit, installations and categories, attributes, installation data, and installation rating process.

BRAC RESEARCH & DATA COLLECTION INTERVIEWS		
ARMY ORGANIZATIONS/AGENCIES	**ARMY INSTALLATIONS**	**FEDERAL/DOD ORGANIZATIONS**
Army BRAC Office	Fort Belvoir	BRAC Commission
Military Traffic Management Command	Fort A.P. Hill	General Accounting Office
Criminal Investigation Command	Vint Hill Farms Station	DOD BRAC Office
The Surgeon General	Fort Lee	USAF BRAC Office
Assistant Chief of Engineers	Fort Pickett	USN BRAC Office
Army Materiel Command	Fort McNair	USN Post Graduate School
Military District Washington	Fort Meade	National Defense University
7th Signal Command	Fort Ritchie	
Concepts Analysis Agency	Fort Detrick	
Medical Research and Development Command	Fort Indiantown Gap	
Intelligence and Security Command	Letterkenny Army Depot	
Special Operations Command	Fort Monroe	
Toxic and Hazardous Materials Agency	Fort Gillem	
Engineering Housing and Support Center	Fort Eustis	
Deputy Chief of Staff for Logistics	Fort Story	
Deputy Chief of Staff for Operations	Aberdeen Proving Grounds	
Forces Command	Carlisle Barracks	
Corps of Engineers	Fort Wainwright	
Office, Chief Army Reserves	Fort Richardson	
Health Services Command	Fort Lewis	
U.S. Army Pacific Command	Fort Dix	
Information Systems Command	Fort Huachuca	
NOTE. Interviews conducted with staff elements through video-teleconferences, phone conversations, and on-site visits.		

Figure 3. ESSC BRAC INTERVIEWS

d. **Stage Four: Analysis and Synthesis.** The ESSC BRAC study team focused its attention on the key BRAC issues identified and approved by the study sponsor in stage three. Further in-depth research was conducted which provided the basis for analysis of each of the five issue areas. The details of our analysis are contained in Annexes A through E and are summarized in Section II (Evaluation) of this report.

e. **Stage Five: Presentation.** The final stage of the study process is to provide a consolidated report package containing our findings. The most important issues to the study sponsor, the Army BRAC Office, are the weaknesses in the BRAC installation assessment process and our recommendations to improve these weaknesses. This report was delivered June 17, 1992, to the study sponsor who plans to staff the study report. Based in part upon the comments received from DA staff elements and Army MACOMs, the Army BRAC Office will use the recommendations from the report to implement changes in the Army BRAC 93-Phase I efforts beginning in the summer of 1992.

6. DEFINITIONS.

a. **Realignment.** This term "includes any action which both reduces and relocates functions and civilian personnel positions, but does not include a reduction in force resulting from workload adjustments, reduced personnel or funding levels, or skill imbalances."[2]

b. **DOD Selection Criteria or DOD Criteria.** The Secretary of Defense must publish in the Federal Register and transmit to congressional defense committees the criteria proposed to be used by the Department of Defense in making recommendations for the closure or realignment of military installations inside the United States. For BRAC 91, eight criteria were established. Four criteria pertain to military value; they are given priority consideration. Of the remaining four selection criteria, one addresses return on investment; and three look at impacts on the economy, community, and environment. [3]

c. **Military Value.** DOD states that four DOD selection criteria should give priority consideration to military value in selecting an installation for realignment or closure. The DOD criteria--Others--may also be used. The Army has translated these DOD selection criteria into five measures of merit which measure an installations military value. These are--mission essentiality, mission suitability, operational efficiencies, expandability, and quality of life.

d. **Installation.** Land and the improvements thereon under the control of the DA at a fixed location at which functions of the Army are or may be carried on, and which has been established by order of the DA or by an overseas command under delegated authority. Such land and improvements within a common boundary utilized as a post or camp, with a function such as airfield, hospital, depot, arsenal, industrial plant, cemetery, harbor or port, generally will be designated as a single installation. For the purpose of inventory reporting, sub-installations and property at separate locations (other than leaseholding not part or all of an installation and

---

[2] *Report to the President 1991: Defense Base Closure and Realignment Commission*, (Defense Base Closure and Realignment Commission, July 1991), p. A-14.

[3] *Report to the President 1991: Defense Base Closure and Realignment Commission*, (Defense Base Closure and Realignment Commission, July 1991), p. A-5.

assigned space in Federal public buildings) accommodating an activity, whether or not established by general order, will be reported as an installation.[4]

e. **Installation, semi-active.** An installation which is not in continuous use by Army organizations other than active Army Garrison required to support intermittent use of Reserve Component or field exercise requirements. An installation which is in custody of a non-Army agent charged with support of Reserve Component training and/or maintenance of the installation as a mobilization base.

f. **Base.** For the purposes of this report, this term is synonymous with--installation, camp, post, station, yard, center, and homeport facility for any ship.

g. **Facilities.** All items of improvements on land. Examples of such items are buildings, roads, parking areas, fences, communication lines, waterlines, and railroads storage tanks. For the purpose of this inventory, buildings will be distinguished in the report from other facilities.[5]

h. **Real Property.** Land and rights therein, ground improvements, utility systems, and buildings and structures excluding plant equipment.[6] Terminology and classification of items of real property to report for inventory purposes are contained in AR 415-28.[7]

i. **Installation Data.** ESSC uses this phrase to define information on, about, or relating to the operation of Army installations, their facilities, and real property. This includes information, data, and data bases pertaining to the environment, base operations, personnel, and the locale immediate to the installation.

j. **Environment.** Any one of the following--navigable waters, neat shore and open waters and any other surface water, groundwater, drinking water supply, land surface or subsurface area, and ambient air.[8]

7. LIMITATIONS.

a. **Limitation.** There are many issues that affect the calculation of the military value of Army installations. BRAC subject matter experts have surfaced many of these issues. ESSC has focused on several, however, not all have been examined and analyzed in this report. **Significance.** Various BRAC-Phase I issues of interest to some DA and MACOM staff elements may not be represented in this report.

b. **Limitations.** The integrity of the information contained in this study is compromised by lack of information and the changing world situation. Certain Army and MACOM vision documents were unavailable at the time of this study. Of particular significance was the unavailability of AMC, TRADOC, and FORSCOM vision statements. **Significance.** The

---

[4] *Inventory of Army Military Real Property, AR 405-45, Change 2* (Department of the Army, 15 April 1992).

[5] Ibid.

[6] Ibid.

[7] *Department of the Army Facility Classes and Construction Categories (Category Codes), AR 415-28* (Department of the Army, 1 December 1981).

[8] *Environmental Protection and Enhancement AR 200-1* (Department of the Army, 21 April 1990).

TABS group must evaluate ESSC's recommendations in light of the new MACOM vision statements when they become available.

c. **Limitations**. This study report did not evaluate two Army BRAC categories: Reserve Component and Other, since these categories were not included in the Phase I assessment process in the Army BRAC 91 study report.[9] **Significance**. Economies to be gained through realignment and closure of installations in these two categories must be analyzed on a case-by-case basis. The Reserve Component requirements are being analyzed under a separate study effort.[10]

8. **POINTS OF CONTACT.**

a. **Study Sponsor**. Department of the Army, Office of the Chief of Staff, Base Realignment and Closure Office, ATTN: DACS-DMB, Washington, DC 20310-0200

(1) ***Colonel William T. Harvey***, Chief, Base Realignment and Closure Office, (703) 693-3500

(2) ***Major Kevin Maguire***, Sponsor's Study Director, (703) 693-7556

b. **Study Agency**. U.S. Army Corps of Engineers, Engineer Strategic Studies Center, ATTN: CETEC-ES, Fort Belvoir, VA 22060-5583

(1) ***Colonel C. O. LaFond***, Commander/Director, Engineer Strategic Studies Center, (703) 355-2373

(2) ***Mr. Stephen C. Reynolds***, Project Director, (703) 355-2126

(3) ***Mr. Richard L. Taylor***, Project Team Leader, (703) 355-2149

(4) ***Mr. Stephan E. Ryeczek***, Project Analyst, (703) 355-2282

---

[9] *Report to the Secretary of Defense on Base Closure and Realignment, Appendix I* (Department of the Army, 1 April 1991).

[10] *Quick Reaction Analysis and Reserve Component Stationing Study (RCSTS) Briefing* (USA Concepts Analysis Agency, 1 May 1992).

Blank Page

II. EVALUATION

9. **OVERVIEW.** ESSC identified five key issues for analysis in this study. These key issues were identified during the data collection stage, and they have emerged as the focus of this study. The objective of our analysis is to examine and review the effectiveness of the Army BRAC 91-Phase I process and recommend improvements where needed through these five key issue areas. In the first issue area, we examine the measures of merit and their ability to assess military value. In the second issue area, we look at the validity of selecting installations and their allocation to BRAC installation categories. In the third and fourth issue areas, we review the soundness of the attributes used in Phase I and the respective data for those attributes. In the fifth issue area, we examine the logic and analytical techniques used in the Army's BRAC-Phase I. A color-coded example of how these areas relate to an installation's military value calculation is shown in **Figure 4.** A summary of our detailed analysis is presented in the following paragraphs.

10. **MEASURES OF MERIT.** The key element of information that is crucial to the measures of merit and their effect on the BRAC process is the determination of military value. In our report, ESSC asks: Are the Army's measures of merit considering the correct visions to support the Army's future force when judging an installation's military value? We first reviewed the measures of merit used in Army BRAC 91 to determine their strengths and weaknesses, and to see their effect on the process (**Figure 5**). Then, we reviewed current Army planning documents as the defining source of guidance for measuring military value. There are three dominant principles that reoccur in the National Military Strategy,[11] The Army Plan,[12] the Army Long Range Planning Guidance,[13] The Army Stationing Strategy,[14] and Airland Operations.[15] The future Army must be mission oriented, have a high quality of life, and be expandable. It is these principles that ESSC has reflected in suggesting changes to the BRAC measures of merit. Mission Essentiality and Mission Suitability were considered very important during Army BRAC 91. Consequently, the Army assigned the greatest weight to these two measures of merit. ESSC found that today's planning documents suggest the need to emphasize mission essentiality more than suitability. The Army of the future must focus on mission preparedness. Quality of Life is the third priority. The Army of the future will continue to support the total Army community through quality of life standards that retain and attract quality soldiers and civilians. All of today's Army planning documents stress the importance of expandability in the future. An equal weight between the expandability and operational efficiency is not in line with the planning strategy for the Army of the future. Operational efficiency is terribly important if the Army is to make the best use of the limited resources projected for the future. However, operational efficiency does not carry the same weight as expandability if the Army is to faithfully follow guidance to preserve its ability to expand to meet future crisis response and reconstitution missions.

---

[11] *National Military Strategy of the United States* (Joint Chiefs of Staff, January 1992).

[12] *The Army Plan FY 1994-2009* (Department of the Army, 10 October 1991).

[13] *Army Long Range Planning Guidance* (Office of the Deputy Chief of Staff for Operations, June 1991).

[14] *Draft Army Stationing Strategy* (Office of the Deputy Chief of Staff for Operations, May 1992).

[15] *Airland Operations, PAM 525-5* (TRADOC, 1 August 1991).

Blank Page

CATEGORY: Fighting
SUB-CATEGORY: Maneuver
INSTALLATION: Camp Swampy

MEASURES & ATTRIBUTES	WEIGHT		SCORE	
MANEUVER ACRES	55		630	
RANGES	55		0.5	
DEPLOYMENT NETWORK	55		8.9	
TOTAL ACRES	45		656	
RESERVE COMP SUP	20		0.1	
MISSION ESSENTIALITY		250		6.9
CONTICUOUS MNV ACRES	45		630	
OPS/ADMIN FAC	45		658	
AVN MAINT FAC	40		266	
VEH MAINT FAC	45		436	
SUP/STORAGE FAC	20		335	
DISTANCE TO TNG AREA	40		5	
INFORMATION MSN AREA	15		970	
MISSION SUITABILITY		250		4.5
VHA RATE	15		1,389	
FAM HSG COST/UNIT	15		10,722	
AVG CIV SALARY	15		41,317	
HOURLY WG RATE	15		19.64	
MER	15		0.164	
CER FACTOR	15		3.213	
AVG UTIL COST FACTOR	15		823.00	
RPMA COST PER SQ FT	15		4202.00	
MCA FACTOR	15		1.95	
BMAR	15		25,976	
OPERATIONAL EFFICIENCIES		150		3.5
BUILDABLE ACRES	20		2654	
TOTAL FAC SQ FEET	45		6337	
ENCROACHMENT	45		10	
ENVIRONMENT	20		8.6	
WATER/SEWER FAC	20		4.9	
EXPANDABILITY		150		4.9
% PERMANENT	44		97	
ARMY COE SCORE	10		10	
FAMILY HSG UNITS	33		9166	
UOPH	24		303	
UEPH	33		2729	
COMMUNITY FAC	23		466	
PLACES RATED RATING	20		10	
MEDICAL SIT CAPACITY	23		31	
QUALITY OF LIFE		200		2.9
	SCORE	1000	RANK	9

KEY

INSTALLATIONS & CATEGORIES

MEASURES OF MERIT

ATTRIBUTES

INSTALLATION RATING PROCESS

INSTALLATION DATA

Figure 4. SAMPLE MILITARY VALUE CALCULATION

Blank Page

MANEUVER INSTALLATIONS

Measure of Merit	Points
Mission Essentiality	250
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	200
Total	1,000

MAJOR TRAINING AREAS

Measure of Merit	Points
Mission Essentiality	250
Mission Suitability	350
Operational Efficiency	150
Expandability	150
Quality of Life	100
Total	1,000

INITIAL ENTRY/BRANCH SCHOOLS

Measure of Merit	Points
Mission Essentiality	250
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	200
Total	1,000

PROFESSIONAL SCHOOLS

Measure of Merit	Points
Mission Essentiality	250
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	200
Total	1,000

COMMAND & CONTROL CENTERS

Measure of Merit	Points
Mission Essentiality	250
Mission Suitability	250
Operational Efficiency	110
Expandability	150
Quality of Life	200
Total	960

DEPOTS

Measure of Merit	Points
Mission Essentiality	250
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	200
Total	1,000

COMMODITY ORIENTED

Measure of Merit	Points
Mission Essentiality	250
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	200
Total	1,000

PRODUCTION INSTALLATIONS

Measure of Merit	Points
Mission Essentiality	250
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	200
Total	1,000

PORTS

Measure of Merit	Ocean Points	Ammo Points
Mission Essentiality	350	450
Mission Suitability	350	450
Operational Efficiency	75	30
Expandability	150	40
Quality of Life	75	30
Total	1,000	1,000

USACE

Measure of Merit	Points
Mission Essentiality	250
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	200
Total	1,000

Figure 5. ARMY BRAC 91 MEASURES OF MERIT WEIGHTING SYSTEM

11. **INSTALLATIONS AND CATEGORIES.** ESSC uses questions to facilitate its discussion and focus its analysis. The following question is crucial to our discussion of the Army's categories and installations: What is the best array of installation categories and what is the best allocation of installations into categories? Thus, ESSC's analysis focuses its discussion on these two areas.

a. **Category Analysis Summary.** ESSC identified four major weaknesses in the Army BRAC 91 categories (**Figure 6**): insufficient industrial categories, incorrect use of command and control and major training area categories, and omitted categories. ESSC examined the BRAC process used by other military services and past BRAC-type efforts to analyze these weaknesses.

(1) ***Industrial Categories.*** In the case of industrial categories, we found that other BRAC efforts use multiple categories and subcategories for industrial operations. The Navy uses 11 industrial categories, and the Air Force uses three. The Navy and Air Force segregate industrial activities along functional lines. For example, the Navy and the Air Force segregate R&D activities. The Army groups three industrial functional areas within the confines of the commodity subcategory. The Army Audit Agency (AAA) proposal on dividing the commodity subcategory is a viable option.

(2) ***Incorrect and Omitted Categories.*** With regards to incorrect use of categories, ESSC found little fault. However it is possible to have overlap into other categories. Omitted categories posed a different situation. The Air Force addresses special operations and space within the confines of two categories. The Army has perhaps inadvertently omitted intelligence, special operations, and space operations from consideration. Although, there are few installations engaged in these activities, an important reason exists for considering them. These unique installations have the potential for consolidation with other Army installations or other services in the region. No installations should be eliminated from review simply because "there are only one or two."

(3) ***Categories Studies.*** The Army exempted many installations from reviews based on the logic that they were being reviewed in other arenas. Many Defense Management Review Decisions, Tri-Service reliance, and other consolidation reviews and studies have completed their first draft. Other critical reviews, such as the Army's Reserve Component Training Requirements study, are in progress. The recommendations and actions from these efforts must be reviewed by TABS as they become available because they affect the Army's BRAC Phase I process.

b. **Installation Allocation Analysis Summary.** For Army BRAC 93, just as in past efforts, the logic of grouping installations into categories is quite sound. Lumping all installations together and ignoring their different missions and assets would be foolish. However, functional boundaries will become less clear on installations in the future. The Army has reaffirmed its commitment to large, diverse, efficient installations: "close small, single purpose installations and either consolidate their function onto large, multi-function posts or eliminate them."[15]

(1) ***Installation Allocations.*** Installations are reasonably allocated to categories; no glaring mistakes are seen. The use of an installation's primary mission as the allocation rule allows the simplest and most efficient alignment into categories.

---

[16] *The Army Stationing Strategy for BRAC 93, Draft* (Department of the Army, Deputy Chief of Staff for Operations, May 1992), p. 4.

FIGHTING INSTALLATIONS		TRAINING INSTALLATIONS	
MANEUVER	TRAINING AREAS	INITIAL ENTRY BRANCH SCHOOLS	PROFESSIONAL SCHOOLS
Fort Bragg	Fort A.P. Hill	Fort Benjamin Harrison	Carlisle Barracks
Fort Campbell	Fort Chaffee	Fort Bennin	Fort Leavenworth
Fort Carson	Fort Dix	Fort Bliss	Fort McNair
Fort Drum	Fort Greeley	Fort Eustis	Presidio of Monterey
Fort Hood	Fort Indiantown Gap	Fort Story	West Point
Fort Lewis	Fort Hunter Liggett	Fort Gordon	
Fort Ord	Fort Irwin	Fort Huachuca	
Fort Polk	Fort McCoy	Fort Jackson	
Fort Richardson	Fort Pickett	Fort Knox	
Fort Riley		Fort Lee	
Schofield Barracks		Fort Leonard Wood	
Fort Stewart		Fort McClellan	
Fort Wainwright		Fort Rucker	
		Fort Sam Houston	
		Fort Sill	

COMMAND & CONTROL INSTALLATIONS	INDUSTRIAL INSTALLATIONS			
	DEPOTS	COMMODITY ORIENTED	PRODUCTION ORIENTED	PORTS
Fort Belvoir	Anniston	Aberdeen Proving Grounds	Hawthorne	Bayonne, NJ
Fort Devens	Blue Grass	Belvoir Fuels	Holston	Oakland, CA
Fort Gillem	Letterkenny	Detroit Arsenal	Iowa	Sunny Point, NC
Fort Hamilton	Red River	Dugway Proving Grounds	Lake City	
Fort Totten	Sacramento	Fort Detrick	Lone Star	
Fort McPherson	Savanna	Fort Monmouth	McAlester	
Fort Meade	Seneca	Harry Diamond Laboratory	Milan	
Fort Monroe	Sierra	Natick RD&E	Radford	
Fort Myer	Tobyhanna	Picatinny Arsenal	Pine Bluff Arsenal	
Fort Ritchie	Tooele	Redstone Arsenal	Rock Island Arsenal	
Fort Shafter		Tint Hill Farm Station	Watervliet Arsenal	
		White Sands Missile Range		
		C.M. Price Support Ctr.		
		Yuma Proving Grounds		

Figure 6. ARMY BRAC 91 INSTALLATION ALLOCATION TO CATEGORIES

(2) ***Crossovers Installations.*** There are functional crossovers. For instance, several installations in the major training area subcategory (Fort Pickett, Fort Indiantown Gap and Fort McCoy) could just as easily be placed into the Reserve Component category. However, in such cases, the installation allocations made for Army BRAC 91 were reasonable and appropriate.

(3) ***Multi-Purpose Installations.*** What are considered strengths for the future of the Army are complications for Army BRAC. The Army continues its goal of developing multi-purpose installations started in Army BRAC 91: "The Army will reduce the number of small, single purpose installation and those remaining will house organizations with highly specific missions."[17] In light of the Army's goal to develop multi-functional posts, it is important that the Army BRAC 93 installation categorization and assessment scheme be able to adequately support this goal. This can be done by emphasizing appropriate attributes.

12. **ATTRIBUTES.** ESSC considered the following two questions central to the effect of attributes on the Army BRAC process: First-- Do the attributes determine military value in light of the Army's new strategic vision?; and second--Are the attributes used relevant to measuring an installation's mission?

a. **Intent of ESSC Analysis.** Participation by subject matter experts at all levels of the Army is a vital ingredient in making the results of the BRAC process as complete and credible as possible. This participation is not limited to simply supplying the input data prescribed by higher headquarters; it also requires the active participation of all levels, from the installations on up, in defining meaningful attributes and setting the weights on those attributes. The changes proposed by ESSC are not intended to replace the deliberations that must take place within the TABS group and the MACOMs during BRAC 93. Rather, ESSC's suggestions are intended as a straw man to be used as a starting point that builds on the experience gained from a careful analysis of Army BRAC 91. In proposing changes to the attributes used for BRAC 91 ESSC has tried to:

(1) Add new attributes or revise attributes--to better reflect the new national defense strategy and Army planning guidance that has evolved since BRAC 91.

(2) Eliminate duplicate and redundant attributes and attributes of lesser relevance--to allow greater attention to be given to the more trustworthy attributes.

(3) Clarify and standardize attribute definitions and calculation procedures--in cases where MACOMs had developed slightly different attributes to cover essentially the same factor.

b. **ESSC Attribute Analysis.**

(1) ***New Attributes.*** ESSC's goal is to simplify the Army BRAC analysis not to add to the complexity; consequently, new attributes are proposed only if there is strong justification. ESSC looked at four potential new attributes: geographic location, port capacities and equipment, mobilization, and environmental carrying capacity. A new geographic location attribute is duplicative of other attributes. The purpose of a mobilization attribute is to gauge the

[17] *Report to the Secretary of Defense on Base Closure and Realignment* (Department of the Army, 1 April 1991), p. 14

ability of an installation to support the Army's crisis response and reconstitution efforts. This is done by measuring the billeting, maintenance, and transportation throughput of an installation. ESSC realized that all installation categories have special needs. ESSC adjusted the mobilization attribute to incorporate the special needs of certain categories. For example, in the ports categories, mobilization throughput capacity is offered for use instead of the mobilization attribute. The environmental carrying capacity attribute is meant to determine the ability of Army installations to receive additional units or expanded operations in light of installation environmental constraints. It is an expansion of the environment attribute that was used in Army BRAC 91. For Army BRAC 93, the intent is to capture additional data beyond the historical/archaeological sites and endangered species. Specifically to gain access to air quality, noise quality, hazardous materials such as asbestos and radon, and contaminated sites information. Two new port attributes--normal throughput capacity and material handling equipment--were examined for use.

(2) ***Attribute Revisions.*** Several attributes used during Army BRAC 91 are in need of revision and expansion due to ongoing changes in the Army.

(a) The water and sewer attribute used in many expandability measures of merit is incomplete. There are other systems besides water and sewers that need to be considered when an installation is experiencing expansion. Impacts on other infrastructure systems such as electrical distribution systems, and landfill capacity need to be determined. This attribute needs to consider the needs of the entire infrastructure of an installation.

(b) The multi-function attribute used in the training category is very similar to the multi-mission attribute used in the industrial category. The purpose is to quantify the variety of missions executed on an installation. By expanding the current multi-function definition to incorporate industrial missions, a standardized attribute can be used by all categories measuring several different activities. In addition, it allows an industrial installation such as Letterkenny Army depot to take credit for tenant activities that they support on post.

(c) Another attribute of real military value is deployment network. This attribute was used in the fighting category. It measured an installation's ability to support deployments through air, sea, or rail network. The deployment network attribute is very similar to the transportation network attribute used in the industrial category. The transportation network has the benefit of an additional criteria--interstate highway. ESSC did not see any appreciable difference between the intent of these two attributes. By expanding the deployment network definition to include interstate roads, the Army BRAC process gains from a more comprehensive, precise, and standardized attribute.

(3) ***Attribute Duplication.*** ESSC found attributes used in Army BRAC 91 that could be eliminated since they duplicate the purpose of other attributes already used. These attributes are medical facilities, reserve demographics, and port attributes.

(a) The value of the medical facilities attribute in the training/branch and the training/professional school is already captured in the health care support index attribute. The value of the reserve demographics in the major training areas installation category can be captured in the reserve support attribute.

(b) In the port installation category, five attributes are repeated between the mission essentiality and the mission suitability measures of merit. These attributes are deep piers

and wharfs, rail and road linkages, hard surface staging areas, transportation infrastructure, and support facilities. ESSC only used each attribute once and developed new attributes that better determine the military value of a port. These new attributes are normal throughput capacity, mobilization throughput capacity, and material handling equipment.

(4) ***Attribute Redundancy.*** During ESSC's analysis of the attributes, eight were found to be of secondary importance because other attributes can better capture the military value that they are intended to measure. They should be eliminated from the Army BRAC-Phase I process. These attributes are total acres, hourly wage grade rate, utilities cost factor, real property maintenance accounts (RPMA) cost factor, total building square feet, unique capability, permanent operational administrative facilities, and community economics.

(5) ***Attribute Clarity.*** ESSC discovered, during its analysis, that the names of several attributes were unclear. ESSC analysts could not readily understand the intent of some attributes from their names. It was unclear what was being measured. The attributes that were unclear are--AR 5-9 support, proximity to other services, transportation network, recruit and retain, maneuver acres.

(a) Upon encountering the attribute name "AR 5-9," the attribute's intent is unclear. The intent of the AR 5-9 attribute, which is listed in the Command and Control Category, is to measure the number of active Army sub-installations supported by the installation. The intent of an attribute should be clear upon reading its name.

(b) The aim of the transportation network attribute in the command and control category seems fairly straightforward at first glance. However, is it measuring on-post infrastructure or proximity to air, sea, and land transportation? Its real purpose is to measure the installations accessibility to airline transportation. Compounding the uncertainty of this attribute is that there is another attribute, called transportation network, that measures how close an installation is to an airport, a rail head, a port, and a major highway.

(c) ESSC analysts assumed the recruit and retain attribute was measuring an army installation's success in recruiting soldiers. The real intent is to measure the percentage of authorized civilian positions filled on an installation.

(d) ESSC was misled by the name of the "maneuver acres" attribute used in the fighting category. ESSC thought of maneuver area land for mechanized units of battalion size or larger. A strict interpretation would indicate that only facility category codes 17710 (maneuver/training area, light) and 17720 (maneuver/training area, heavy) can be used to measure this attribute. In actuality, the intent is to measure the total acreage of the installation available for maneuver and training. This includes covered training areas, infiltration courses, confidence courses, field fortification areas, driving courses, repelling areas, demolitions areas, and float bridge sites. These may not normally be considered as "maneuver areas" and in some cases are not located within maneuver acreage or classified as maneuver acres.

(e) ESSC decided to change the name of "proximity to other services" for one reason--to shorten it.

(6) ***Attribute Standardization.*** ESSC identified attributes that were used in a few categories that can be of benefit to all Army BRAC categories. This effort towards

standardization is a benefit gained. These attributes are--the construction investment and the deployment network.

(a) Construction investment measures the overall investment in facilities and real property over the past 10 years. This is an indicator of an installations modernization. The logic behind this attribute is that newer facilities are expected to be available longer into the future before replacement facilities must be built. This attribute is used, however, in only two installation categories, training/branch schools and training/professional schools. For uniformity and as a true indicator of long term military value. this attribute should be considered for all installation categories. A shrinking budget will make this attribute increasingly demanding in the future. The addition of this attribute across the spectrum of all installation categories also permits the elimination of two attributes that repeat its value; these attributes are--capital investments and backlog of maintenance and repair.

(b) Another attribute of real value is deployment network. This attribute was used in the fighting category. It measures an installation's ability to support deployments through air, sea, and rail network. Almost all categories attempted to measure this factor. The deployment network attribute is very similar to the transportation network attribute used in the industrial category. The transportation network has the benefit of an additional criteria--interstate highway. ESSC expanded the deployment network definition and used one definition and term across the board.

13. **INSTALLATION DATA.** ESSC used the following question to facilitate the analysis of installations data: Are the Army's installation and real property inventory data sufficiently accurate, reliable, complete and consistent enough to support BRAC military value analysis?

a. **Army Installation Data Use and Suitability. Figure 7** shows a sample of the wide range of regulations, MACOM publications, and Army-wide data bases used during Army BRAC 91 to support the quantitative evaluation of an installation's military value. Many of the references in Figure 7 are one of a kind; however, a large percentage of the information is derived from automated data bases. Many of ESSC's discussions with various installation, Army MACOM, and BRAC subject matter experts focused on ways to improve weaknesses in these automated data bases. Our objective in this section is to discuss the two significant weaknesses we found in the suitability of Army-wide installation data used in BRAC 91.

(1) ***Army Stationing and Installation Plan (ASIP).*** The number of units, organizations, and agencies (both military and non-military) on an installation is important to the BRAC process because normally all of these entities require space and facilities. The ASIP is used as the primary data source for this information. A frequent comment from many installation personnel and BRAC points of contact is that the ASIP is not 100% accurate or complete. This is a key point because the Army uses this information to support the analysis of many BRAC calculations. The ASIP also serves as a basis for other data bases, such as Real Property Planning and Analysis System (RPLANS), that are used to meet Army-wide planning and reporting requirements.

(2) ***Data Standardization.*** The consistency of the information used during the Army BRAC 91 process was mentioned in many interviews as a source of discrepancies. One example of an installation data discrepancy is the number of training acres on a post. Assuming

ATTRIBUTE	ATTRIBUTE DATA SOURCES		
	FIGHTING CATEGORY	TRAINING CATEGORY	COMMAND & CONTROL CATEGORY
Maneuver/ Training Acres	HQRPLANS	TRADOC PAM 210-1, Data Call	N/A
Ranges	HQRPLANS	TRADOC PAM 210-1	N/A
Deployment Network	FORSCOM Mob. Expansion Capability	TRADOC Pam 210-1, Data Call	N/A
Total Acres	HQRPLANS	N/A	N/A
Reserve Component Support	AMOPS Training Data Units & Ctrs.	AMOPS TMOPS Data Call	AMOPS, Training Data Units & Ctrs.
Contiguous Maneuver Acres	Data Call	ATSC	N/A
Operational Administrative Facilities	HQRPLANs	HQRPLANS	HQRPLANS, HQ IFS
Vehicle Maintenance Facilities	HQRPLANS	HQRPLANS	N/A
Supply Storage Facilities	HQRPLANS	N/A	N/A
Distance to Training Area	Data Call	N/A	N/A
IMA	Data Call	Data Call	Data Call
Variable Housing Allow.	FORSCOM Pamphlet 11-2	DOD VHA Tables	DOD VHA Tables
Army Family Housing Cost	Housing Report Housing Directorate	Housing Reports Housing Directorate	Housing Reports, Housing Dir.
Average Civilian Sal.	FORSCOM Pamphlet 11-2	TRADOC Resource Factor Hndbk.	MACOM Data Factors

Figure 7. SELECTED DATA SOURCES FOR INSTALLATION EVALUATION
(Continued on next page)

ATTRIBUTE	ATTRIBUTE DATA SOURCES		
	FIGHTING CATEGORY	TRAINING CATEGORY	COMMAND & CNTL CATEGORY
Hourly Wage Grade Rate	DOD Wage Fixing Auth.	DOD Wage Fixing Auth.	DOD Wage Fixing Auth.
Manpower Estimating Factor	FORSCOM Pamphlet 37-1	TRADOC Resource Factor Hndbk.	N/A.
Cost Estimating Relationship	FORSCOM Pamphlet 37-1	TRADOC Resource Factor Hndbk.	N/A
Utilities Cost Factor	Red Book	HQ IFS, Red Book	HQ IFS, Red Book
Real Property Maintenance Account	Red Book	HQ IFS, Red Book	HQ IFS, Red Book
Military Construction Cost Factor	EIRS Bulletin	EIRS Bulletin	EIRS Bulletin
Backlog Maintenance and Repair	BMAR Analysis	N/A	N/A
Total Buildable Acres	Installation Analysis	MACOM Engineer Analysis	MACOM Engineer Analysis
Total Building Square Feet Storage Facilities	HQRPLANs	HQ IFS, Data Call, TRADOC Engineer Review	HQ IFS, Data Call, Engineer Review
Encroachment	Department of Commerce Pubs.	Department of Commerce Pubs.	Department of Commerce Pubs.
Environment	AR 420-40, PL 93-205, CFRs	AR 420-40, PL 93-204, CFRs	AR 420-40, PL 93-204, CFRs
Water/Sewer Facilities	MACOM Engineer Analysis	TRADOC Engineer Analysis	MACOM Engineer Analysis
Percent Permanent Facilities	HQRPLANs	HQRPLANS	HQRPLANS

Figure 7. SELECTED DATA SOURCES FOR INSTALLATION EVALUATION
(Continued on next page)

ATTRIBUTE	ATTRIBUTE DATA SOURCES		
	FIGHTING CATEGORY	TRAINING CATEGORY	COMMAND & CNTL CATEGORY
Army Community of Excellence	DA PAM 600-45	DA Pam 600-45	ACOE Historical Files
Army Family Housing	DD Form 1523	AR 415-15, AR 210-50	AR 415-15, AR 210-50, HQRPLANS
Unaccompanied Officer Personnel Housing	DD Form 1657	DD Form 1657	DD Form 1657
Unaccompanied Enlisted Personnel Housing	DD Form 1657	DD Form 1657	DD Form 1657
Community Facilities	HQRPLANs	HQRPLANS	HQRPLANS
Place Rated Score	Places Rated Almanac	Place Rated Almanac	Places Rated Almanac
Unique Capability	N/A	TRADOC Pam 210-10	N/A
Multi-function	N/A	TRADOC PAM 210-10, ASIP, Data Call	N/A
Major Units Supported	N/A	N/A	ASIP
Levels of Command Supported	N/A	N/A	ASIP

Figure 7. SELECTED DATA SOURCES FOR INSTALLATION EVALUATION (Continued)

the definition of training acres is agreed upon, various levels of command have different interpretations of the answer, based on what source they referenced. Installation personnel have one figure measured from the DEH master plan, the MACOM obtained a different number from the Army Training Support Center (ATSC), and DA found another figure in HQRPLANS. In addition, DOD can extract their figure from the Defense Installation Ranges and Training Areas (DIRT) data base, and the BRAC commission is able to obtain yet another figure from the Reserve Component Training Data System (RCTDS). The example is illustrative, but reflects the lack of use of a single authoritative source and a final standard data element.

b. **Army Installation Data Uses and Suitability Summary.** The Army realizes that its installation data must be as complete and as precise as possible. Many Army activities are working towards updating and completing installation data. The Army also realizes that all parties share in the responsibility for this task, from the installations to the DA staff.[18] Steps are being taken to this end. Notices of data updates are being issued, information cutoff dates established, quality assurance is being integrated into the loop, and Army information management goals are being pursued.[19]

c. **Determination of Army Real Property.** The installations chosen for consideration during Army BRAC 91 are shown in Figure 6. Much of the installation real property information (RPI) was obtained from the U.S. Army Corps of Engineers.[20] The RPI used was extracted from manual and automated real property data bases. Prominent among these are Real Property Planning and Analysis System (RPLANS), and Headquarters RPLANS (HQRPLANS) with its supporting data bases: the Army Stationing and Installation Plan (ASIP), and Integrated Facilities System (IFS). Our objective, as in other parts of this discussion, is to ensure the Army has considered all of the appropriate installations and the correct installation data. ESSC's research and data collection uncovered several weaknesses in Army BRAC 91 real property data. These weaknesses can be grouped into two categories:

(1) ***Data Quality.*** A consistent comment from many installation personnel and BRAC points of contact is that the Army's real property inventory is not 100% accurate. This is a key point because the Army's real property inventory provides the foundation for not only the land and rights therein, but also ground improvements, utility systems, and buildings and structures.[21]

(2) ***Leased Space.*** The Army BRAC 91 RPI did not consider the Army's significant number of leased space holdings across the United States. These holdings need to be considered and reconciled within the Army BRAC 93 process. In some cases, it may be more cost effective to move out of leased space onto an installation and keep it open rather than close the installation and continue to pay for leases.

---

[18] "Preparation for Base Realignment and Closure (BRAC) 93," Memorandum from the Department of the Army, Chief of Staff, dated 26 March 1992.

[19] "Base Realignment and Closure 1993 (BRAC 93) Engineer Guidance," Memorandum from the Department of the Army, Assistant Chief of Engineers, dated 21 April 1992.

[20] The Office of the Assistant Chief of Engineers is the HQDA staff proponent for the real property management program, while the U.S. Engineer and Housing Support Center (EHSC) is the program manager. Major commands, field operating agencies, and installations share responsibility for real property activities within their area of interest.

[21] *Inventory of Army Real Property, AR 405-45* (Department of the Army, 15 April 1982).

d. **Army Real Property Summary.** Ongoing efforts within the Engineer community are aimed at improving the current shortcomings of the Army's real property management program. Improvements in the Integrated Facility System and the Army's leased space inventory management will lead to higher data quality and a more complete picture.

14. **INSTALLATION RATING PROCESS.** The task of comparing military installations with widely different missions and facilities is a complex and challenging problem. ESSC addressed this problem by considering which class of analytical methods is theoretically appropriate for analyzing a problem like the BRAC assessment of military value of installations. We then compared the different techniques within that class of methods to see which specific technique offers the best combination of features to meet the Army's needs for BRAC 93.

a. **Theoretical Analysis.** There is no rigid consensus within the Operations Research community as to a unique way to arrange decision analysis systems. This is largely due to the fact that many decision techniques (particularly the more sophisticated) can be adapted to fit more than one type of problem. However, there is a basically logical pattern to the development of different methods to address problems of increasing complexity. **Figure 8** is adapted from the decision analysis taxonomy used by the Army Logistics Management College in its Multiple Criteria Decision Making course.[22] Using this taxonomy, ESSC was able to quickly zero in on the category of decision analysis methods that is designed to solve problems of the type presented in the BRAC process. The ability of the Compensatory Methods of decision analysis to capture the relative weights of attributes is needed in order to adequately portray the intricate mix of features on Army installations.

b. **Operational Considerations.** After the most appropriate category of decision analysis methods was identified, three specific software programs fitting that category were examined. These programs were evaluated on how well they function in terms of practical considerations such as: data requirements, ease of use, ability to do sensitivity analysis, and limitations on problem size.

[22] The original graphic from which Figure 8 was derived was provided by the Army Logistics Management College. However, ESSC has modified the taxonomy for presentation in the context of this report.

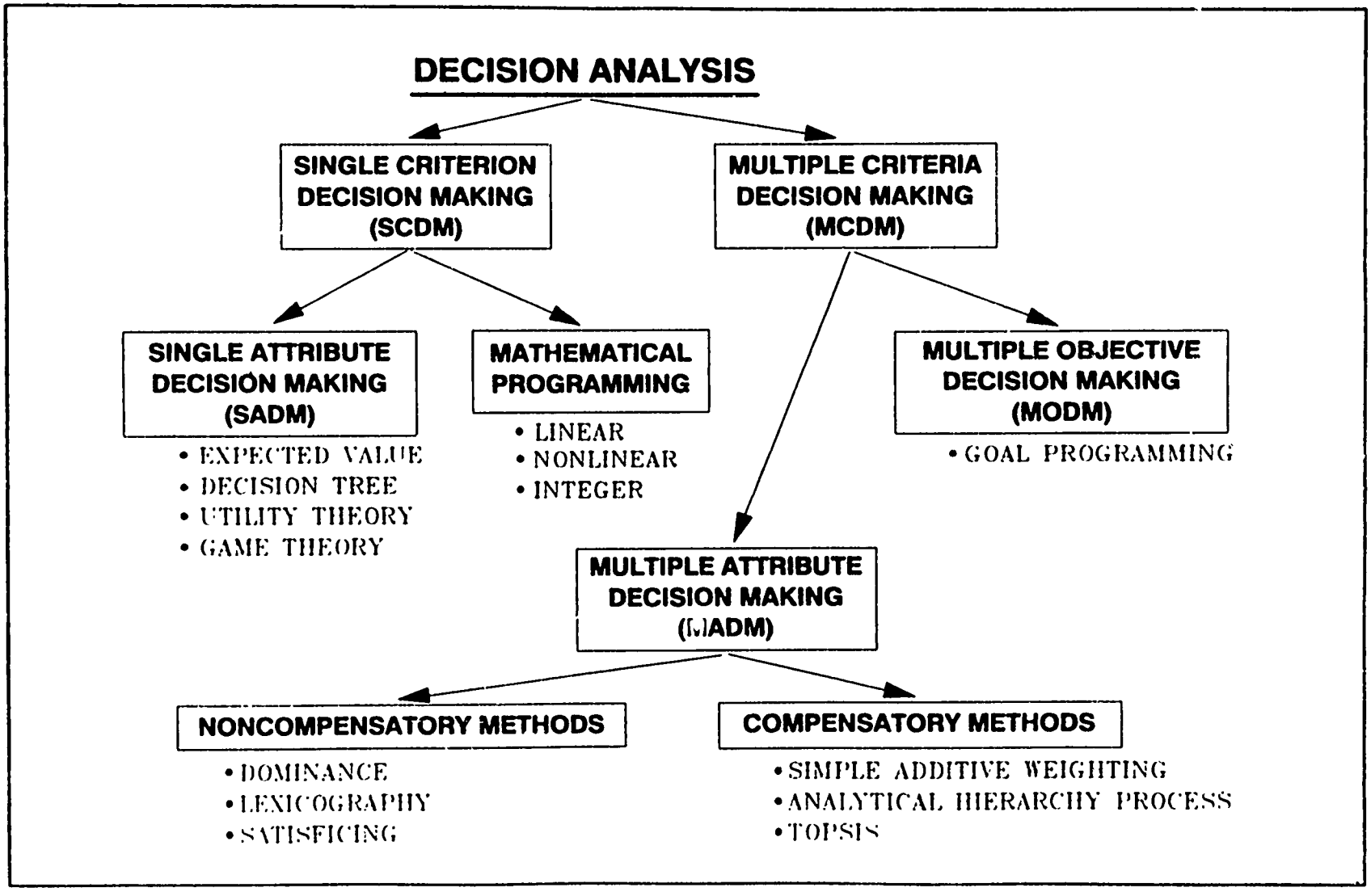

Figure 8. DECISION ANAYLSIS TAXONOMY

Blank Page

III. RESULTS

15. **GENERAL.** These paragraphs provide specific findings and recommendations for consideration in Army BRAC 93. These findings and recommendations are discussed in more detail in Annexes A through E.

16. **MEASURES OF MERIT (MOM) FINDINGS AND RECOMMENDATIONS.** This section provides a narrative description of findings and recommendations for Measures of Merit. **Figure 9** shows a summary of our findings and recommendations.

- **FINDING 1.** Mission essentiality and mission suitability are the highest priority measures of merit. However, mission essentiality deserves the greater weight of the two because it measures those attributes deemed as the most important for accomplishing the installation's primary mission.

  RECOMMENDATION. Maintain the current emphasis on the mission essentiality and mission suitability measures of merit, but shift weights to give greater significance to mission essentiality.

- **FINDING 2.** Quality of life (QOL) is the next highest priority measure of merit for the Army of the future.

  RECOMMENDATION. Maintain the current priority and weight assigned to the QOL measure of merit for those installation categories with significant on-post troop populations. For major training areas and the industrial categories, we recommend shifting weight from quality of life to the other measures of merit.

- **FINDING 3.** The expandability measure of merit needs more weight to truly illustrate its military value.

  RECOMMENDATION. Insert the expandability measure of merit as the third priority with a greater weight than operational efficiency but less than or equal to the quality of life measure of merit, except in the industrial categories where we recommend retaining the Army BRAC 91 weights for expandability and operational efficiency.

MANEUVER INSTALLATIONS

Measure of Merit	Old	New
Mission Essentiality	250	275
Mission Suitability	250	225
Operational Efficiency	150	100
Expandability	150	200
Quality of Life	200	200
Total	1,000	1,000

MAJOR TRAINING AREAS

Measure of Merit	Old	New
Mission Essentiality	250	350
Mission Suitability	350	250
Operational Efficiency	150	100
Expandability	150	200
Quality of Life	100	100
Total	1,000	1,000

INITIAL ENTRY/BRANCH SCHOOLS

Measure of Merit	Old	New
Mission Essentiality	250	275
Mission Suitability	250	225
Operational Efficiency	150	100
Expandability	150	200
Quality of Life	200	200
Total	1,000	1,000

PROFESSIONAL SCHOOLS

Measure of Merit	Old	New
Mission Essentiality	250	275
Mission Suitability	250	225
Operational Efficiency	150	100
Expandability	150	200
Quality of Life	200	200
Total	1,000	1,000

COMMAND & CONTROL CENTERS

Measure of Merit	Old	New
Mission Essentiality	250	275
Mission Suitability	250	225
Operational Efficiency	110	100
Expandability	150	200
Quality of Life	200	200
Total	960	1,000

DEPOTS

Measure of Merit	Old	New
Mission Essentiality	250	300
Mission Suitability	250	250
Operational Efficiency	150	150
Expandability	150	150
Quality of Life	200	150
Total	1,000	1,000

COMMODITY ORIENTED*

Measure of Merit	Old	New
Mission Essentiality	250	300
Mission Suitability	250	250
Operational Efficiency	150	150
Expandability	150	150
Quality of Life	200	150
Total	1,000	1,000

PRODUCTION INSTALLATIONS

Measure of Merit	Old	New
Mission Essentiality	250	300
Mission Suitability	250	250
Operational Efficiency	150	150
Expandability	150	150
Quality of Life	200	150
Total	1,000	1,000

OCEAN PORTS

Measure of Merit	Old	New
Mission Essentiality	350	300
Mission Suitability	350	250
Operational Efficiency	75	150
Expandability	150	150
Quality of Life	75	150
Total	1,000	1,000

AMMO PORTS

Measure of Merit	Old	New
Mission Essentiality	450	300
Mission Suitability	450	250
Operational Efficiency	30	150
Expandability	40	150
Quality of Life	30	150
Total	1,000	1,000

*A single category in Army BRAC 91: ESSC recommends dividing these installations into three categories for Army BRAC 93 (proving grounds, research and development centers, and inventory control points). See Annex C, Attributes, for an explanation of this change.

Figure 9. MEASURES OF MERIT WEIGHTING SYSTEM

17. **INSTALLATIONS & CATEGORIES FINDINGS AND RECOMMENDATIONS.** This section provides a narrative description of findings and recommendations for Installations and Categories. **Figure 10** shows a summary of our findings and recommendations.

- **FINDING 1.** The industrial category, commodity subcategory contains three functional activities within one subcategory. It is found that in the industrial categories, installations with distinct functional activities are evaluated best in their own distinct category.

  RECOMMENDATION. Divide the industrial category, commodity subcategory into three: inventory control points, proving grounds, and R&D laboratories.

- **FINDING 2.** The Army does not fully address installations that have highly specific missions. These installations fall into a special category (e.g.. space operations and intelligence).

  RECOMMENDATION. Create a special purpose category to group installations used for space, intelligence, communications, special operations, and other special purpose activities.

- **FINDING 3.** Several categories of installations were exempt from review during Army BRAC 91 because of other consolidation actions and management reviews. The recommendations and actions from these efforts affect the Army's Phase I BRAC process.

  RECOMMENDATION. Include all Army installations for review. Examine the results of the other consolidation studies, particularly medical centers and reserve component installations. Include them in the next BRAC 93 process.

ARMY BRAC 91	ARMY BRAC 93
Command & Control	**Command & Control**
Fighting Maneuver Major Training Areas	**Fighting** Maneuver Major Training Areas
Training Initial Entry Professional	**Training** Initial Entry/Branch Schools Professional Schools
Industrial Depots Commodity Production Ports	**Industrial** Depots R&D Laboratories* Inventory Control Points* Proving Grounds* Production Ports
Reserve Component National Guard U.S. Army Reserve	**Reserve Component** National Guard U.S. Army Reserve
Corps of Engineers Districts Divisions	**Corps of Engineers** (Removed from consideration within BRAC by DOD direction.)
Others (not considered) Stand Alone Housing Cemeteries Recreation Areas Hospitals Communications Miscellaneous	**Other*** Stand Alone Housing Cemeteries Recreation Areas Medical Centers* Special Purpose*

Sources: *Report to the Secretary of Defense on Base Closure and Realignment*, Department of the Army, April 1991
Note: Entries in boldface are categories; others are sub-categories. Asterisk designates change from BRAC 91

Figure 10. REVISED CATEGORY RECOMMENDATIONS

18. **ATTRIBUTE FINDINGS AND RECOMMENDATIONS.** This section provides a narrative description of findings and recommendations for Attributes. **Figures 11 - 22** show a summary of our findings and recommendations.

- **FINDING 1.** ESSC found the need for new or substantially revised attributes. These new attributes address weaknesses in the set of attributes used for Army BRAC 91 and add to the Army's effort of measuring an installations military value. These candidate attributes are--geographic location, mobilization, and environmental carrying capacity.

  RECOMMENDATION. ESSC recommends that two new attributes--mobilization and environmental carrying capacity--be implemented for Army BRAC 93. The geographic location attribute duplicates the traits of other attributes and is not recommended as a new attribute.

- **FINDING 2.** ESSC found attributes that were duplicating the intent of other attributes. These attributes are--medical facilities, reserve demographics, and port attributes.

  RECOMMENDATION. Reduce the duplication through uniform and standardized attributes that do not double count the same value. Eliminate redundant attributes.

- **FINDING 3.** The names of several attributes used during Army BRAC 91 are unclear and in need of clarification. The attributes that were unclear are--AR 5-9 support, proximity to other services, transportation network, recruit and retain, and maneuver acres.

  RECOMMENDATION. ESSC recommends the following attribute name changes to strengthen their meaning:

  - recruit and retain -- change to -- work force retention
  - transportation net -- change to -- airport proximity
  - AR 5-9 support -- change to -- sub-installation support
  - proximity to other services -- change to -- joint synergy
  - maneuver acres -- change to -- maneuver-training acres

- **FINDING 4.** ESSC found several attributes used during BRAC 91 are more valuable when revised and expanded. They are--water and sewer, multi-mission, and transportation network.

  RECOMMENDATION. ESSC recommends the attribute expansions be incorporated and the following attribute name changes be made to strengthen their meaning:

MISSION ESSENTIALITY

Attribute	Old	New
Maneuver Training Acres	75	75
Ranges	55	50
Deployment Network	55	50
Total Acres	45	0
Mobilization	0	45
Joint Synergy	0	15
Reserve Support	20	40
Total	250	275

EXPANDABILITY

Attribute	Old	New
Total Buildable Acres	20	50
Total Building Square Feet	45	0
Encroachment	45	50
Environmental Capacity	20	50
Multi-function	0	25
Infrastructure	0	25
Water/Sewer Facilities	20	0
Total	150	200

MISSION SUITABILITY

Attribute	Old	New
Contiguous Maneuver Acres	45	80
Operational/Admin Facils	45	30
Aviation Maintenance	40	25
Vehicle Maintenance	45	30
Supply/Storage	20	10
Distance to Training Area	40	30
Construction Investment	0	10
Information Mission Area	15	10
Total	250	225

QUALITY OF LIFE

Attribute	Old	New
% Permanent Facilities	34	25
Community of Excellence	10	10
Army Family Housing	33	35
Unaccomp Officer Housing	24	25
Unaccomp Enlisted Housing	33	35
Community Facilities	23	25
Places Rated Almanac Rating	20	10
Health Care Support Index	23	35
Total	200	200

OPERATIONAL EFFICIENCY

Attribute	Old	New
Variable Housing Allowance	15	15
Family Housing Cost Per Unit	15	15
Average Civilian Salary	15	15
Hourly Wage Grade Rate	15	0
Manpower Est Relationship	15	20
Cost Estimate Relationship	15	20
Utilities Cost Factor	15	0
RPMA Cost Factor	15	0
Military Construction Cost	15	15
Backlog Maintenance Repair	15	0
Total	150	100

TOTAL ATTRIBUTE SCORE

	Old	New
Mission Essentiality	250	275
Mission Suitability	250	225
Operational Efficiency	150	100
Expandability	150	200
Quality of Life	200	200
Total	1,000	1,000

Figure 11. REVISED ATTRIBUTES FOR MANEUVER INSTALLATIONS.

MISSION ESSENTIALITY

Attribute	Old	New
Maneuver Training Acres	75	0
Contiguous Maneuver Acres	0	200
Ranges	55	55
Deployment Network	30	35
Total Acres	50	0
Joint Synergy	0	20
Reserve Support	40	40
Total	250	350

EXPANDABILITY

Attribute	Old	New
Total Buildable Acres	20	50
Total Building Square Feet	45	0
Encroachment	45	50
Environmental Capacity	20	50
Multi-function	0	25
Infrastructure	0	25
Water/Sewer Facilities	20	0
Total	150	200

MISSION SUITABILITY

Attribute	Old	New
Contiguous Maneuver Acres	220	0
Maneuver Training Acres	0	135
Operational/Admin Facils	17	20
Aviation Maintenance	17	20
Vehicle Maintenance	35	35
Supply/Storage	25	30
Reserve Demographics	36	0
Construction Investment	0	10
Total	350	250

QUALITY OF LIFE

Attribute	Old	New
% Permanent Facilities	10	10
Community of Excellence	0	0
Army Family Housing	0	0
Unaccomp Officer Housing	5	5
Unaccomp Enlisted Housing	5	5
Community Facilities	5	5
Places Rated Almanac Rating	0	0
Health Care Support Index	75	75
Total	100	100

OPERATIONAL EFFICIENCY

Attribute	Old	New
Variable Housing Allowance	15	15
Family Housing Cost Per Unit	15	15
Average Civilian Salary	15	15
Hourly Wage Grade Rate	15	0
Manpower Est Relationship	15	20
Cost Estimate Relationship	15	20
Utilities Cost Factor	15	0
RPMA Cost Factor	15	0
Military Construction Cost	15	15
Backlog Maintenance Repair	15	0
Total	150	100

TOTAL ATTRIBUTE SCORE

	Old	New
Mission Essentiality	250	350
Mission Suitability	350	250
Operational Efficiency	150	100
Expandability	150	200
Quality of Life	100	100
Total	1,000	1,000

Figure 12. REVISED ATTRIBUTES FOR MAJOR TRAINING AREAS.

MISSION ESSENTIALITY

Attribute	Old	New
Multi-function	41	0
Mobilization	0	40
Army Readiness	34	55
Unique Capability	62	0
Maneuver Training Acres	27	50
Contiguous Maneuver Acres	16	0
Impact Range Acres	28	50
Deployment Network	16	35
Reserve Support	26	45
Total	250	275

EXPANDABILITY

Attribute	Old	New
Total Buildable Acres	15	50
Total Building Square Feet	39	0
Encroachment	21	20
Environmental Capacity	36	50
Multi-function	0	30
Infrastructure	0	50
Water/Sewer Facilities	39	0
Total	150	200

MISSION SUITABILITY

Attribute	Old	New
Contiguous Maneuver Acres	0	15
General Instruction Facils	42	45
Applied Instruction Facils	48	50
Ranges (BRM)	29	25
Maintenance Facilities	25	20
Operational/Admin Facils	25	20
Information Mission Area	27	25
Medical Facilities	25	0
Construction Investment	29	25
Total	250	225

QUALITY OF LIFE

Attribute	Old	New
% Permanent Facilities	23	20
Community of Excellence	15	10
Army Family Housing	28	30
Unaccomp Officer Housing	26	25
Unaccomp Enlisted Housing	38	40
Community Facilities	30	30
Places Rated Almanac Rating	16	10
Health Care Support Index	24	35
Total	200	200

OPERATIONAL EFFICIENCY

Attribute	Old	New
Variable Housing Allowance	12	15
Family Housing Cost Per Unit	15	15
Average Civilian Salary	11	10
Hourly Wage Grade Rate	10	0
Manpower Est Relationship	11	20
Cost Estimate Relationship	12	20
Utilities Cost Factor	25	0
RPMA Cost Factor	35	0
Military Construction Cost	19	20
Total	150	100

TOTAL ATTRIBUTE SCORE

	Old	New
Mission Essentiality	250	275
Mission Suitability	250	225
Operational Efficiency	150	100
Expandability	150	200
Quality of Life	200	200
Total	1,000	1,000

Figure 13. REVISED ATTRIBUTES FOR INITIAL ENTRY/BRANCH SCHOOLS

MISSION ESSENTIALITY

Attribute	Old	New
Multi-function	50	0
Mobilization	0	35
Army Readiness	34	50
Maneuver Training Acres	12	0
Impact Range Acres	11	0
General Instruction Facils	80	100
Deployment Network	22	40
Reserve Support	41	50
Total	250	275

EXPANDABILITY

Attribute	Old	New
Total Buildable Acres	28	50
Total Building Square Feet	35	0
Encroachment	19	20
Environmental Capacity	33	50
Multi-function	0	30
Infrastructure	0	50
Water/Sewer Facilities	35	0
Total	150	200

MISSION SUITABILITY

Attribute	Old	New
Applied Instruction Facils	66	65
Maneuver Training Acres	0	10
Ranges	12	10
Maintenance Facilities	18	15
Operational/Admin Facils	48	50
Information Mission Area	54	50
Medical Facilities	22	0
Construction Investment	30	25
Total	250	225

QUALITY OF LIFE

Attribute	Old	New
% Permanent Facilities	23	20
Community of Excellence	15	10
Army Family Housing	28	30
Unaccomp Officer Housing	26	25
Unaccomp Enlisted Housing	38	40
Community Facilities	30	35
Places Rated Almanac Rating	16	10
Health Care Support Index	24	30
Total	200	200

OPERATIONAL EFFICIENCY

Attribute	Old	New
Variable Housing Allowance	12	15
Family Housing Cost Per Unit	15	15
Average Civilian Salary	11	10
Hourly Wage Grade Rate	10	0
Manpower Est Relationship	11	20
Cost Estimate Relationship	12	20
Utilities Cost Factor	25	0
RPMA Cost Factor	35	0
Military Construction Cost	19	20
Total	100	100

TOTAL ATTRIBUTE SCORE

	Old	New
Mission Essentiality	250	275
Mission Suitability	250	225
Operational Efficiency	150	100
Expandability	150	200
Quality of Life	200	200
Total	1,000	1,000

Figure 14. REVISED ATTRIBUTES FOR PROFESSIONAL SCHOOLS

MISSION ESSENTIALITY

Attribute	Old	New
Major Unit Support	60	80
Levels of Command	71	90
Reserve Support	39	55
AR 5-9 Support	36	0
Sub-installation Support	0	50
Proximity	44	0
Total	250	275

EXPANDABILITY

Attribute	Old	New
Total Buildable Acres	33	45
Total Building Square Feet	31	0
Encroachment	26	30
Environmental Capacity	26	50
Multi-function	0	30
Infrastructure	0	45
Water/Sewer Facilities	34	0
Total	150	200

MISSION SUITABILITY

Attribute	Old	New
Accessibility	41	30
Recruit and Retain	36	0
Work Force Retention	0	20
Operational/Admin Facils	35	40
Permanent Op/Admin Facils	50	0
Mobilization	0	20
Construction Investment	0	20
Transportation Net	48	0
Airport Proximity	0	30
Joint Synergy	0	35
Information Mission Area	40	30
Total	250	225

QUALITY OF LIFE

Attribute	Old	New
% Permanent Facilities	31	35
Community of Excellence	22	10
Army Family Housing	29	35
Unaccomp Officer Housing	22	25
Unaccomp Enlisted Housing	24	25
Community Facilities	24	25
Places Rated Almanac Rating	23	10
Health Care Support Index	25	35
Total	200	200

OPERATIONAL EFFICIENCY

Attribute	Old	New
Variable Housing Allowance	15	15
Family Housing Cost Per Unit	15	15
Average Civilian Salary	14	15
Hourly Wage Grade Rate	15	0
Manpower Est Relationship	0	20
Cost Estimate Relationship	0	20
Utilities Cost Factor	17	0
RPMA Cost Factor	18	0
Military Construction Cost	16	15
Total	110	100

TOTAL ATTRIBUTE SCORE

	Old	New
Mission Essentiality	250	275
Mission Suitability	250	225
Operational Efficiency	110	100
Expandability	150	200
Quality of Life	200	200
Total	960	1,000

Figure 15. REVISED ATTRIBUTES FOR COMMAND AND CONTROL INSTALLATIONS

MISSION ESSENTIALITY

Attribute	Old	New
Multi-Mission	35	0
Capacity - Supply	50	75
Capacity - Maintenance	70	95
Capacity - Ammo Storage	60	85
Unique Mission	15	0
Reserve Component Support	20	45
Total	250	300

EXPANDABILITY

Attribute	Old	New
Total Buildable Acres	10	10
Total Unused Ammo Storage	20	15
Multi-function	0	10
Encroachment	10	10
Environmental Capacity	10	30
Infrastructure	0	10
Water/Sewer Facilities	10	0
Work Force Available	20	15
Total Unused Maintenance	40	30
Total Unused Supply	30	20
Total	150	150

MISSION SUITABILITY

Attribute	Old	New
Deployment Network	0	70
Transportation Network	70	0
Location	40	40
Environmental Compliance	30	30
Capital Investments	45	0
Construction Investment	0	45
Information Mission Area	30	30
Quantity - Distance	35	35
Total	250	250

QUALITY OF LIFE

Attribute	Old	New
% Permanent Facilities	40	30
Community of Excellence	20	10
Army Family Housing	10	15
Unaccomp Officer Housing	10	10
Unaccomp Enlisted Housing	10	15
Community Facilities	30	30
Places Rated Almanac Rating	30	10
Health Care Support Index	20	30
Community Economics	30	0
Total	200	150

OPERATIONAL EFFICIENCY

Attribute	Old	New
Variable Housing Allowance	10	20
Family Housing Cost Per Unit	10	20
Average Civilian Salary	25	25
Hourly Wage Grade Rate	30	0
Manpower Est Relationship	10	30
Cost Estimate Relationship	10	30
Utilities Cost Factor	20	0
RPMA Cost Factor	20	0
Military Construction Cost	15	25
Total	150	150

TOTAL ATTRIBUTE SCORE

	Old	New
Mission Essentiality	250	300
Mission Suitability	250	250
Operational Efficiency	150	150
Expandability	150	150
Quality of Life	200	150
Total	1,000	1,000

Figure 16. REVISED ATTRIBUTES FOR DEPOTS

MISSION ESSENTIALITY

Attribute	Old	New
Mobilization	80	85
Production Flexibility	80	85
Production Storage	0	60
Plant Capacity	0	70
Reserve Support	10	0
Unique Mission	80	0
Total	250	300

EXPANDABILITY

Attribute	Old	New
Total Buildable Acres	20	20
Unused Capacity - Plant	20	20
Encroachment	20	15
Environmental Capacity	20	35
Infrastructure	0	15
Water/Sewer Facilities	20	0
Work Force Available	20	15
Unused Ammo Storage	30	30
Total	150	150

MISSION SUITABILITY

Attribute	Old	New
Location	35	0
Deployment Network	0	80
Transportation Network	45	0
Production Storage	70	0
Plant Capacity	80	0
Reserve Support	0	40
Construction Investment	0	65
Information Mission Area	20	65
Total	250	250

QUALITY OF LIFE

Attribute	Old	New
% Permanent Facilities	40	30
Community of Excellence	20	10
Army Family Housing	20	15
Unaccomp Officer Housing	10	10
Unaccomp Enlisted Housing	10	15
Community Facilities	30	30
Places Rated Almanac Rating	30	10
Health Care Support Index	20	30
Community Economics	20	0
Total	200	150

OPERATIONAL EFFICIENCY

Attribute	Old	New
Variable Housing Allowance	10	15
Family Housing Cost Per Unit	10	15
Average Civilian Salary	25	20
Non DOD Financing Costs	20	25
Manpwer Est Relationship	5	25
Cost Estimate Relationship	5	25
Utilities Cost Factor	25	0
RPMA Cost Factor	25	0
Military Construction Cost	25	25
Total	150	150

TOTAL ATTRIBUTE SCORE

	Old	New
Mission Essentiality	250	300
Mission Suitability	250	250
Operational Efficiency	150	150
Expandability	150	150
Quality of Life	200	150
Total	1,000	1,000

Figure 17. REVISED ATTRIBUTES FOR PRODUCTION INSTALLATIONS

MISSION ESSENTIALITY

Attribute	Old	New
Deep Piers and Wharfs	100	0
Rail and Road Linkages	85	90
Hard Surface Staging Areas	40	0
Transportation Infrastructure	75	0
Support Facilities	50	75
Normal Throughput Capacity	0	100
Reserve Support	0	35
Total	350	300

EXPANDABILITY

Attribute	Old	New
Total Buildable Acres	38	35
Total Building Square Feet	37	0
Environmental Capacity	37	40
Mobilization Thruput Capacity	0	45
Infrastructure	0	30
Water/Sewer Facilities	38	0
Total	150	150

MISSION SUITABILITY

Attribute	Old	New
Deep Piers and Wharfs	100	80
Rail and Road Linkages	80	0
Hard Surface Staging Areas	35	45
Transportation Infrastructure	70	65
Support Facilities	50	0
Material Handling Equipment	0	25
Construction Investment	0	20
Information Mission Area	15	15
Total	350	250

QUALITY OF LIFE

Attribute	Old	New
% Permanent Facilities	12	30
Community of Excellence	12	10
Army Family Housing	10	20
Unaccomp Officer Housing	10	20
Unaccomp Enlisted Housing	10	20
Community Facilities	10	25
Health Care Support Index	11	25
Total	75	150

OPERATIONAL EFFICIENCIES

Attribute	Old	New
Variable Housing Allowance	0	25
Family Housing Cost Per Unit	12	20
Average Civilian Salary	15	25
Hourly Wage Grade Rate	12	0
Manpower Est Relationship	0	25
Cost Estimate Relationship	0	30
Utilities Cost Factor	12	0
RPMA Cost Factor	12	0
Military Construction Cost	12	25
Total	75	150

TOTAL ATTRIBUTE SCORE

Attribute	Old	New
Mission Essentiality	350	300
Mission Suitability	350	250
Operational Efficiency	75	150
Expandability	150	150
Quality of Life	75	150
Total	1,000	1,000

Figure 18. REVISED ATTRIBUTES FOR OCEAN TERMINAL PORTS

MISSION ESSENTIALITY

Attribute	Old	New
Deep Piers and Wharfs	110	0
Rail and Road Linkages	90	90
Hard Surface Staging Areas	50	0
Transportation Infrastructure	80	0
Support Facilities	60	60
Normal Throughput Capacity	0	100
Reserve Support	60	50
Total	450	300

EXPANDABILITY

Attribute	Old	New
Total Buildable Acres	11	35
Total Building Square Feet	9	0
Environmental Capacity	9	40
Mobilization Thruput Capacity	0	45
Infrastructure	0	30
Water/Sewer Facilities	11	0
Total	40	150

MISSION SUITABILITY

Attribute	Old	New
Deep Piers and Wharfs	130	80
Rail and Road Linkages	105	0
Hard Surface Staging Areas	45	45
Transportation Infrastructure	85	65
Support Facilities	60	0
Material Handling Equipment	0	25
Construction Investment	0	20
Information Mission Area	25	15
Total	450	250

QUALITY OF LIFE

Attribute	Old	New
% Permanent Facilities	5	30
Community of Excellence	5	10
Army Family Housing	4	20
Unaccomp Officer Housing	4	20
Unaccomp Enlisted Housing	4	20
Community Facilities	3	25
Health Care Support Index	5	25
Total	30	150

OPERATIONAL EFFICIENCIES

Attribute	Old	New
Variable Housing Allowance	0	25
Family Housing Cost Per Unit	4	20
Average Civilian Salary	10	25
Hourly Wage Grade Rate	4	0
Manpower Est Relationship	0	25
Cost Estimate Relationship	0	30
Utilities Cost Factor	4	0
RPMA Cost Factor	4	0
Military Construction Cost	4	25
Total	30	150

TOTAL ATTRIBUTE SCORE

Attribute	Old	New
Mission Essentiality	450	300
Mission Suitability	450	250
Operational Efficiency	30	150
Expandability	40	150
Quality of Life	30	150
Total	1,000	1,000

Figure 19. REVISED ATTRIBUTES FOR AMMUNITION PORTS

MISSION ESSENTIALITY

Attribute	Weight
Ops/Admin Facilities	125
Accessibility	100
Airport Proximity	75
Total	300

EXPANDABILITY

Attribute	Weight
Total Buildable Acres	30
Environment	50
Infrastructure	40
Multi-Function	30
Total	150

MISSION SUITABILITY

Attribute	Weight
Work Force Retention	100
Construction Investment	50
Information Mission Area	100
Total	250

QUALITY OF LIFE

Attribute	Weight
Percent Permanent Facilities	30
Community of Excellence Score	15
Army Family Housing	15
Unaccompanied Officer Housing	15
Unaccompanied Enlisted Housing	15
Community Facilities	25
Places Rated Almanac Rating	10
Health Care Support Index	25
Total	150

OPERATIONAL EFFICIENCY

Attribute	Weight
Varible Housing Allowance	25
Family Housing Cost Per Unit	25
Average Civilian Salary	30
Manpower Estimate Relationship	25
Cost Estimate Relationship	25
MILCON Cost Factor	20
Total	150

TOTAL ATTRIBUTE SCORE

Mission Essentiality	300
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	150
Total	1,000

Figure 20. RECOMMENDED ATTRIBUTES FOR INVENTORY CONTROL POINTS

MISSION ESSENTIALITY

Attribute	Weight
T&E Facilities	150
T&E Ranges	100
Total Acres	50
Total	300

EXPANDABILITY

Attribute	Weight
Total Buildable Acres	25
Encroachment	20
Environment	50
Infrastructure	30
Multi-function	25
Total	150

MISSION SUITABILITY

Attribute	Weight
Operational/Admin Facilities	125
Work Force Retention	75
Information Mission Area	50
Total	250

QUALITY OF LIFE

Attribute	Weight
Percent Permanent Facilities	30
Community of Excellence Score	15
Army Family Housing	15
Unaccompanied Officer Housing	15
Unaccompanied Enlisted Housing	15
Community Facilities	25
Places Rated Almanac Rating	10
Health Care Support Index	25
Total	150

OPERATIONAL EFFICIENCY

Attribute	Weight
Varible Housing Allowance	25
Family Housing Cost Per Unit	25
Average Civilian Salary	30
Manpower Est. Relationship	25
Cost Estimate Realationship	25
MILCON Cost Factor	20
Total	150

TOTAL ATTRIBUTE SCORE

Mission Essentiality	300
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	150
Total	1,000

Figure 21. RECOMMENDED ATTRIBUTES FOR PROVING GROUNDS

MISSION ESSENTIALITY

Attribute	Weight
R & D Facilities	150
Work Force Retention	100
Total Acres	50
Total	300

EXPANDABILITY

Attribute	Weight
Total Buildable Acres	25
Encroachment	20
Environment	50
Infrastrucuture	30
Multi-Function	25
Total	150

MISSION SUITABILITY

Attribute	Weight
Operational/Admin Facilities	100
Construction Investment	50
Airport Proximity	25
Information Mission Area	75
Total	250

QUALITY OF LIFE

Attribute	Weight
Percent Permanent Facilities	30
Community of Excellence Score	15
Army Family Housing	15
Unaccompanied Officer Housing	15
Unaccompanied Enlisted Housing	15
Community Facilities	25
Places Rated Almanac Rating	10
Health Care Support Index	25
Total	150

OPERATIONAL EFFICIENCY

Attribute	Weight
Varible Housing Allowance	25
Family Housing Cost Per Unit	25
Average Civilian Salary	30
Manpower Estimate Relation.	25
Cost Estimate Relationship	25
MILCON Cost Factor	20
Total	150

TOTAL ATTRIBUTE SCORE

Mission Essentiality	300
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	150
Total	1,000

Figure 22. RECOMMENDED ATTRIBUTES FOR R & D CENTERS

- water and sewer -- change to -- infrastructure
- multi-mission -- change to -- multi-function
- transportation network -- change to -- deployment network

- **FINDING 5.** Several attributes need to be eliminated since they make no significant contribution to measuring a military installation's military value. These attributes are--total acres, hourly wage grade rate, utilities cost factor, RPMA cost factor, total building square feet, unique capability, permanent operational administrative facilities, and community economics.

  RECOMMENDATION. For uniformity and simplicity, these attributes should be eliminated from the BRAC Phase I process.

- **FINDING 6.** ESSC found the use of standardized attributes increases the simplicity and utility of measuring an installation's military value. These attributes are--the construction investment and deployment network.

  RECOMMENDATION. Use these attributes to effect a measure of utility and standardization across all Army BRAC categories.

19. **INSTALLATION DATA FINDINGS AND RECOMMENDATIONS.**

- **FINDING 1.** The Army BRAC process makes extensive use of real property data and automated data bases--especially the ASIP and the IFS. These data bases are sound and effective systems for tracking installation data. These systems are improving, but they are not 100% accurate or complete.

  RECOMMENDATION. Construct an adequate project management plan that ensures sufficient time to properly update and correct installation data bases. Notify installation commanders and DEH of the key role that installation data bases play in the Army BRAC process, and of the importance of their accuracy and completeness, not only for Army BRAC 93, but also for all future planning in a resource-constrained environment.

- **FINDING 2.** Various versions or editions of installation data are used during the Army BRAC process. This leads to data discrepancies, endless verifications loops, and inaccuracies.

  RECOMMENDATION. Establish an information cutoff date. Verify the data. Establish a standard Army BRAC 93 installation data set. This standard data set is to be used and referenced by all BRAC participants--installations MACOMs, DA, DOD, and the BRAC Commission.

- **FINDING 3.** The Army's BRAC process makes little consideration of the significant number of Army leased space holdings throughout the fifty states. These holdings should be considered and reconciled within the Army BRAC process.

  RECOMMENDATION. Initiate an assessment of the Army's leased space. Consider the leased space assessment in BRAC 93-Phase II when closure and realignment options are studied.

20. **INSTALLATION RATING PROCESS FINDING AND RECOMMENDATION.**

- **FINDING.** A thorough review of decision analysis theories leads to the conclusion that the most appropriate decision analysis techniques are those in the category of Multiple Attribute Decision making, Compensatory Methods Based on operational considerations, the specific software program in the preferred category is D-PAD.

- **RECOMMENDATION.** Retain D-PAD as the software program used to assess the military value of Army installations during BRAC 93-Phase I.

Blank Page

LAST PAGE OF MAIN PAPER

ANNEX A

MEASURES OF MERIT

ANNEX A

MEASURES OF MERIT

Blank Page

I. INTRODUCTION

1. **PURPOSE.** This annex examines the effectiveness of the Base Realignment and Closure (BRAC) measures of merit used by the Army in BRAC 91[1] to measure military value.

2. **SCOPE.** This annex--

a. Reviews the Department of Defense (DOD) criteria and Army measures of merit used in BRAC 91, and evaluates their relationship to the installation assessment process.

b. Discusses various Army planning documents and their relationship to the military value concept in the BRAC process.

c. Provides recommendations for improving the measures of merit in Army BRAC 93 to better reflect the latest Army strategic vision.

3. **BACKGROUND.** The Engineer Strategic Study Center (ESSC) arranged this study into a main paper and five annexes. The main paper summarizes the key points of each annex and provides ESSC's overall conclusions and recommendations. The five annexes provide an in-depth analysis of the Army BRAC Phase I process. This annex specifically addresses the examination of the measures of merit. This is the first step in the Army BRAC process in determining military value.

4. **APPROACH.** ESSC used four steps in analyzing the Army BRAC 91 measures of merit.

a. **BRAC Measures of Merit Review.** ESSC first reviewed the development process from which each measure of merit arose. This included ESSC's look at the weights applied to each measure of merit for each type of installation.

b. **BRAC 91 Analysis.** Next, ESSC analyzed the appropriateness of each Army BRAC 91 measure of merit based on the information gathered from Army BRAC planners. ESSC also sought to identify the important strengths and weaknesses of the current measures of merit used in the Army BRAC 91 process.

c. **Analysis of Planning Documents.** After the completion of the second step of the analysis, ESSC examined the most recent planning documents that provide the vision for the Army of the future. ESSC then analyzed the measures of merit against this vision to see what changes might be needed to ensure that the measures of merit and weights used in Army BRAC 93 support the future direction of the Army.

d. **Findings and Recommendations.** Based on this analysis, ESSC then developed

---

[1] *Report to the Secretary of Defense on Base Closure and Realignment* (Department of the Army, 1 April 1991).

a statement of findings for Army BRAC 91 and a set of recommendations to consider for Army BRAC 93.

5. **ESSENTIAL ELEMENT OF ANALYSIS.** The key element of information that is crucial to the measures of merit and their effect on the Army BRAC process is the determination of military value. In this annex, we ask ourselves a key question: Are the Army's measures of merit considering the correct visions to support the Army's future force when judging an installation's military value?

II. DISCUSSION

6. **INTRODUCTION.** The Phase I installation process is an integral part of the Total Army Basing Study (TABS) analytical process. The focus of the Phase I process is to determine the military value of an Army installation through measures of merit. Measures of merit are the Army's way of quantitatively assessing its installations and rank ordering them based solely on military value. These measures of merit are intended to provide an objective frame of reference that avoids subjective biases, opinions, and guesses based on individual interpretation of the DOD criteria. In our discussion, we look at the measures of merit used in the Army BRAC 91 process. Particularly we examine their effectiveness as a measuring stick to gauge military value. We also look at new and evolving planning documents that provide the vision for the Army of the future.

7. **ARMY BRAC 91 MEASURES OF MERIT REVIEW.** The DOD developed eight criteria as guidance for the services to consider in conducting their BRAC analysis. The DOD further stipulated that "priority consideration" should be given to the military value of installations by considering the first four criteria on its list. TABS developed the measures of merit for the Army BRAC 91 process as its implementation of the DOD's selection criteria guidance. **Figure A-1** shows the DOD selection criteria, the five measures of merit used by the Army to rate military value, and the "crosswalk" done by the TABS to track how the Army's measures of merit support the DOD criteria. In our analysis, ESSC first reviewed the Army's measures of merit to determine if they do indeed uphold the DOD criteria.

a. **Army BRAC 91 Measures of Merit.** The Army, using the BRAC 88 Commission's report[2] as a point of departure, developed measures of merit in early 1990. These measures of merit were to identify and describe the elements necessary to assess the military value of an installation. The Army weighted each measure of merit for several categories of installations. The measures of merit with associated attributes determined the military value of the installations. The military value of each installation was then ranked. These rankings served as a jump-off point from which the TABS could begin the BRAC Phase II development of specific closure and realignment recommendations. The five measures of merit used in BRAC 91 were:

(1) ***Mission Essentiality***. The ability of an installation to generate, project, and sustain combat power in support of national military goals.

(2) ***Mission Suitability***. The ability of an installation to support the operational requirements of its assigned units.

(3) ***Operational Efficiencies***. The cost of operating and maintaining the installation.

(4) ***Expandability***. The ability of an installation to increase current mission activities and accept other functions at the same location.

(5) ***Quality of Life***. The ability of an installation to support soldiers and their families.

---

[2] *Report of the Defense Secretary's Commission* (Defense Secretary's Commission on Base Realignment and Closure, Washington, DC, December 1988).

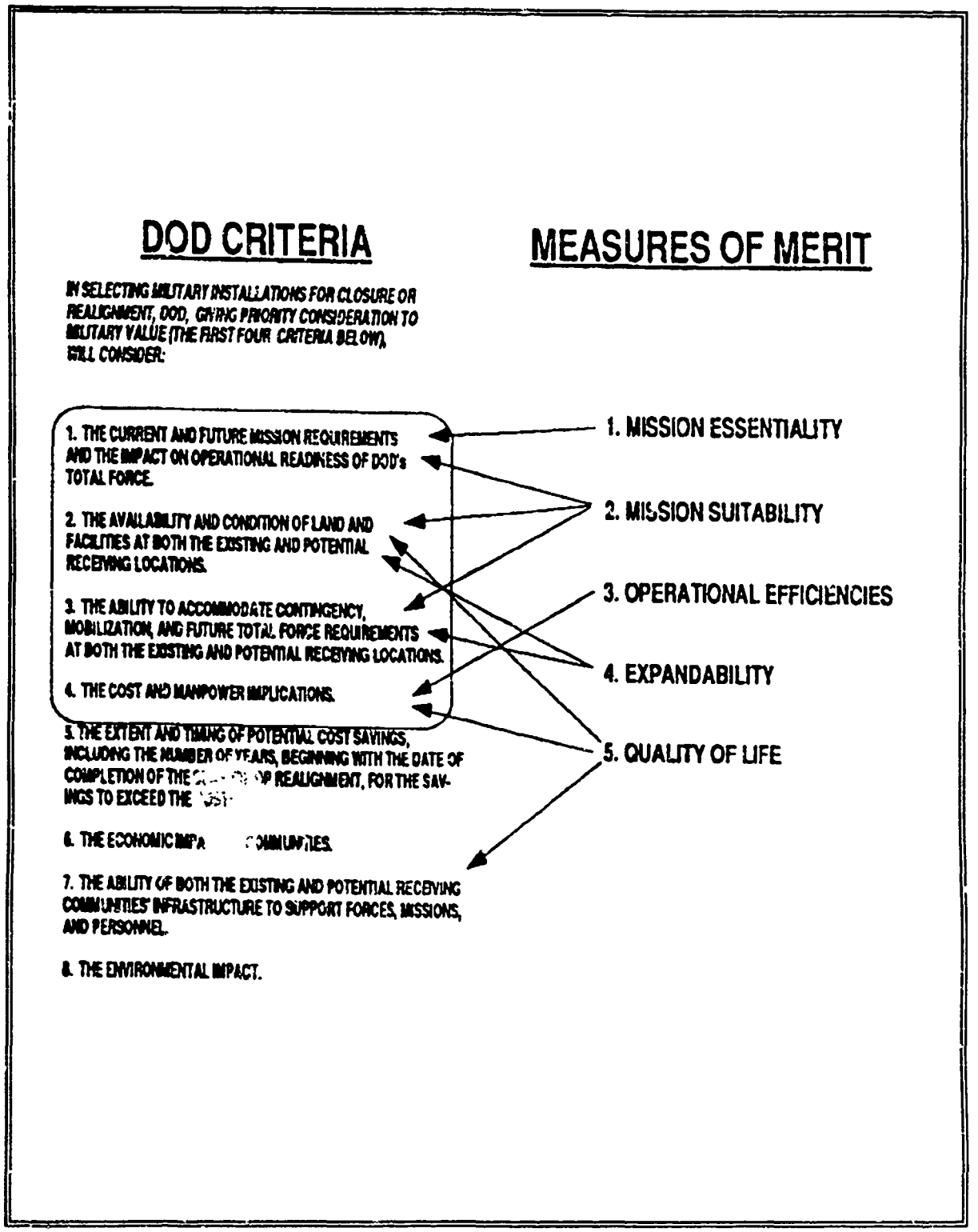

Figure A-1. DOD SELECTION CRITERIA AND ARMY MEASURES OF MERIT

b. **Correlation of Army Measures Of Merit to DOD Criteria.** The relationship of the Army measures of merit to the DOD criteria shown in Figure A-1 reflects the fact that in many cases the attributes used under each measure of merit actually address issues contained in more than one of DOD's criteria. ESSC examines the attributes within each measure of merit in Annex C. In that annex, we offer suggestions to better align attributes under measures of merit. However, it is unavoidable that some of the quantitative factors used as attributes have applicability to several different criteria. For example, attributes that measure administrative, maintenance, and storage space will impact: current and future mission requirements (DOD criteria 1); availability and condition of facilities (DOD criteria 2); and the ability to accommodate contingency, mobilization, and future force requirements (DOD criteria 3). The only way to develop a pure hierarchy in which the DOD criteria lead to Army measures of merit, that in turn lead to attributes (with no crossovers), would be to duplicate attributes wherever they apply under each branch of the hierarchy. This would complicate the analysis process since it would cause serious problems of double counting. Moreover, far from simplifying the explanation of the results, it would make any interpretation more difficult.

c. **Measures Of Merit Weighting System. Figure A-2** shows the point system used to judge the military value of each category of installation. Headquarters, Department of the Army (HQDA) followed criteria from the Office of the Secretary of Defense (OSD) to establish the weights of the measures of merit category. The objective of the measure of merit system is to provide the Army with the capability to apply the DOD criteria in a quantitative manner across various categories of bases.

8. **ARMY BRAC 91 MEASURES OF MERIT ANALYSIS.** The Army evaluated the military value of its bases using quantifiable characteristics called measures of merit. The weight given to each measure of merit reflected the relative importance of the measure within the context of the overall military value. Attributes which focus on the specific characteristics of an installation support the measures of merit. The weights given to each attribute also showed the relative importance of the specific attribute within the context of the measure of merit. These quantitative assessments provide a starting point in the evaluation of the Army's base structure. This assessment permits a quantitative ranking for each installation category. The comparative rankings provided in Phase I are then used as a point of departure from which a detailed analysis of the realignment and closure potential of the installation can be done in Phase II. In the following paragraphs, we analyze the inherent strengths and weaknesses of the Army BRAC 91 measures of merit.

a. **Weighting System.** As shown in Figure A-2, the weighting system used for the measures of merit places a strong emphasis on Mission Essentiality and Mission Suitability for all installation categories. In eight of the ten installation categories, these two measures combined received 500 points (50 percent of the total weight)[3]. For major training areas, these two measures accounted for 600 points. In the port category, they received 700 and 900 points since two types of ports were evaluated. The Quality of Life measure of merit received 200 points in eight of the ten installation categories. The major training area and port categories are the only categories which did not place Quality of Life as the next most important measure of merit.

[3] The Command and Control Center installation category actually has 52 percent of the total weight attached to the Mission Essentiality and Mission Suitability Measures of Merit.

MANEUVER INSTALLATIONS

Measure of Merit	Points
Mission Essentiality	250
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	200
Total	1,000

MAJOR TRAINING AREAS

Measure of Merit	Points
Mission Essentiality	250
Mission Suitability	350
Operational Efficiency	150
Expandability	150
Quality of Life	100
Total	1,000

INITIAL ENTRY/BRANCH SCHOOLS

Measure of Merit Points	
Mission Essentiality	250
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	200
Total	1,000

PROFESSIONAL SCHOOLS

Measure of Merit	Points
Mission Essentiality	250
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	200
Total	1,000

COMMAND & CONTROL CENTERS

Measure of Merit	Points
Mission Essentiality	250
Mission Suitability	250
Operational Efficiency	110
Expandability	150
Quality of Life	200
Total	960

DEPOTS

Measure of Merit	Points
Mission Essentiality	250
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	200
Total	1,000

COMMODITY ORIENTED

Measure of Merit	Points
Mission Essentiality	250
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	200
Total	1,000

PRODUCTION INSTALLATIONS

Measure of Merit	Points
Mission Essentiality	250
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	200
Total	1,000

PORTS

Measure of Merit	Ocean Points	Ammo Points
Mission Essentiality	350	450
Mission Suitability	350	450
Operational Efficiency	75	30
Expandability	150	40
Quality of Life	75	30
Total	1,000	1,000

USACE

Measure of Merit	Points
Mission Essentiality	250
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	200
Total	1,000

Figure A-2. ARMY BRAC 91 MEASURES OF MERIT WEIGHTING SYSTEM

Operational Efficiency and Expandability each received 150 points in eight of the ten installation categories. Command and control centers only awarded 110 points to the Operational Efficiency measure of merit. Ports awarded only 75 points to this measure of merit.

b. **Attributes.** Annex C of this study analyzes the attributes in detail. The weights assigned to each attribute are not discussed in this analysis of the measurements of merit. The recommendations for changing the attributes in Annex C, however, were incorporated in the final points applied to each measure of merit here in Annex A. Again, our analysis of the total points assigned to each measure of merit is designed to determine whether the priorities of the five measures of merit are in line with the Army's requirements as stated in today's current planning concepts.

c. **Mission Essentiality and Mission Suitability.** Mission Essentiality and Mission Suitability were the two highest priority measures of merit in Army BRAC 91. This emphasis accurately reflects current Army thinking that preparedness through training is vital to the defense of the nation. Training the individual soldier or a unit to perform the expected mission is paramount to any other consideration. If an individual or a unit cannot perform the expected mission, then that person or unit faces elimination from the force structure. A realistic training environment is necessary for preparedness which is the first step to victory in any conflict. This importance is illustrated by the fact that all ten installation categories give more weight to these two measures of merit than the other three.

d. **Quality of Life.** To keep well-trained soldiers in the military with a high state of morale, the Army must ensure that their working conditions are adequately suited for their mission. Support systems for the soldier's family need to be functional. Living conditions need to be conducive to the health and welfare of the soldier and his dependents. For this reason, the Quality of Life measure of merit was more important than Expandability or Operational efficiencies within most installation categories. This is especially true where troops live, train, and work. The Quality of Life measure of merit was the second priority in eight of the ten installation categories. The two exceptions were the major training areas and ports categories. This is due to the uniqueness of these installation categories.

e. **Operational Efficiency.** In every category, except ports, the Operational Efficiency measure of merit was assigned 150 points. In the ports category, it received only 75 points (for ocean ports) or 30 points (for ammunition ports), in order to allow more points for Mission Essentiality and Mission Suitability. In light of tight budgets and the need to make the best use of every defense dollar, it is important that Army installations be as efficient and economical to operate as possible. However, the importance of this measure cannot be increased by giving it more points without reducing the relative importance of the other measures.

f. **Expandibility.** This measure received 150 points in all ten installation categories except for the ammunition port category which only received 40 points. The need to support expandibility is a theme that figures prominently in the Army's vision of the future. Therefore, the weight given to this measure in Army BRAC 91 needs to be increased for Army BRAC 93. This will be addressed later in this annex when the documents expressing the Army's vision for the future are examined.

g. **Weaknesses.** The significant weaknesses uncovered during site visits and ESSC's analysis of the Army BRAC 91 measures of merit are discussed below. Many weaknesses apply not only to the measures of merit, but to other issue areas that impact the measures of merit.

(1) ***Inability to Determine Installation Uniqueness.*** White Sands Missile Range is the only major joint inland range. It is a unique, one-of-a-kind post. Therein lies its military value. White Sands has a large amount of range area but none for maneuver training. It is not only important for missile firing training, but also for training on all U.S. tactical weapons systems. White Sands Missile Range, when combined with the training ranges of Fort Bliss, provides a totally unique range system. Thus, unique training areas may have very good ranges but receive a lower score in Quality of Life. The major training areas and ports installation categories reflect this by the lower weights applied to the Quality of Life measure of merit. These installation categories attempt to place an emphasis in uniqueness. Some BRAC analysts who were interviewed at these installations believed that the weights assigned are not indicative of the real importance of unique training areas and mission support functions.

(2) ***Judgement of Multi-Diversity.*** Multi-diversity is difficult to evaluate. How do you accurately portray a multi-function post? Site visits to the various installations revealed an overall dissatisfaction in the judging of military value of diverse posts. Many of the installations had multi-missions or large tenant activities and were unsure of how to evaluate themselves. They did not know how to properly reflect a large diverse tenant population through measures of merit and their respective weights.

(3) ***Mobilization Requirements.*** The measures of merit do not specify requirement differences between partial and full mobilization. Some installations felt the measures of merit reflected very little interest in mobilization requirements.

(4) ***Quantitative Analysis.*** The perceptions at the installations are that the Army BRAC 91 analysis was one of pure number crunching rather than an economic or engineering analysis. In their opinion, the measures of merit cannot accurately and fairly reflect military value due to the number of unique variables not captured. The installations believe there are more considerations to military value than the simple mathematics of the present scoring system.

h. **Strengths.** Some of the strengths of the Army BRAC 91 process are discussed in the following paragraphs.

(1) ***Accuracy.*** While there may be room for adjusting the weights of some measures of merit, the relative order of the Army BRAC 91 measures of merit accurately reflected the priorities cited in then current planning documents. Mission Essentiality and Mission Suitability are the highest priorities since they impact mission preparedness. Quality of Life is the next priority because the Army wants to keep these mission ready soldiers in the service once they are trained. The other measures of merit are important, but play support roles in preparing the force.

(2) ***Initial Measurement Gage.*** Although not an exact science, the weights assigned to the measures of merit to develop a quantifiable ranking comparison are a means to measure military value in the short time allotted to respond to BRAC 93. As an initial measurement gauge, these measures of merit become the starting point to begin the evaluation of the installations.

(3) ***Familiarity***. The measures of merit used during the Army BRAC 91 are known and understood by Army BRAC planners. Installations are now familiar with the measures of merit, their meaning, and their application. Change would only raise additional problems of retraining and re-communicating new measures of merit guidance.

9. **U.S. MILITARY VISION.** The Army is currently determining what its force structure and materiel requirements will be for the year 2000 and beyond. To support this Army of the future in a changing world environment, it is appropriate that the Army reduce its structure but maintain its capability to meet these "new world" missions. The Army must divest any function, organization, equipment, or facility that does not contribute to the essence of the Army or to its mission. Consolidation is necessary for functions and facilities when cost-effective, affordable, and consistent with Army missions. This changing world environment is causing a new focus and vision. The essence of this new focus and vision needs to be in the measures of merit used in Army BRAC 93 since they impact our installations of the future. ESSC captures the Army's strategy in the measures of merit by examining the National Military Strategy, The Army Plan, the Army Long Range Planning Guidance, The Army Stationing Strategy, and Airland Operations. These documents provide detailed doctrinal and strategic trends for the future.

a. **National Military Strategy of the U.S.**[4]. The National Military Strategy (NMS) implements the Defense Agenda of the President's National Security Strategy. It also spells out the Secretary of Defense's policies in the Defense Planning Guidance in the Annual Report to the President and the Congress.

(1) ***NMS - Preparing for the Future***. The strategic principles in the NMS that reflect the trends for the future and directly impact Army BRAC 93 measures of merit are:

(a) *Readiness*. As the military reduces in size, it must not become under-manned, under-trained, nor unprepared for immediate deployment.

(b) *Collective Security*. The response to a crisis through multilateral organizations under the auspices of international security organizations.

(c) *Arms Control*. The reduction of weapons of mass destruction while retaining vital military capabilities.

(d) *Maritime & Aerospace Superiority*. The ability to establish control of the sea, air, and space quickly.

(e) *Strategic Agility*. The capability to rapidly move needed forces anywhere in the world on short notice.

(f) *Power Projection*. The ability to project power from the U.S. and from forward deployed areas.

(g) *Technological Superiority*. The reliance on technological superiority to

---

[4] *National Military Strategy of the United States* (Joint Chiefs of Staff, January 1992).

offset quantitative advantages.

(h) *Decisive Force.* The ability to assemble the appropriate forces needed to win rapidly.

(2) ***NMS and the Measures of Merit.*** The NMS provides an emphasis on deterrence, crisis response, force packages, research and development, and a regional focus. As seen by the strategic principles which guide the Army of the future, training for mission preparedness is clearly in the first two measures of merit, Mission Essentiality and Mission Suitability. As inferred elements, these two measures of merit are in five of the eight trends for the future referenced in NMS. The Expandability measure of merit has a greater role in the Army of the future. This measure of merit is an inferred element in three of the eight trends for the future referenced in NMS. Although Operational Efficiency is important to the Army, as a measure of merit, Expandability begins to take on a greater importance than Operational Efficiencies. Although not directly stated, the Quality of Life measure of merit is important in maintaining a high state of morale. This high morale enables the soldier to perform his mission effectively and makes it possible to maintain the high quality forces that are the explicit goal of the NMS.

b. **The Army Plan**[5]. The Army Plan (TAP) provides planning guidance and objectives for the Army. It summarizes National Military Strategy and Security Policy for the Army. The TAP articulates the current view of the force in 1999 and 2009. The standing resource priorities in TAP that reflect the trend for the future and directly impact the Army BRAC 93 measures of merit are a trained and ready force which is the overarching priority. All other resource priorities are supportive to this trained and ready force.

(1) ***TAP - Preparing for the Future.*** To ensure quality training and readiness during decrements, the TAP states that the Army must maintain the Quality of the Total Force. The Army must also maintain Quality of Life. The Army must ensure that the end state (Total Force) is sustainable. The Army will protect the modernization of the future Total Force. We must rationally evolve the Total Force into a smaller, but versatile, deployable, and lethal Army. The Army will protect, maintain, and revitalize base structures and infrastructure for the Total Force in the end state.

(2) ***TAP - Implementation.*** This new national military strategy can only occur through peacetime interactions by relying on collective security and international relationships. The Army must be capable of managing uncertainty and meeting challenges with an intelligent and realistic vision. The Army must attract and keep high quality soldiers and civilians to resource the force for decisive victory. The Army will maintain readiness by focusing on tough, realistic training with the most advanced technology in weapons and equipment. We must shape the Army with the appropriate mix of forces to maintain a qualitative warfighting advantage.

(3) ***TAP and the Measures of Merit.*** The TAP provides a strong impetus to break the historical pattern of losing capability while reorganizing through force reductions. The first two measures of merit, Mission Essentiality and Mission Suitability, clearly focus on the steps the Army must take to provide a trained and ready force, i.e. to maintain the edge and to maintain a quality force. As inferred elements in four of the six trends for the future referenced in TAP,

---

[5] *The Army Plan FY 1994-2009* (Department of the Army, 10 October 1991).

these two measures of merit are critical to the Army of the future. These same two measures of merit directly relate to two of the five implementation steps in the TAP. Maintaining Quality of Life is a stated goal in the TAP. The Quality of Life measure of merit is also paramount to one of TAP's implementation steps in attracting and retaining quality soldiers. Therefore, the Quality of Life measure of merit is important to the Army of the future. TAP also mentions the importance of adaptability, expandability, mobilization, flexibility, and crisis response. Therefore, the Expandability measure of merit has a greater role in the Army of the future. The Expandability measure of merit is an inferred element in two of the six trends for the future referenced in TAP. Although Operational Efficiency is important to the Army, as a measure of merit, Expandability begins to take on added value over Operational Efficiency.

c. **Army Long-Range Planning Guidance**[6]. The Army Long Range Planning Guidance (ALRPG) examines the external and internal trends and potential events that may have an impact on Army missions and capabilities in the future. The focus of ALRPG is to maintain the edge, reshape the force, provide resources to the force, and to strengthen the Total Force.

(1) ***ALRPG - Preparing for the Future.*** The characteristics in the ALRPG that reflect the trends for the future and directly impact the measures of merit are:

(a) *Versatility.* A versatile Army that includes quality soldiers and civilians, the appropriately structured and designed forces, intensive and frequent training, and well trained leaders.

(b) *Deployability.* A deployable Army that includes strategic lift, forcible entry capability, deployable equipment and support organizations, war reserves and pre-positioned equipment and supplies, and focused training and exercise programs.

(c) *Lethalness.* A lethal Army that exhibits evolutionary warfighting doctrine, technological modernization, and combat readiness of the force.

(d) *Expandability.* An expandable Army that provides an enhancement of reserve capability and the development of a mobilization apparatus.

(e) *Base Operations.* Base operations which provide excellent facilities and services to maintain combat forces, training, industrial base preparedness, mobilization, deployment, and high quality of life standards.

(f) *Environmental Concern.* Exercising stewardship in preserving and protecting the environment, and enhancing cultural and natural resources on Army installations.

(g) *Infrastructure.* Focusing resources on revitalizing the infrastructure that will remain after the force structure reductions and base closures. Emphasizing in a smaller, CONUS-based Army and power projection.

(2) ***ALRPG and the Measures of Merit.*** The ALRPG stresses the importance of a logistics sustainment base, administrative and command and control centers, transportation, and professionalism. The first two measures of merit, Mission Essentiality and Mission Suitability,

---

[6] *Army Long Range Planning Guidance* (Office of the Deputy Chief of Staff for Operations, June 1991).

examine characteristics that will clearly impact the future Army. As inferred elements, these two measures of merit are part of four of the seven trends for the future referenced in the ALRPG. Maintaining a Quality of Life standards for the Total Army family is a stated goal in the ALRPG. The Quality of Life measure of merit is paramount in attracting and retaining high quality soldiers. Therefore, the Quality of Life measure of merit is important to the Army of the future. The ALRPG also directly mentions the importance of Expandability. Therefore, the Expandability measure of merit has a greater role in the Army of the future. The Expandability measure of merit is an inferred element in four of the seven trends for the future referenced in the ALRPG. Although Operational Efficiency is important to the Army, as a measure of merit. Expandability begins to take on added value over Operational Efficiency.

d. **The Army Stationing Strategy**[7]. The Army Stationing Strategy provides the conceptual framework to guide the Major Commands (FORSCOM and TRADOC) in development of their visions of the future. It describes a greater reliance upon rapid deployment in sustainable packages when required to respond to a contingency. The requirement for the future is to provide a trained and ready force.

(1) ***Army Stationing Strategy - Preparing for the Future.*** The characteristics in the Army Stationing Strategy that reflect the trends for the future and directly impact the measures of merit are:

(a) *Training.* New systems will greatly impact peacetime training. The Army needs to provide training areas (maneuver and firing ranges), and facilities to support a trained and ready force.

(b) *Expandability.* Weapons lethality, effects, Command, Control, communications, Intelligence, and maneuverability will continue to grow with the future. The installation base structure needs to be capable of responding to future force structure changes and advances in weapons systems.

(c) *Environment.* Wise management and stewardship of training assets requires planning for environmental regeneration of training land and protection of endangered species and flora.

(d) *Mobilization.* Decreased forward deployment and a smaller Army require significant increased reliance on mobilization. A need for adequate mobilization and deployment capabilities to ensure an effective response to a contingency.

(e) *Quality of Life.* Minimize the hardships for soldiers, families, and civilian employees who comprise the Army community on each post.

(2) ***Army Stationing Strategy and the Measures of Merit.*** The Army Stationing Strategy stresses the importance of mission preparedness and Quality of Life. In fact, the Army Stationing Strategy states "Mission and high quality of life go hand in hand. The best quality of life the Army can provide for its soldiers is tough, realistic training..." As seen by the characteristics of the Army Stationing Strategy, the first two measures of merit, Mission Essentiality and Mission Suitability, impact the future Army. As inferred elements, these two

---

[7] *Draft Army Stationing Strategy* (Office of the Deputy Chief of Staff for Operations, May 1992).

measures of merit are in two of the five trends for the future referenced in the Army Stationing Strategy. Maintaining a Quality of Life for the Army community is a direct quote from the Army Stationing Strategy. In fact, the Quality of Life measure of merit as a priority is put on a par with mission training requirements. Therefore, the Quality of Life measure of merit is important to the Army of the future. The Army Stationing Strategy also directly mentions the importance of Expandability. We can see the Expandability measure of merit has a greater role in the Army of the future. The Expandability measure of merit is an inferred element in three of the five trends for the future referenced in the Army Stationing Strategy. Although Operational Efficiency is important to the Army, as a measure of merit, Expandability begins to take on added value over Operational Efficiency.

e. **Airland Operations**[8]. AirLand Operations doctrine conducts operations across an operational continuum, using power projection, decisive advantage, and joint and combined operations which include Total Force Integration. This document is the plan that describes how the Army will fight in the future and win.

(1) ***Airland Operations - Preparing for the Future.*** The operations in this document that reflect the trends for the future and directly impact the measures of merit are:

(a) *Versatility*. The ability to tailor forces for specific missions. To be able to counter a vast array of threats with a small force. This will require the correct mix of forces, logistics, skills, and equipment. The Army needs to be in a state of readiness so when called upon to perform a mission it will do the task effectively. Through realistic and rigorous training, having the correct mix of units (active and reserve), and an effective sustainment base capable of supporting it, these goals are obtainable.

(b) *Deployability*. Military units must be globally deployable with little or no warning. Units must be inter-operable with allied units and other U.S. services. The U.S. must be capable of rapidly deploying a force on a global scale with a regional focus while always maintaining a counterbalance to a possible renewed Soviet threat.

(c) *Lethalness*. The capability to defeat an enemy quickly, with minimum losses. The Army must be able to support the four Defense Policy Foundations - Strategic Deterrence, Forward Presence, Crises Response, and Reconstitution.

(d) *Expandability*. The use of reserve forces to expand the active force. The U.S. Army will need to maintain the mobilization stations necessary to provide this capability.

(e) *Supportability*. The use of fewer resources and installations while maintaining the capability to enforce national strategic goals. The U.S. Army must continue to develop modern equipment and warfighting systems that provide the edge over superior numbers. The Army's need for Service Support and Combat Service Support units and missions will always be the determining multiplier on the battlefield.

(2) ***Airland Operations and the Measures of Merit.*** Airland Operations also focuses on an end state that provides a prepared force capable of completing any mission, anywhere, at any time. According to Airland Operations this is obtainable through realistic training,

---

[8] *Airland Operations* (TRADOC PAM 525-5, 1 August 1991).

technological superiority, and competent soldiers with a high morale. As seen in the future trends of Airland Operations, the Mission Essentiality and Mission Suitability measures of merit play a huge role in the Army's future. As inferred elements, these two measures of merit are in all five trends for the future referenced in Airland Operations These future trends emphasize the importance placed upon installations that provide the capability to train and become mission ready. Although not directly stated, the Quality of Life measure of merit is necessary in maintaining a high state of morale which enables the soldier to perform assigned missions effectively. Airland Operations also mentions the importance of flexibility, reducing duplication, transition from peace to war, and staging. Therefore, the Expandability measure of merit has a greater role in the Army of the future. The Expandability requirement is a direct quote from Airland Operations trends for the future. Therefore, although Operational Efficiency is important to the Army, as a measure of merit, Expandability begins to take on added value over Operational Efficiency.

f. **Summary of Army Planning Documents.** Common to all of the Army's planning documents is the change in the Army's military strategy. In the past, the U.S. considered global war a real and dangerous possibility. The future concept is more regionally oriented. The major threat is with the uncertain and the unknown. The U.S. will combat these uncertainties with a smaller but more technically advanced Total Force. The CINC's will direct the planning process. Plans will have to be adaptable for any contingency. The spearhead of the Army will be strategic agility and decisive force. Lastly, The noncombatant roles the Army performs require no less attention and effort. Especially since, they will suffice to keep conflict from occurring and escalating into war. The clear message in all of these planning documents is preparedness. The Army of the future does not want to encounter a disaster as demonstrated by Task Force Smith at the opening of the Korean War. The reductions in the military after World War II left the U.S. ill prepared to fend off the initial attacks of the North Korean Army. Therefore, these planning documents all portray an Army in the future that must be capable of performing its mission while maintaining a high state of morale. In summary, there are three dominant principles mentioned in all five future planning documents from which the future Army will develop. The future Army will be mission oriented, have a high Quality of life, and be expandable. It is these principles that need to be reflected in the BRAC measures of merit.

(1) ***Mission Oriented.*** Performing tough, realistic training and continually being mission ready through maximum productive use of existing installation resources is the number one priority of the Army of the future. Training is paramount to preparedness. The capability to provide the Army with well trained quality soldiers is the foundation for its military value. Mission preparedness is inferred in five of the eight future trends in NMS. TAP cites mission oriented goals in four of its six trends for the future. The ALRPG mentions mission preparedness in four of its seven characteristics for the future. The Army Stationing Strategy supports this number one priority mentioning mission preparedness through realistic mission training in two trends of the future. Airland operations mentions the importance of mission in all five of its future trends. Mission Essentiality and Mission Suitability are the two measures of merit that capture this important military value for the future Army. Therefore, for BRAC 93 the Mission Essentiality and Mission Suitability measures of merit need to appropriately reflect this military value as the number one priority.

(2) ***High Quality of Life Standards.*** Providing the Army's soldiers, family members, and civilian employees with a quality base structure in which to work, train, and live is also an important goal for the future Army. TAP states that the Army must maintain a Quality of Life in

order to retain and attract quality soldiers. Maintaining Quality of Life standards for the Total Army family is a direct quote from the ALRPG. In military value, the Army Stationing Study puts Quality of Life on an even par with mission preparedness. Although not directly stated in the other planning documents, it is an inferred element in maintaining a high state of morale which enables soldiers to perform their mission effectively. The Quality of Life measure of merit is therefore, a secondary priority that supports the end state of mission preparedness. Thus, for BRAC 93 the Quality of Life measure of merit needs to appropriately reflect this military value as the priority immediately below mission essentiality and mission suitability.

(3) ***Expandability***. Expandability is the capability of the nation to quickly expand at any time its mobilization and industrial base to meet deployment requirements for any regional conflict. This is an important military value that needs to be in the BRAC measures of merit. Expandability has a greater role in the Army of the future. Expandability is an inferred element in three of the eight future trends in NMS. TAP refers to the importance of expandability in two of its six trends for the future Army. The ALRPG references expandability in four of its seven trends for the future Army. The Army Stationing Strategy mentions elements of expandability in three of its five future trends. The importance of expandability is also stated in Airland Operations. Clearly, expandability is a vital measure of merit that needs to have the appropriate weight to measure its military value for the Army of the future. For this reason, the weight assigned to the Expandability measure of merit needs to be raised to show this importance. For Army BRAC 93, expandability should be the next priority following the Quality of Life measure of merit.

Blank Page

III. RESULTS

10. **INTRODUCTION.** This section synthesizes the measures of merit analyzed in this annex into findings and recommendations. We then summarize our findings and recommendations in **Figure A-3** showing ESSC's proposed changes for Army BRAC 93.

11. **MEASURES OF MERIT FINDINGS.**

- **FINDING 1.** The Mission Essentiality and Mission Suitability are the highest priority measures of merit. However, Mission Essentiality deserves the greater weight of the two because it measures those attributes deemed as the most important for accomplishing the installation's primary mission.

  DISCUSSION. Mission Essentiality and Mission Suitability were considered very important during BRAC 91. Consequently, the Army assigned the greatest weight to these two measures of merit. ESSC found that today's planning documents confirm this Army BRAC decision. The Army of the future will continue to focus on mission preparedness through tough, realistic training.

  RECOMMENDATION. Maintain the current emphasis on the Mission Essentiality and Mission Suitability measures of merit, but shift weights to give greater significance to Mission Essentiality.

- **FINDING 2.** Quality of Life is the next highest priority measure of merit for the Army of the future.

  DISCUSSION. Quality of Life was the second priority during Army BRAC 91 for most installation categories. Consequently, the Army assigned the second greatest weight to this measure of merit. ESSC found that today's planning documents also confirm this BRAC decision. The Army of the future will continue to support the Total Army Community through Quality of Life standards that retain and attract quality soldiers and civilians. However, the nature of the mission and on-post population in the major training areas and industrial categories is such that the best way to support the personnel on these installations is to emphasize mission measures.

  RECOMMENDATION. Maintain the current priority and weight assigned to the Quality of Life measure of merit for those installation categories with significant on-post troop populations. For major training areas and the industrial categories, we recommend shifting weight from Quality of Life to the other measures of merit.

- **FINDING 3.** The Expandability measure of merit needs more weight to truly illustrate its miliary value.

  DISCUSSION. All of today's Army planning documents stress the importance of expandability in the future. An equal weight between the Expandability and Operational Efficiencies is not in line with current planning strategy for the Army of

MANEUVER INSTALLATIONS

Measure of Merit	Old	New
Mission Essentiality	250	275
Mission Suitability	250	225
Operational Efficiency	150	100
Expandability	150	200
Quality of Life	200	200
Total	1,000	1,000

MAJOR TRAINING AREAS

Measure of Merit	Old	New
Mission Essentiality	250	350
Mission Suitability	350	250
Operational Efficiency	150	100
Expandability	150	200
Quality of Life	100	100
Total	1,000	1,000

INITIAL ENTRY/BRANCH SCHOOLS

Measure of Merit	Old	New
Mission Essentiality	250	275
Mission Suitability	250	225
Operational Efficiency	150	100
Expandability	150	200
Quality of Life	200	200
Total	1,000	1,000

PROFESSIONAL SCHOOLS

Measure of Merit	Old	New
Mission Essentiality	250	275
Mission Suitability	250	225
Operational Efficiency	150	100
Expandability	150	200
Quality of Life	200	200
Total	1,000	1,000

COMMAND & CONTROL CENTERS

Measure of Merit	Old	New
Mission Essentiality	250	275
Mission Suitability	250	225
Operational Efficiency	110	100
Expandability	150	200
Quality of Life	200	200
Total	960	1,000

DEPOTS

Measure of Merit	Old	New
Mission Essentiality	250	300
Mission Suitability	250	250
Operational Efficiency	150	150
Expandability	150	150
Quality of Life	200	150
Total	1,000	1,000

COMMODITY ORIENTED*

Measure of Merit	Old	New
Mission Essentiality	250	300
Mission Suitability	250	250
Operational Efficiency	150	150
Expandability	150	150
Quality of Life	200	150
Total	1,000	1,000

PRODUCTION INSTALLATIONS

Measure of Merit	Old	New
Mission Essentiality	250	300
Mission Suitability	250	250
Operational Efficiency	150	150
Expandability	150	150
Quality of Life	200	150
Total	1,000	1,000

OCEAN PORTS

Measure of Merit	Old	New
Mission Essentiality	350	300
Mission Suitability	350	250
Operational Efficiency	75	150
Expandability	150	150
Quality of Life	75	150
Total	1,000	1,000

AMMO PORTS

Measure of Merit	Old	New
Mission Essentiality	450	300
Mission Suitability	450	250
Operational Efficiency	30	150
Expandability	40	150
Quality of Life	30	150
Total	1,000	1,000

*A single category in Army BRAC 91: ESSC recommends dividing these installations into three categories for Army BRAC 93 (proving grounds, research and development centers, and inventory control points). See Annex C, Attributes, for an explanation of this change.

Figure A-3. MEASURES OF MERIT WEIGHTING SYSTEM

the future. Although important, the Operational Efficiency measure of merit does not carry the same weight in military value as Expandability, except in the industrial category where the goals of efficiency and expandability are complementary.

RECOMMENDATION. Insert the Expandability measure of merit as the priority with a greater weight than Operational Efficiency but less or equal to the Quality of Life measure of merit, except in the industrial categories where we recommend retaining the Army BRAC 91 weights for expandability and operational efficiency.

- **FINDING 4.** All installation categories should be based on a 1,000 point total in its measures of merit.

  DISCUSSION. All of the installation categories use a 1,000 total point system for the measures of merit except Command and Control Centers. Command and Control Centers used a 960 point system due to the dropping of two attributes that could not be applied to all Command and Control installations. The remaining attributes should absorb this reduction in points to equal 1,000 points for uniformity. At first glance, the lower points without an explanation appear unfair.

  RECOMMENDATION. Distribute the lost points proportionally between the remaining attributes within Command and Control Centers to raise the total measure of merit weights to 1,000 points.

- **FINDING 5.** Installation uniqueness and multi-diversity are difficult to capture in the measures of merit.

  DISCUSSION. There are a few installations that are of great military value but cannot rate very high under the point system in one or two measures of merit. This is usually due to a unique mission or a one of a kind location. Many installations have multi-missions or large tenant activities and are unsure of how to evaluate themselves for military value.

  RECOMMENDATION. Continue to capture these differences in the weights assigned to the attributes within each type of unique installation category. For example, Ports and Major Training Areas weighted the measures of merit toward their specific unique missions. This area is examined in Annex C, Attributes, where we evaluate attribute weights used to emphasis unique missions within different categories.

12. **SUMMARY RESULTS.** The results of our findings and recommendations are in Figure A-3. This figure considers our findings and recommendations, incorporates their intent, and provides our recommended Army BRAC 93 measures of merit.

Blank Page

LAST PAGE OF ANNEX A

ANNEX B

INSTALLATIONS AND CATEGORIES

ANNEX B

INSTALLATIONS AND CATEGORIES

Blank Page

I. INTRODUCTION

1. **PURPOSE.** This annex examines the validity of the installations considered and the categories used by the Army in the Base Relocation and Closure 91 (BRAC 91), Phase I, process.

2. **SCOPE.** This annex--

a. Evaluates installation categories used in Army BRAC 91.

b. Reviews the process of placing installations into categories.

c. Suggests improvements to the existing installation and category structure for use in Army BRAC 93.

3. **BACKGROUND.** The Engineer Strategic Study Center (ESSC) arranged this study into a main paper and five annexes. The main paper summarizes the key points of each annex and provides ESSC's overall conclusions and recommendations. The five annexes provide an in-depth analysis of the Army BRAC-Phase I process. This annex specifically reviews the logic used to allocate Army installations to categories.

4. **APPROACH.** Our overall analysis approach in this annex is to examine the structure of the categories used in the Army BRAC 91, analyze the component parts of these categories, and recommend improvements to the present structure of categories based upon our findings. More specifically, ESSC organized its examination of the Army's BRAC 91 use of categories to review installations into three parts:

a. The first part of this analysis looks at the Army BRAC 91 installation categories and their effectiveness. As a basis for this analysis, we review the categories used by other services and in previous Army stationing studies.

b. The second part of the analysis looks at how the Army allocates installations into each category. Simply put, is each installation matched with the correct category?

c. The last part of this annex summarizes the results of our analysis, and provides recommendations for improvements to the category system based on our findings.

5. **ESSENTIAL ELEMENTS OF ANALYSIS.** ESSC uses questions to facilitate its discussion and focus its analysis. The essential elements of analysis that are crucial to our discussion of the Army's categories and installations are:

- What is the best array of installation categories?
- What is the best allocation of installations into categories?

Blank Page

II. DISCUSSION

6. ARMY BRAC 91 INSTALLATION CATEGORIES ANALYSIS.

a. **Background.** The 1988 Defense Secretary's BRAC Commission study[1] states that one of the first steps in the BRAC process is to establish a complete inventory of installations and assign them to categories. Both the 1991 BRAC Commission and the Army's Total Army Basing Study (TABS) group used a similar approach as they initiated their BRAC review. The Army's BRAC 91 submission noted that "before proceeding with its study, the Army divided its installations into . . . categories to facilitate comparison of those with similar functions . . . ."[2] Our analysis builds upon what has been done in the past--to improve the process for the future.

b. **Army BRAC 91 Categories.** For BRAC 91, the Army identified seven main categories and eighteen subcategories (see **Figure B-1**) for the analysis. The purpose of these categories is to allow the Army to place installations of similar function or mission into a group for comparison (see **Figure B-2**). The desired result is that "apples are compared to apples" (e.g. training installations are compared to training installations).

c. **Weaknesses of Army BRAC 91 Categories.** Many of ESSC's discussions with BRAC subject matter experts highlighted weaknesses in the Army BRAC 91 installation categories. In this section we examine these weaknesses.

(1) ***Industrial.*** Perhaps the most documented weakness was identified in a 1991 Army Audit Agency (AAA) report.[3] AAA suggested that the Army Material Command (AMC) further subdivide its industrial commodity subcategory into three groups: proving grounds (PG), research and development (R&D) centers, and inventory control points (ICPs). This, AAA suggests, would bring these installations into functional alignment.

(2) ***Command & Control.*** Another weakness that emerged during our research and data collection was that the Command and Control category was in effect a miscellaneous category. For example, Fort Belvoir and Fort Devens contain a large collection of unrelated units and activities--active, reserve, and TDA (Table of Distribution and Allowance) units. Fort Ritchie, a small post, contains a small subordinate command of the Information System Command--the 7th Signal Brigade and supports the Alternate National Military Command Center. Forts Monroe, Shafter, and McPherson are homes for Army major command (MACOM) headquarters, while Fort Meade and Fort Gillem contain Army Reserve Headquarters. Fort Totten and Fort Hamilton are small posts with reserve and recruiting responsibilities. All these posts also contain other activities and tenants.

---

[1] *Report of the Defense Secretary's Commission* (Defense Secretary's Commission on Base Realignment and Closure, December 1988). Herein referred to as BRAC 88.

[2] *Report to the Secretary of Defense on Base Closure and Realignment* (Department of the Army, 1 April 1991), p 17. Herein referred to as BRAC 91.

[3] *Lessons Learned for Future Basing Studies, AAA Report HQ 91-710* (U.S. Army Audit Agency, 17 September 1991).

Command & Control
Fighting Maneuver Training Areas
Training Initial Entry/Branch Schools Professional Schools
Industrial Depots Commodity Production Ports
Reserve Component National Guard U.S. Army Reserve
Corps of Engineers Districts Divisions
Others (not considered) Stand Alone Housing Cemeteries Recreation Areas Hospitals Communications Miscellaneous
Source: *Report to the Secretary of Defense on Base Closure and Realignment*, Department of the Army, April 1991. **Note**: Entries in boldface are categories; others are subcategories.

Figure B-1. ARMY BRAC 91 INSTALLATION CATEGORIES

FIGHTING INSTALLATIONS

MANEUVER

Fort Bragg
Fort Campbell
Fort Carson
Fort Drum
Fort Hood
Fort Lewis
Fort Ord
Fort Polk
Fort Richardson
Fort Riley
Schofield Barracks
Fort Stewart
Fort Wainwright

TRAINING AREAS

Fort A.P. Hill
Fort Chaffee
Fort Dix
Fort Greeley
Fort Indiantown Gap
Fort Hunter Liggett
Fort Irwin
Fort McCoy
Fort Pickett

TRAINING INSTALLATIONS

INITIAL ENTRY BRANCH SCHOOLS

Fort Benjamin Harrison
Fort Bennin
Fort Bliss
Fort Eustis
Fort Story
Fort Gordon
Fort Huachuca
Fort Jackson
Fort Knox
Fort Lee
Fort Leonard Wood
Fort McClellan
Fort Rucker
Fort Sam Houston
Fort Sill

PROFESSIONAL SCHOOLS

Carlisle Barracks
Fort Leavenworth
Fort McNair
Presidio of Monterey
West Point

COMMAND & CONTROL INSTALLATIONS

Fort Belvoir
Fort Devens
Fort Gillem
Fort Hamilton
Fort Totten
Fort McPherson
Fort Meade
Fort Monroe
Fort Myer
Fort Ritchie
Fort Shafter

INDUSTRIAL INSTALLATIONS

DEPOTS

Anniston
Blue Grass
Letterkenny
Red River
Sacramento
Savanna
Seneca
Sierra
Tobyhanna
Tooele

COMMODITY ORIENTED

Aberdeen Proving Grounds
Belvoir Fuels
Detroit Arsenal
Dugway Proving Grounds
Fort Detrick
Fort Monmouth
Harry Diamond Laboratory
Natick RD&E
Picatinny Arsenal
Redstone Arsenal
Vint Hill Farm Station
White Sands Missile Range
C.M. Price Support Ctr.
Yuma Proving Grounds

PRODUCTION ORIENTED

Hawthorne
Holston
Iowa
Lake City
Lone Star
McAlester
Milan
Radford
Pine Bluff Arsenal
Rock Island Arsenal
Watervliet Arsenal

PORTS

Bayonne, NJ
Oakland, CA
Sunny Point, NC

Figure B-2. ARMY BRAC 91 INSTALLATION ALLOCATION TO CATEGORIES

(3) ***Fighting.*** The fighting-major training area subcategory is labeled as a "catch all category" by several who worked the Army BRAC 91 process. For instance, although Fort Greeley's primary mission is training, it has more duty personnel assigned to cold regions testing than to the Northern Warfare Training Center. Forts A.P. Hill, Pickett, McCoy, Dix, and Indiantown Gap are semi-active posts that support RC training, while Fort Irwin and Fort Chaffee are national training centers that support mainly active component units.

(4) ***Omitted Categories.*** The absence of certain categories was also pointed out as a weakness by several BRAC analysts. Of specific note were the lack of the following categories: intelligence or "Black" (highly classified) programs, recruiting stations, space, and special operations activities. Many did not agree with the "not considered" status given to the installations placed in the "Other" category.

d. **Comparison of Army Categories to Other BRAC Efforts.** In this section we compare the categories used in Army BRAC 91 with categories used in other BRAC efforts.

(1) **BRAC 88 Commission Study Categories.** As mentioned previously "the first step in installation evaluation was to establish a complete inventory of installations and assign them to categories."[4] The twenty-two categories used by the 1988 BRAC Commission are shown in **Figure B-3.** Several distinct similarities and differences are apparent between the Army's BRAC 91 categories and the Department of Defense BRAC 88 Commission categories. In assessing Army BRAC 91 categories, with respect to figure B-3, our observations are:

- There were six BRAC 88 industrial categories (maintenance depots, supply depots, munitions facilities, industrial facilities, production facilities, and R&D labs) compared to four contained in Army BRAC 91.

- The BRAC 88 headquarters category is synonymous with the Army BRAC 91 Command and Control category.

- BRAC 88 considered special operations, space operations and intelligence sites while Army BRAC 91 did not.

(2) **Air Force Categories.** The Air Force during their BRAC 91 deliberations used a process similar to the Army BRAC 91 process. Like the Army, one of the first steps taken by the Air Force during their analysis was to establish an inventory of installations and allocate them to categories.[5] These categories can be seen in **Figure B-4.** Comparatively, the categories are very similar to the Army's, both in number and function. Considering Army BRAC 91 categories, and using figure B-4 for comparison, our observations are:

---

[4] *Report of the Defense Secretary's Commission* (Defense Secretary's Commission on Base Realignment and Closure, December 1988)

[5] *Base Closure and Realignment Recommendations-Detailed Analysis* (Department of the Air Force, April 1991)

BRAC 88	ARMY BRAC 91
Headquarters	**Command and Control**
Operating Ground	**Fighting** Maneuver Major Training Areas
Operating Troops	
Operating Tactical Aircraft	
Operating Strategic Aircraft	
Operating Mobility Aircraft	
Operating Missiles	
Operating Surface Ships	
Operating Submarines	
Maintenance Depots	**Industrial** Depots Commodity Oriented Production Ports
Supply Depots	
Munitions Facilities	
Industrial Facilities	**Corps of Engineers** Districts Divisions
Production Facilities	
R&D Laboratories	
Guard & Reserve Centers	**Reserve Component** National Guard U.S. Army Reserve
Flying Training	**Training** Initial Entry/Branch Schools Professional Schools
Training Classrooms	
Communications/Intelligence Sites	**Other** (not considered) Stand Along Housing Cemeteries Recreation Areas Hospitals Communications Miscellaneous
Special Operations Bases	
Space Operations Centers	
Medical Facilities	

Sources. *Base Realignments and Closures Report of the Defense Secretary's Commission*, December 1988. Department of the Army, *Report to the Secretary of Defense on Base Closure and Realignment*, 1 April 1991
Note: Entries in boldface are categories; others are sub-categories.

Figure B-3. BRAC 88 AND ARMY BRAC 91 CATEGORY COMPARISONS

ARMY BRAC 91	AIR FORCE
Command & Control	**Other** (Major Command HQ & Space Ops)
Fighting Maneuver Training Areas	**Flying** Strategic Tactical Mobility Training Other (Special Ops)
Training Initial Entry/Branch Schools Professional Schools	**Training**
Industrial Depots Commodity Production Ports	**Support** Depots Products Div. & Labs Test-Facility
Reserve Component National Guard U.S. Army Reserve	**Air Reserve** Air National Guard Air Force Reserve
Corps of Engineers Districts Divisions	
Others (not considered) Stand Alone Housing Cemeteries Recreation Areas Hospitals Communications Miscellaneous	

Sources: *Base Closure and Realignment Recommendations-Detailed Analysis*, Department of the Air Force April 1991, *Report to the Secretary of Defense on Base Closure and Realignment*, Department of the Army, April 1991
Note: Entries in boldface are categories; others are sub-categories.

Figure B-4. ARMY AND AIR FORCE BRAC 91 CATEGORY COMPARISONS

- The Air Force's Other Category which contains major command headquarters and space operations is equivalent to the Army's Command and Control.

- The AF support category is synonymous with the Army's industrial category, but with fewer subcategories.

- Like the Army, the Air Force places training installations into two categories--training and flying.

- The Air Force provides a subcategory for special operations (Other subcategory).

(3) **Navy Categories.** The Department of Navy used 23 Navy and 5 USMC primary categories in its BRAC 91 assessment. No subcategories were used. However upon examination of **Figure B-5**, correlation between some Army subcategories and Navy categories are apparent. With respect to Army BRAC 91 categories, our observations in light of figure B-5 are:

- The Navy's Administrative Category is equivalent to the Army's Command and Control category.

- The Navy lists eleven categories (shipyards, aviation depots, supply centers/depots, RDT&E centers, ordnance centers, ordnance production, strategic ordnance, technical production, ship repair, trident reset, and inventory control points) that are comparable to the Army's four industrial subcategories.

- Communications/Intelligence is considered as a category, as are recruit depots.

(4) **Long Range Stationing Study (LRSS) Categories.** The process of base closure is not a new phenomena. Reports document concerted efforts at base closure starting as early as 1960.[6] The Army has attempted to mitigate adverse turmoil resulting from base closure by establishing long-term stationing plans. Efforts to develop and implement systems to determine Army long-range stationing have yielded benefits.[7] Among these benefits are base stationing methodologies, especially the installation categorization process. **Figure B-6** shows the installation categories used in the Army Long Range Stationing Study compared with the Army BRAC 91 categories. ESSC's observations in light of Figure B-6 are:

- The LRSS Administrative Post Category is the same as the Army's BRAC 91 Command and Control category.

- The LRSS sustaining installations and unique characteristic installations are synonymous with the Army's BRAC 91 industrial category.

---

[6] *Army Base Realignment Methodology, ESC Report 81-12* (U.S. Army Engineer Studies Center, August 1981)

[7] *Long Range Stationing Study* (Department of the Army, Deputy Chief of Staff for Operations and Plans (DA DCSOPS), 19 April 1988)

ARMY BRAC 91	NAVY	USMC
Command & Control	**Administrative**	
Fighting Maneuver Training Areas	**Naval Stations**	**USMC Bases**
	Naval Air Stations	**USMC Air Stations**
	Submarine Bases	**USMC Logistic Bases**
Training Initial Entry/Branch Schools Professional Schools	**Training Bases**	**USMC Recruit Depots**
	Educational Bases	**USMC Unique Bases**
	Shipyards	
	Aviation Depots	
Industrial Depots Commodity Production	**Supply Centers/Depots**	
	RDT&E Centers	
	Ordnance Storage	
	Ordnance Production	
Ports	**Strategic Ordnance**	
Reserve Component National Guard U.S. Army Reserve	**Technical Production**	
	Ship Repair	
	Trident Reset	
Corps of Engineers Districts Divisions	**Inventory Control Pts.**	
	Air Reserve Centers	
Others (not considered) Stand Alone Housing Cemeteries Recreation Areas Hospitals Communications Miscellaneous	**Reserve Centers**	
	Construction Battalion Ctrs.	
	Pubic Works Centers	
	Medical Centers	
	Communication & Intelligence	

Sources. Telephone Conversation between Richard Taylor-ESSC, Captain Hoyt-Department of the Navy, Chief of Naval Operations OP-44-1.
Note: Entries in boldface are categories; others are sub-categories

Figure B-5. ARMY AND NAVY/USMC BRAC 91 CATEGORY COMPARISONS

Army BRAC 91	Long Range Stationing Study (LRSS)
Command & Control	**Administrative Post**
Fighting Maneuver Training Areas	**Mobilization** **Deployment**
Training Initial Entry/Branch Schools Professional Schools	**Joint Combined Arms Training Areas**
	Heavy Division-Multiple Brigade Training **Medium Division-Multiple Brigade Training** **Light Division-Multiple Brigade Training**
	Single Brigade Training
	School-ATC Training Post
Industrial Depots Commodity Production Ports	**Sustaining Installation**
Reserve Component National Guard U.S. Army Reserve	**Unique Characteristic Installation**
Corps of Engineers Districts Divisions	
Others (not considered) Stand Alone Housing Cemeteries Recreation Areas Hospitals Communications Miscellaneous	

Sources. *Report to the Secretary of Defense on Base Closure and Realignment*, Department of the Army, April 1991, *Long Range Stationing Study*, DA DCSOPS, 19 April 1988.
Note: Entries in boldface are categories; others are sub-categories.

Figure B-6. ARMY BRAC 91 AND LRSS CATEGORY COMPARISONS

- The Army's BRAC 91 major training area subcategory is comparable to three LRSS categories (Single Brigade training, joint combined arms training areas, and heavy, medium, light division multiple BDE training).

(5) **Category Analysis Summary.** ESSC recognizes the limitations of comparing categories used for other services and study purposes. However, there are some macro-level benefits to be gained from looking at how others have tackled the same problem. Our observations in light of the Army BRAC 91 category weaknesses are:

(a) ***Industrial Categories.*** All services and reports examined used categories and subcategories that pertained to a service's industrial operations. The Navy has the most industrial categories, followed by the Army, and the Air Force. All consider depots as a separate category. The Navy and the Air Force segregate R&D activities while the Army considers R&D within the confines of the Commodity Subcategory. The Army is the only service to use a commodity subcategory for three industrial or support activities. The AAA report offers a logical proposal to subdivide the commodity category into three subcategories--proving grounds, research and development centers, and inventory control points.[8]

(b) ***Command & Control.*** All services and reports maintained a category or subcategory for command and control. The Air Force "Other" category, LRSS "administrative post", Army's "Command & Control", 1988 BRAC "Headquarters", and the Navy's "Administrative" all point to one function: supporting command operations.

(c) ***Fighting-Major Training Areas.*** The Navy trains at sea, the Air Force trains in the sky, and the Army trains on land. Consequently, other services do not require as much real property training area as the Army. Thus, appropriate comparative categories are not present for analysis. The Air Force, Navy, and Army do, however, share ranges with one another as in the case of White Sands Missile Range.

(d) ***Omitted Categories.*** The Army has omitted inteiligence, special operations, space operations, and recruiting categories. Other services include these categories due to their special mission requirements. Categories listed but not considered in Army BRAC 91 were stand alone housing, cemeteries, recreation areas, hospitals, communications, miscellaneous. The rationale for their exclusion from consideration were many. Most category exclusions were due to their involvement in ongoing reviews and studies in other forums such as Defense Management Review Decisions (DRMDs), Vanguard, and Tri-Service Project Reliance.

7. **ARMY BRAC 91 INSTALLATION ALLOCATION ANALYSIS.** This part of our discussion looks at now the Army allocates installations to each category. Allegorically speaking, we want to place the peaches in the bushel basket, the oranges in the box, and the apples in the crate. Figure B-2 shows the allocation of the installations into categories during Army BRAC 91 by virtue of their primary missic.. The installation's mission dictates which Army Major Command

---

[8] *Lessons Learned for Future Basing Studies, AAA Report HQ 91-710* (U.S. Army Audit Agency, September 1991), p. 17.

(MACOM) they fall under functionally and for BRAC review. Our discussions below look at options for improving several potential weaknesses, so that the Army is assured of having the proper installation in the appropriate category.

a. **Weaknesses of Army BRAC 91 Categories.** ESSC's research and data collection uncovered weaknesses in the Army BRAC 91 installation allocation mechanism. These weaknesses have surfaced through interviews with BRAC analysts and installation staff personnel and are discussed in this section.

(1) ***Diverse Installations.*** Installations that maintain a wide variety of Army missions, capabilities, and functions occasionally cloud the placement of bases into functional categories. Single purpose installations are recognizable and easy to functionally allocate into categories.

(2) ***Functional Crossovers.*** Several installations functionally can be placed into another category due to their mission and function. This causes turmoil in the installation allocation process. In some cases the functional crossover is clear and distinct, in other cases it is not--and may be combined with other BRAC process weaknesses to form a hybrid or third weakness. For example, there are bases that contain both diversity and functional crossover weakness. In our discussion, we present distinct examples. It is a fine line between the weakness of diverse installations and functional crossover--but there is a difference.

b. **Army BRAC 91 Installation Allocations.** ESSC reviewed the installations allocated to categories in Figure B-2. We conducted this review in terms of the diverse (multi-purpose) installation and functional crossover weaknesses discussed above.

(1) ***Installation Trends.*** It is the Army's objective to make installations more diverse. The Army has gone on record as stating that it wants to decrease the number of single purpose installations and create more multi-purpose installations.[9] This trend is growing, and is encouraged by the Army. This makes the BRAC process more difficult by clouding the issue of functional classification of installations. For example, at most installations in almost every category there is an example of the trend towards diversity and the creation of new multi-purpose or administrative categories. There are numerous examples of installations that could be classified into a new multi-purpose or administrative category.

(a) *Industrial Category Diversity.* In the industrial category, Aberdeen Proving Ground (APG) is an Army Materiel Command (AMC) installation with the primary mission of conducting research, development, test and evaluation (RDT&E) activities. APG is home to AMC's Test and Evaluation Command (TECOM). APG is also home to a TRADOC activity which is a significant presence--the ordnance school. This is in addition to the presence of numerous chemical and environmental activities on APG.

(b) *Command & Control Diversity.* In Army BRAC 91, Fort Belvoir was allocated to the Command and Control category. Employees on Fort Belvoir represent such a diverse community that it would also be suited to become allocated to an administrative category--

---

[9] *The Army Stationing Strategy for BRAC 93 (Draft)* (Department of the Army, Deputy Chief of Staff for Operations, May 1992), p. 4

if it existed. No real command activity dominates. Significant presence on Fort Belvoir includes the USA Intelligence and Security Command (INSCOM), Humphreys Engineer Center, Belvoir R & D Center, Military Transportation Management Command, part of the Information Systems Command, as well as part of the Army Ordnance School. Currently, over 100 different activities are supported.

(2) ***Classification Trend.*** ESSC examined the installations classified as training, depots, etc., and concluded that all were placed into a logically appropriate category. However, ESSC also found that, due to their mission and function, some installations could just as well be placed into another existing category.

(a) *Functional Crossover.* A clear examples of how an installation can be classified in one category as well as another are installations in the fighting category and the reserve component (RC) category. For example, the major mission of a significant number of installations in the major training area subcategory are to exclusively support RC training. Fort Indiantown Gap is a state-owned, federally leased, semi-active post, manned by an active duty garrison with the primary mission of supporting reserve component training. However, it is not considered within the RC component category--such as other RC training areas (Camps Grayling, Ripley, and Shelby). Fort Indiantown Gap is allocated to the major training area subcategory. It could be just as easily allocated to the RC category. This situation is a functional crossover.

(3) ***New Allocation Trends.*** New methods of installation allocation for Army BRAC 93 have been offered from the field. These new methods are attempts to incorporate the Army's emphasis towards multi-purpose posts.

(a) *Lumping Scheme.* Many have suggested that the most efficient method to eliminate single purpose posts is to lump categories. This in effect would force elimination of single function posts in favor of larger more diverse installations. For example, one of the most discussed lumping schemes is to eliminate the Command and Control Category, and lump those installations into the fighting category. This would force the Army to consolidate command functions onto fighting installations. The suggestions vary from having a single category, to no more than four. Although an appealing idea in theory, lumping is not practical because it ignores the need to distinguish legitimate differences in the requirements of different missions.

(b) *Multi-Dimensional Scheme.* Another suggested allocation scheme is one that ranks installations against every category in which they are eligible. The drawback of this scheme is that it compounds the data collection problem, is very complicated to analyze and explain, and it clouds the issue of determining military value.

(c) *Expandability Scheme.* The expandability scheme is a variation on the present allocation system. The basic premise is to keep the same system of categories and address the installation's ability to support multi-functions by revising the expandability measure of merit. This could be accomplished by adding a multi-function attribute to the expandability attribute along with assigning increased weight to this measure of merit.

c. **Installation Allocation Summary.**

(1) For Army BRAC 93, just as in past efforts, the logic of grouping installations into categories is quite sound. Lumping all installations together and ignoring their different missions and assets would be foolish. However, functional boundaries will become less clear on installations in the future. The Army has reaffirmed its commitment to large, diverse, efficient installations: "close small, single purpose installations and either consolidate their function onto large, multi-function posts or eliminate them."[10]

(2) Installations are reasonably allocated to categories; no glaring mistakes are seen. The use of an installation's primary mission as the allocation rule allows the simplest and most efficient alignment into categories.

(3) There are functional crossovers; however, the installation allocations were appropriate. Several installations in the major training area subcategory (Fort Pickett, Fort Indiantown Gap and Fort McCoy) could just as easily be placed into the Reserve Component category.

(4) What are considered strengths for the future of the Army are complications for the Army BRAC process. The Army continues its goal of developing multi-purpose installations started in BRAC 91: "The Army will reduce the number of small, single purpose installation and those remaining will house organizations with highly specific missions."[11]

(5) In light of the Army's goal to develop multi-functional posts, it is important that the BRAC 93 installation categorization and assessment scheme be able to adequately support this goal. This does not require a category change. It will be addressed in Annex C: Attributes.

---

[10] *The Army Stationing Strategy for BRAC 93, Draft* (Department of the Army, Deputy Chief of Staff for Operations, May 1992), p. 4.

[11] *Report to the Secretary of Defense on Base Closure and Realignment* (Department of the Army, 1 April 1991), p. 14.

Blank Page

III. RESULTS

8. **FINDINGS.** This section synthesizes our discussion of the Army's BRAC 91 categories and installations into findings and recommendations. We also summarize our findings and recommendations into a final figure (see **Figure B-7**) that compares BRAC 91 categories with the categories we propose for BRAC 93.

ARMY BRAC 91	ARMY BRAC 93
Command & Control	**Command & Control**
Fighting Maneuver Major Training Areas	**Fighting** Maneuver Major Training Areas
Training Initial Entry/Branch Schools Professional Schools	**Training** Initial Entry/Branch Schools Professional Schools
Industrial Depots Commodity Production Ports	**Industrial** Depots R&D Laboratories* Inventory Control Points* Proving Grounds* Production Ports
Reserve Component National Guard U.S. Army Reserve	**Reserve Component** National Guard U.S. Army Reserve
Corps of Engineers Districts Divisions	**Corps of Engineers** (Removed from consideration within BRAC by DOD direction.)
Others (not considered) Stand Alone Housing Cemeteries Recreation Areas Hospitals Communications Miscellaneous	**Other*** Stand Alone Housing Cemeteries Recreation Areas Medical Centers* Special Purpose*

Sources: *Report to the Secretary of Defense on Base Closure and Realignment*, Department of the Army, April 1991
Note: Entries in boldface are categories; others are sub-categories. Asterisk designates change from BRAC 91.

Figure B-7. REVISED CATEGORY RECOMMENDATIONS

- **FINDING 1.** The industrial commodity subcategory contains three functional activities within one subcategory.

  DISCUSSION. ESSC examined the BRAC process used by other military services and past BRAC-type efforts. They all used multiple categories and subcategories for industrial operations. The Navy uses eleven industrial categories, and the Air Force uses three. The Navy and Air Force segregate industrial activities along functional lines. For example, the Navy and the Air Force segregate R&D activities. The Army groups three industrial functional areas within the confines of the commodity subcategory. The AAA proposal on dividing the commodity subcategory is a viable option.

  RECOMMENDATION. Divide the industrial commodity subcategory into three: inventory control points, proving grounds, and R&D laboratories.

- **FINDING 2.** The Army does not fully address installations that have highly specific missions. These installations fall into a special category (e.g. space operations and intelligence).

  DISCUSSION. The Air Force addresses special operations and space within the confines of two categories. The Army has perhaps inadvertently omitted intelligence, special operations, space operations, and other small special purpose installations from consideration. Although, there are few installations engaged in these activities, an important reason exists for considering them. These unique installations have the potential for consolidation with other Army installations or other services in the region. No installations should be eliminated from review simply because "there are only one or two".

  RECOMMENDATION. Create a special purpose category to group installations used for space, intelligence, communications, special operations, and other small special purpose installations.

- **FINDING 3.** Several categories of installation were exempt from review during Army BRAC 91 because of other consolidation actions and management reviews.

  DISCUSSION. The Army exempted many installations from reviews based on the logic that they were being reviewed in other arenas. Many Defense Management Review Decisions, Tri-Service reliance, and other consolidation reviews and studies have completed their first draft. Other critical reviews, such as the Army's Reserve Component Training Requirements study, are in progress. The recommendations and actions from these efforts affect the Army's BRAC process.

RECOMMENDATION. Include all installations for review. Examine the results of the other consolidation studies, particularly medical centers. Include them in the next BRAC 93 process. Of critical importance is the RC Training requirements study. Without that study, the Army's BRAC 93 will be incomplete.

Blank Page

LAST PAGE OF ANNEX B

ANNEX C

ATTRIBUTES

ANNEX C

ATTRIBUTES

Figure		Page
C-1	Army BRAC 91 Phase I Process	C-7
C-2	Revised Attributes for Maneuver Installations	C-10
C-3	Revised Attributes for Major Training Areas	C-15
C-4	Revised Attributes for Initial Entry/Branch Schools	C-20
C-5	Revised Attributes for Professional Schools	C-25
C-6	Revised Attributes for Command and Control Installations	C-30
C-7	Revised Attributes for Depots	C-35
C-8	Revised Attributes for Production Installations	C-39
C-9	Revised Attributes for Ocean Terminal Ports	C-43
C-10	Revised Attributes for Ammunition Ports	C-48
C-11	BRAC 91 Attributes for Commodity Oriented Installations	C-52
C-12	Recommended Attributes for Inventory Control Points	C-53
C-13	Recommended Attributes for Proving Grounds	C-55
C-14	Recommended Attributes for R & D Centers	C-58

I. INTRODUCTION

1. **PURPOSE.** This annex evaluates the suitability of the attributes used by the Army in the Base Realignment and Closure (BRAC) 91-Phase I process.

2. **SCOPE.** This annex--

a. Reviews the attributes used by the Army during BRAC 91 and their relationship to the installation assessment process.

b. Analyzes the Army BRAC 91 attributes for redundancy, applicability, and dependability as a true measure of military value.

c. Explores the use of new attributes to measure military value in the Army BRAC 93 process.

d. Provides recommendations for improving the attributes in BRAC 93 to better reflect the Army's installations of the future.

3. **BACKGROUND.** The Engineer Strategic Study Center (ESSC) arranged this study into a main paper and five annexes. The main paper summarizes the key points of each annex and provides ESSC's overall conclusions and recommendations. The five annexes provide an in-depth analysis of the Army BRAC 91-Phase I process. This annex focuses on the ability of attributes to measure the military value of installations in support of Army BRAC decisions.

4. **APPROACH.** Our overall analysis approach in this annex is similar to other annexes in this report. ESSC examines the present state of Army attributes, analyzes the individual components, examines factors affecting these components, and recommends improvements to the present state based upon our findings. More specifically, ESSC structured its examination of the Army's use of attributes in BRAC 91 into four parts.

a. **BRAC Attributes Review.** ESSC first reviewed the attributes used during Army BRAC 91. This includes ESSC's look at the weights applied to each attribute for each type of installation.

b. **BRAC 91 Attribute Analysis.** Next, ESSC analyzed the appropriateness of each Army BRAC 91 attribute based on information gathered from reports and interviews with BRAC planners. ESSC as part of this analysis also identified the important strengths and weaknesses of the current attributes used in the Army BRAC 91 process. This includes assessing the validity of

the attributes when compared to the requirements of the latest guidance on the strategic vision for the Army of the future.

c. **New Attributes Analysis.** ESSC examined the feasibility of including several new attributes for BRAC 93. These new attributes were suggested by BRAC subject matter experts.

d. **Findings and Recommendations.** ESSC then developed recommendations for BRAC 93 based on our findings.

5. **ESSENTIAL ELEMENTS OF ANALYSIS.** Several essential elements of analysis are critical to the attributes and their effect on the BRAC process.

- Do the attributes determine military value in light of the Army's new strategic vision?
- Are the attributes used relevant to measuring an installation's mission?

II. DISCUSSION

6. GENERAL.

a. **Basic Concepts of Attribute Analysis.** During the Phase I installation assessment process, the Army evaluated the military value of its installations using measures of merit. Each **measure of merit** is comprised of a set of measurable characteristics called **attributes.** The number of attributes for each installation category may vary, and the weight for each attribute may also vary. The **weight** given to each attribute indicates the relative importance of the attribute within the context of the military value for each measure of merit.

b. **Structure of Discussion.** In the remainder of this discussion section, we analyze the redundancy and validity of the Army BRAC 91 attributes for use in Army BRAC 93.

(1) ***By Category.*** Our discussion of the attributes is divided by each category for Army BRAC 91 from Fighting Installations through Research & Development Centers, plus additional sections discussing new and revised candidate attributes proposed for Army BRAC 93. All installation categories have the same five Measures of Merit, and many of the same attributes within each Measure of Merit. However, the MACOMs were allowed some freedom to use different attributes, or different weights on the same attributes, to better define each installation category. In our analysis each category is discussed in turn, naturally leading to a situation where many attributes are discussed more than once.

(2) ***Repetition for Clarity.*** We recognize that discussing all attributes for every category becomes repetitious for attributes that reappear in every category. However, we wanted to make sure that the paragraph dedicated to each installation category was clear, complete, and self contained. This format allows readers interested in one installation category to read a specific paragraph, without searching about in the text to find all of the attributes relevant to that category.

c. **Intent of the ESSC Analysis.** Participation by subject matter experts (SME) at all levels of the Army is a vital ingredient in making the results of the BRAC process as complete and credible as possible. This participation is not limited to simply supplying the input data prescribed by higher headquarters; it also requires the active participation of all levels, from the installations on up, in defining meaningful attributes and setting the weights on those attributes. The changes proposed by ESSC are not intended to replace the deliberations that must take place within the Total Army Basing Study (TABS) group and the MACOMs during BRAC 93. Rather, ESSC's suggestions are intended as a straw man to be used as a starting point that builds on the experience gained from a careful analysis of Army BRAC 91.

d. **Purpose of Recommended Changes in Attribute Selection and Weighting.** In proposing changes to the attributes used for Army BRAC 91, ESSC has tried to:

(1) ***Eliminate.*** Eliminate redundant attributes and attributes of lesser relevance -- to allow greater attention to be given to the more trustworthy attributes.

(2) *Standardize.* Standardize attribute definitions and calculation procedures -- in cases where MACOMs had developed slightly different attributes to cover essentially the same factor.

(3) *Add or redefine.* Add attributes or redefine attributes -- to better reflect the new national defense strategy and Army planning guidance that has evolved since BRAC 91.

7. ROLE OF BRAC 91 ATTRIBUTES IN THE RANKING OF INSTALLATIONS BY MILITARY VALUE.

a. **Developing the Attributes.** During the Phase I installation assessment process, the concept of measuring an installation's military value involves identifying key measures of merit and their attributes (see **Figure C-1**). Developing measurable attributes starts with the formation of the Army's measures of merit, which is step 4 of Figure C-1. Each measure of merit is comprised of a set of measurable characteristics called attributes. The attributes are weighted to indicate the relative importance of the specific attribute within the context of the measure of merit and the installation category. Later in the process, in step 7 of Figure C-1, attributes are further defined and assigned to installation categories. **Figures C-2 through C-11** show the attributes and measures of merit used for each installation category during Army BRAC 91. These figures show that the number of attributes for each installation category varied. The weights for these attributes also varied for each category.

b. **Defining the Weighting Scheme.** DA defines the weighting scheme for attributes in three of the measures of merit (MOM): quality of life, expandability, and operational efficiencies. Army MACOMs define the attributes with respective weights for the other two measures of merit: mission essentiality and suitability. In some cases, latitude is given to MACOMs to adjust attributes and weights defined by DA. After the attributes are defined and weighted, data is supplied to calculate a score for each attribute. These scores are then tallied, weighted, and totaled. This total serves as a ranked score when it is compared to other installation totals. In effect, the military value of each installation is ranked. DA BRAC analysts apply cost benefit trade-off analyses to these rankings to recommend realignments and closures in Phase II.

c. **Attribute Breakdown by Category.** A total of 339 attributes were used for all installation categories to determine military value. Fighting Installations (maneuver) used 35 attributes. The major training areas used 31 attributes to determine military value. Training and Branch Schools used 38, while professional school installations used 36. There were 31 attributes used with command and control centers. In the industrial category, depots used 38 attributes and commodity oriented installations used 39. There were 34 attributes used with production installations. Ocean terminals used 28 attributes in the port category while the ammunition port used 29 attributes.

d. **Attribute Weighting System.** For all installation categories except command and control centers, a 1,000 total point weighting system was used to measure all five measures of merit.

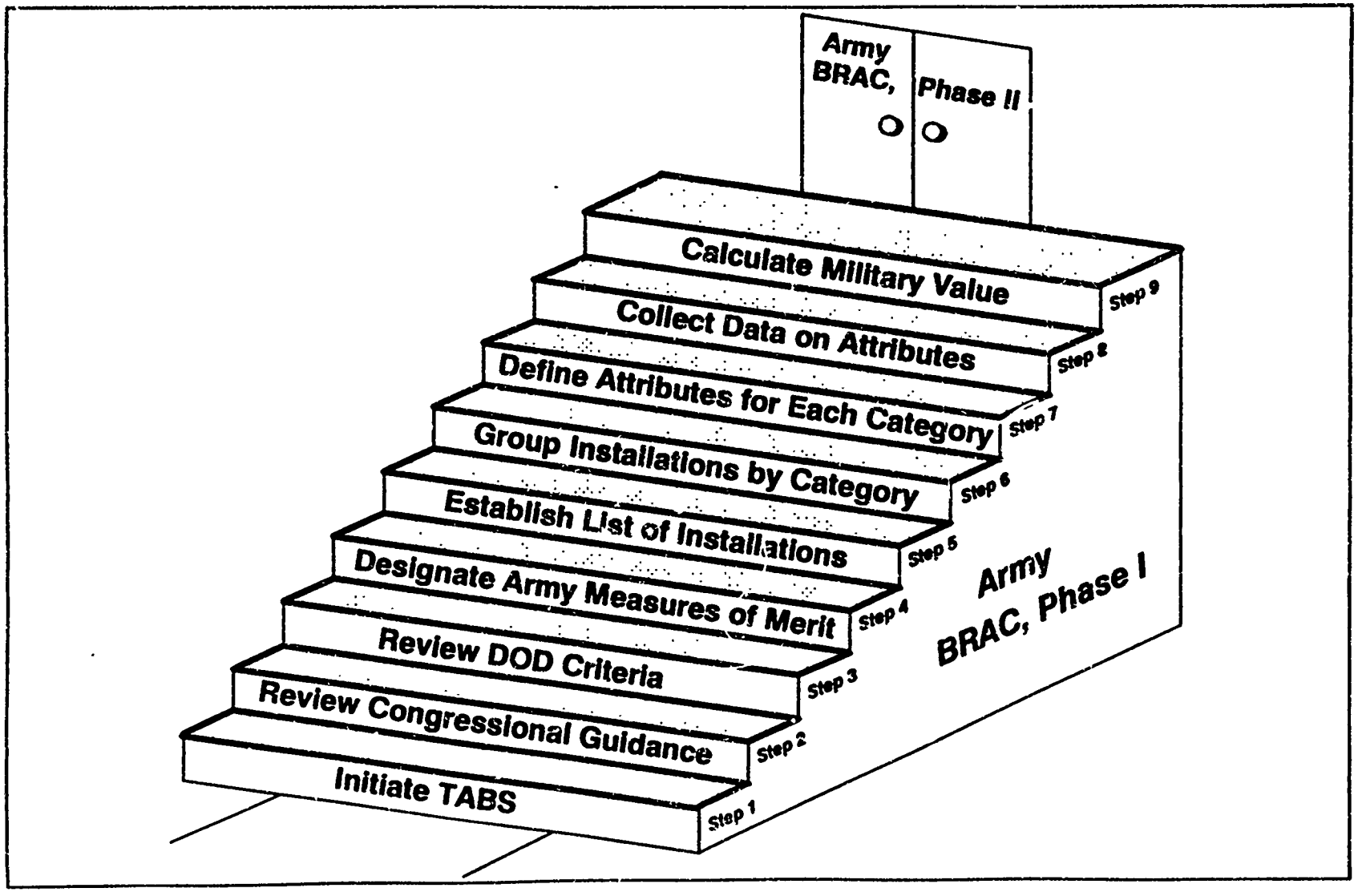

Figure C-1. ARMY BRAC 91-PIIASE I PROCESS

(1) ***Formulation and Common Point Distribution.*** In most cases, the attributes for the Quality of Life, Operational Efficiency, and Expandability measures of merit were directed by HQDA. The MACOMs formulated the attributes and weights for the Mission Essentiality and Mission Suitability measures of merit. The attributes formulated by the MACOMs with associated weights were approved by HQDA. The most common distribution of the total points was: 250 points each -- in the mission essentiality and mission suitability measures of merit; 200 points -- for quality of life; and 150 points each -- for operational efficiencies and expandability.

(2) ***Exceptions.*** The exceptions were command and control centers, major training areas, and ports. Command and control centers used a 960 total point weighting system (due to the elimination of two attributes found in the other installation categories). Major training areas reduced the quality of life weight and put the additional weight in their mission suitability measure of merit. Due to their unique missions, ports placed almost their entire weight in mission essentiality and mission suitability.

c. **New Attribute Weighting System.** In Annex A, ESSC is recommending that the weights for each measure of merit within each installation category be changed to make the weighting system more logically consistent and to bring the weights into alignment with the Army's strategic vision.

(1) ***For Fighting, Training, and Command & Control Categories.*** For the fighting, training, and command and control categories, ESSC gives mission essentiality 275 points, mission suitability 225 points, operational efficiency 100 points, and the expandability and quality of life measures of merit 200 points. Major training areas are given 350 points for mission essentiality, 250 points for mission suitability, and 100 points for quality of life. Points for expandability and operational efficiency measures of merit are the same as for the fighting categories. Due to the unique requirements and locations of the major training areas, this deviation is considered necessary to accurately reflect their military value.

(2) ***For Industrial Categories.*** The weighting system for the industrial category installations was also made uniform. Mission essentiality received 300 points, mission suitability received 250 points, and the operational efficiency, expandability, and quality of life measures of merit each received 150 points.

III. DETAILED DISCUSSION BY CATEGORY

8. MANEUVER INSTALLATIONS.

a. **Mission Essentiality Attributes.** For Army BRAC 91, this installation category used five attributes with a total weight of 250 points. They were maneuver acres (75), ranges (55), deployment network (55), total acres (45), and reserve component support (20). For Army BRAC 93, due to the importance of the mission essentiality measure of merit (see Annex A for details), ESSC recommends the total points be raised from 250 to 275. This increase in weight is necessary to ensure those attributes which are paramount to mission preparedness are properly weighted. **Figure C-2** reflects the increase in measure of merit weights and shows ESSC's recommended weight distribution for each attribute.

(1) ***Maneuver Acres.*** The name of the "maneuver acres" attribute should be changed to Maneuver-Training Acres. This would enable the attribute to capture the importance of all training acreage, not simply maneuver area.

(2) ***Ranges.*** The approximate weight assigned to this attribute adequately portrays its importance for the Army of the future. However, due to the addition of two new attributes, the weight was lowered five points. This slight reduction does not detract from the importance of ranges when compared to the weights of the remaining attributes. However, it is questionable whether the definition of the unit of measure for ranges adequately reflect the Army's range requirements now and for the future. Ranges in the future need to be larger and capable of accepting all Army weapon systems. Consideration of both air and ground weapons systems, to include the family of small arms, is an important asset to measure. The military value of an installation is very dependent on its capability to train its soldiers on the most recently fielded weapons systems. BRAC needs to measure this future requirement correctly and fully within this attribute and the expandability measure of merit.

(3) ***Deployment Network.*** ESSC recommends this attribute be revised to include a distance to nearest interstate highway. The approximate weight assigned to this attribute adequately portrays its importance for the Army of the future. However, due to the addition of two new attributes, the weight was lowered five points. This slight reduction does not detract from the importance of the deployment network attribute when compared to the weights of the remaining attributes.

(4) ***Total Acres.*** An analysis of this attribute revealed that "total acres" does not provide any real value in mission essentiality. The total acres attribute only provides a big, bigger, and biggest measure. The total acres attribute measures land unsuitable for training. This attribute would consider areas such as swamps, wildlife preserves, and ground under parking lots, buildings, and parks which are captured in other attributes. Therefore, this attribute should be eliminated and the points redistributed to the attributes that capture the value of prime training acreage. The importance of acreage can be captured in the mission suitability measure within the contiguous maneuver acres attribute and within the maneuver training acres attribute of this measure of merit.

MISSION ESSENTIALITY

Attribute	Old	New
Maneuver Training Acres	75	75
Ranges	55	50
Deployment Network	55	50
Total Acres	45	0
Mobilization	0	45
Joint Synergy	0	15
Reserve Support	20	40
Total	250	275

EXPANDABILITY

Attribute	Old	New
Total Buildable Acres	20	50
Total Building Square Feet	45	0
Encroachment	45	50
Environmental Capacity	20	50
Multi-function	0	25
Infrastructure	0	25
Water/Sewer Facilities	20	0
Total	150	200

MISSION SUITABILITY

Attribute	Old	New
Contiguous Maneuver Acres	45	80
Operational/Admin Facils	45	30
Aviation Maintenance	40	25
Vehicle Maintenance	45	30
Supply/Storage	20	10
Distance to Training Area	40	30
Construction Investment	0	10
Information Mission Area	15	10
Total	250	225

QUALITY OF LIFE

Attribute	Old	New
% Permanent Facilities	34	25
Community of Excellence	10	10
Army Family Housing	33	35
Unaccomp Officer Housing	24	25
Unaccomp Enlisted Housing	33	35
Community Facilities	23	25
Places Rated Almanac Rating	20	10
Health Care Support Index	23	35
Total	200	200

OPERATIONAL EFFICIENCY

Attribute	Old	New
Variable Housing Allowance	15	15
Family Housing Cost Per Unit	15	15
Average Civilian Salary	15	15
Hourly Wage Grade Rate	15	0
Manpower Est Relationship	15	20
Cost Estimate Relationship	15	20
Utilities Cost Factor	15	0
RPMA Cost Factor	15	0
Military Construction Cost	15	15
Backlog Maintenance Repair	15	0
Total	150	100

TOTAL ATTRIBUTE SCORE

	Old	New
Mission Essentiality	250	275
Mission Suitability	250	225
Operational Efficiency	150	100
Expandability	150	200
Quality of Life	200	200
Total	1,000	1,000

Figure C-2. REVISED ATTRIBUTES FOR MANEUVER INSTALLATIONS.

(5) *Mobilization*. ESSC also recommends that a mobilization attribute be included for this installation category. This new attribute captures the importance of our installations' capability to support reconstitution. Also, the capability of an installation to serve as a power projection platform in the future is essential to the Army preparedness mission. The rationale for adding this new attribute, and an assessment of how to develop relevant sub-attributes to measure it, are presented in paragraph 21, New and Revised Candidate Attributes. The recommended weight assigned to this new attribute is 45.

(6) *Joint Synergy*. ESSC recommends that an additional attribute called "joint synergy" be introduced for this installation category. This revised attribute was formerly the proximity to other services attribute. The joint synergy attribute captures the importance of joint operations, exercises, and common physical boundaries with other services. The capability of an installation to support inter-service exercises provides the Army with an advantage in training on how we plan to fight. This attribute should be based on: support to other services (e.g. tenants on the installation); joint activities conducted with elements of the other services; and support agreements for Army use of their facilities and their use of Army facilities. The recommended weight assigned to this new attribute is 15.

(7) *Reserve Support*. In accordance with the Army's future planning documents, reserve support in the mission essentiality measure of merit will become increasingly important as Army force reductions continue. Therefore, the reserve support attribute should be raised from 20 to 40.

b. **Mission Suitability Attributes**. For Army BRAC 91, this installation category used seven attributes with a total weight of 250 points. They were contiguous maneuver acres (45), operational and administrative facilities (45), aviation maintenance facilities (40), vehicle maintenance facilities (45), supply and storage facilities (20), distance to training area (40), and information mission area (15). For BRAC 93, ESSC recommends the total points within this measure of merit be lowered from 250 to 225. This recommendation reflects ESSC's added value of the mission essentiality measure of merit. This reduction does not detract from the importance of this measure of merit since it still carries more weight than remaining measures of merit. Figure C-2 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) *Contiguous Maneuver Acres*. To capture the importance of contiguous maneuver acres, coupled with the deletion of the total acres attribute in mission essentiality, the weight of the contiguous maneuver acres attribute should be raised from 45 to 80.

(2) *Construction Investment*. This is an added attribute. It is in use in the training category. It has been given a weight value of 10 points. This construction investment attribute reflects the modernization of a post or training area and provides a measurement for future construction requirements.

(3) *Weighting Scheme*. ESSC proposes no substantive changes to the other attributes in this measure of merit except for adjustments to the weights caused by the weighting shifts just discussed.

c. **Operational Efficiency Attributes**. In Army BRAC 91, this installation category used ten attributes with a total weight of 150 points. They were variable housing allowance,

family housing cost, average civilian salary, hourly wage grade rate, manpower estimate relationship, cost estimate relationship, utilities cost, RPMA cost factor, military construction cost, and backlog of maintenance and repair. Each attribute had 15 points for a weight. ESSC recommends for Army BRAC 93 that the measure of merit weight in operational efficiency be lowered from 150 to 100. This is due to the increased importance of expandability (which was raised 50 points) for the Army of the future. Figure C-2 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Hourly Wage Grade Rate.*** ESSC feels this attribute is unnecessary since the cost of the civilian workforce can be captured in one attribute--the average civilian salary attribute. The split into two separate civilian wages is unnecessary.

(2) ***Utilities Cost Factor and RPMA Cost Factor.*** Both of these attributes can be eliminated since the essence of their contribution to military value is already captured in the manpower estimate relationship (MER) and cost estimate relationship (CER) attributes. The equations to determine MER and CER consider utility and RPMA costs. To capture the additional importance of MER and CER due to the elimination of these two attributes, ESSC recommends that the weights assigned to MER and CER be raised from 15 to 20.

(3) ***Backlog of Maintenance and Repair (BMAR).*** ESSC recommends that BMAR be eliminated. BMAR has often been an abused measure that is more closely related to budget expectations than true maintenance requirements. Certain installations have inflated BMAR figures to justify military construction. In some cases it provides a wish list for maintenance that in all likelihood will never be performed. Therefore ESSC does not view it as an accurate measure of operational efficiency.

(4) ***Weighting Scheme.*** The points from the elimination of four attributes, the lowering of the total attribute weight from 150 to 100, and the raising of the MER and CER weight are distributed proportionally among the remaining attributes.

d. **Expandability Attributes.** For Army BRAC 91, this installation category used five attributes with a total weight of 150 points. They were total buildable acres (20), total building square feet (45), encroachment (45), environment (20), and water/sewer facilities (20). For Army BRAC 93, based on our analysis of the requirements of the Army in the future (see Annex A), the expandability measure of merit is more important than previously thought. Therefore, the attributes within this measure of merit are the most changed within this analysis. To show this importance the total weight for all attributes should be raised from 150 to 200. Figure C-2 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Total Building Square Feet.*** This attribute should be eliminated since it does not show the ability of an installation to grow. In most cases, existing buildings are already being utilized. Thus, the total buildable acres attribute should be given more weight to show the ability of an installation to expand by raising the weight from 20 to 50.

(2) ***Environmental Carrying Capacity.*** Formerly the environment attribute, this is a newly revised attribute. The new name reflects the expanded nature of this attribute: an installation's capability to expand in consideration of noise pollution, wetlands, endangered species and fiora areas, etc. Due to the importance of this attribute, the weight was raised from 20 to 50.

The rationale for expanding this attribute, and an assessment of how to develop appropriate sub-attributes to better measure it, are presented in paragraph 21, New and Revised Candidate Attributes.

(3) ***Multi-function.*** This is an added attribute which shows the capability of an installation to expand through the acceptance of new missions and organizations. It is used in the training category and is added here for its ability to reflect diversity. ESSC proposes the number of activities with missions other than the primary mission in this installation category be used as an indicator of an installation's ability to support multiple functions now and in the future. This capability will become increasingly important for the Army of the future. For this reason ESSC gave the multi-function attribute 25 points.

(4) ***Water/Sewer Facilities.*** ESSC recommends changing the "water/sewer facilities" attribute to infrastructure. ESSC also recommends that land fill and electrical distribution capacity be added to water and sewer systems in this attribute. They all impact expansion plans.

(5) ***Weighting Scheme.*** The point differences from Army BRAC 91 to Army BRAC 93 are due to the suggested elimination of one attribute, the raising of the total attribute weight from 150 to 200, and the addition of one new attribute.

e. **Quality of Life Attributes.** For Army BRAC 91, this installation category used eight attributes with a total weight of 200 points. They were percent permanent facilities (34), community of excellence score (10), Army family housing (33), unaccompanied officer housing (24), unaccompanied enlisted housing (33), community facilities (23), places rated almanac rating (20), and health care support (23). For Army BRAC 93 ESSC recommends no change to the total Quality of Life points. Figure C-2 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Places Rated Almanac Rating.*** ESSC recommends reducing the weight of this attribute to 10 points. The places rated almanac rating attribute measures a place during a snapshot in time. The ratings change annually. Additionally, it is extremely difficult for an installation to change local and state administrative affairs, e.g. quality of dollars allocated to school budget. ESSC believes, when measuring military value, it is more important to measure factors "within the fence" than those outside the fence.

(2) ***Health Care Support Index.*** The weight of the health care support index attribute should be raised from 23 to 35. Health care support in the quality of life measure of merit is very important to the Total Army Community and should be weighted appropriately. The Army needs to ensure that its active duty personnel, dependents, government employees, and retirees are afforded the best care possible.

(3) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit. The point differences from Army BRAC 91 are due to the elimination of one attribute and the raising of the health care support attribute weight. The remaining points are then distributed proportionally among the remaining attributes.

9. MAJOR TRAINING AREAS.

a. Mission Essentiality Attributes. For Army BRAC 91, this installation category used five attributes with a total weight of 250 points. They were maneuver acres (75), ranges (55), deployment network (30), total acres (50), and reserve component support (40). ESSC recommends for BRAC 93 that, due to the uniqueness of major training areas, this installation categories' total weighting scheme for three of the five measures of merit be altered. Mission essentiality is given a total weight of 350 points. Figure C-3 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) *Maneuver Acres.* The "maneuver acres" attribute should be changed to maneuver training acres. This would enable the attribute to capture the importance of all training acreage. This attribute also needs to be placed in the mission suitability measure of merit. The rationale for moving this attribute to the mission suitability measure of merit is that the essence of maneuver acres is captured in this measure of merit in the contiguous maneuver acres attribute which has been moved from mission essentiality. To reflect the importance of this attribute, the weight assigned to it should be raised from 75 to 135.

(2) *Contiguous Maneuver Acres.* This attribute was moved to the mission essentiality measure of merit from the mission suitability measure of merit since it is an essential requirement for major training areas. Major training areas need to provide maneuver units with contiguous acreage in which to operate for combined and joint exercises. This contiguous acreage permits training on the scale required to properly prepare for mission readiness.

(3) *Ranges.* The approximate weight assigned to this attribute adequately portrays its importance for the Army of the future. However, it is questionable whether the definition or the unit of measure for ranges adequately reflect the Army's range requirements in the future. Ranges in the future need to be larger and capable of accepting all Army weapon systems. Consideration of both air and ground weapons systems, to include the family of small arms, is an important asset to measure. The military value of an installation is very dependent on its capability to train its soldiers on the most recently fielded weapons systems. BRAC needs to measure this future requirement correctly and fully within this attribute and the expandability measure of merit.

(4) *Deployment Network.* The approximate weight assigned to this attribute adequately portrays its importance for the Army of the future. However, due to the raising of the total weight for this measure of merit, the weight was raised five points. This slight increase does not detract from the importance of the remaining attributes.

(5) *Total Acres.* An analysis of this attribute revealed that "total acres" does not provide any real value in mission essentiality. The total acres attribute only provides a big, bigger, and biggest measure. The total acres attribute measures land unsuitable for training. Therefore, this attribute should be eliminated and the points redistributed to the attributes that capture the value of prime training acreage. The importance of acreage can be captured in the mission suitability measure within the maneuver training acres attribute and within the contiguous maneuver acres attribute of this measure of merit.

MISSION ESSENTIALITY

Attribute	Old	New
Maneuver Training Acres	75	0
Contiguous Maneuver Acres	0	200
Ranges	55	55
Deployment Network	30	35
Total Acres	50	0
Joint Synergy	0	20
Reserve Support	40	40
Total	250	350

EXPANDABILITY

Attribute	Old	New
Total Buildable Acres	20	50
Total Building Square Feet	45	0
Encroachment	45	50
Environmental Capacity	20	50
Multi-function	0	25
Infrastructure	0	25
Water/Sewer Facilities	20	0
Total	150	200

MISSION SUITABILITY

Attribute	Old	New
Contiguous Maneuver Acres	220	0
Maneuver Training Acres	0	135
Operational/Admin Facils	17	20
Aviation Maintenance	17	20
Vehicle Maintenance	35	35
Supply/Storage	25	30
Reserve Demographics	36	0
Construction Investment	0	10
Total	350	250

QUALITY OF LIFE

Attribute	Old	New
% Permanent Facilities	10	10
Community of Excellence	0	0
Army Family Housing	0	0
Unaccomp Officer Housing	5	5
Unaccomp Enlisted Housing	5	5
Community Facilities	5	5
Places Rated Almanac Rating	0	0
Health Care Support Index	75	75
Total	100	100

OPERATIONAL EFFICIENCY

Attribute	Old	New
Variable Housing Allowance	15	15
Family Housing Cost Per Unit	15	15
Average Civilian Salary	15	15
Hourly Wage Grade Rate	15	0
Manpower Est Relationship	15	20
Cost Estimate Relationship	15	20
Utilities Cost Factor	15	0
RPMA Cost Factor	15	0
Military Construction Cost	15	15
Backlog Maintenance Repair	15	0
Total	150	100

TOTAL ATTRIBUTE SCORE

	Old	New
Mission Essentiality	250	350
Mission Suitability	350	250
Operational Efficiency	150	100
Expandability	150	200
Quality of Life	100	100
Total	1,000	1,000

Figure C-3. REVISED ATTRIBUTES FOR MAJOR TRAINING AREAS.

(6) *Joint Synergy*. ESSC recommends that an additional attribute called "joint synergy" be introduced for this installation category. This revised attribute was formerly the proximity to other services attribute. The joint synergy attribute captures the importance of joint operations, exercises, and common physical boundaries with other services. The capability of an installation to support inter-service exercises provides the Army with an advantage in training how we plan to fight. This attribute should be based on: support to other services (e.g. tenants on the installation); joint activities conducted with elements of the other services; and support agreements for Army use of their facilities and their use of Army facilities. The recommended weight assigned to this new attribute is 20.

(7) *Reserve Support*. This attribute and its current weight adequately addresses its importance for the Army of the future. Therefore, no change is necessary.

(8) *Weighting Scheme*. The point difference between the BRAC 91 attributes and these attributes is due to the elimination of one attribute, the switching of one attribute with the mission suitability measure of merit, the addition of one new attribute, and the overall total weight change.

b. **Mission Suitability Attributes**. For Army BRAC 91, this installation category used eight attributes with a total weight of 350 points. They were contiguous maneuver acres (220), operational and administrative facilities (17), aviation maintenance facilities (17), vehicle maintenance facilities (35), supply and storage facilities (25), distance to training area (0), information mission area (0), and reserve component demographics (36). ESSC recommends for BRAC 93, due to the uniqueness of major training areas, that mission suitability be given a total weight of 250 points. Figure C-3 shows ESSC's reallocated recommended weights for each attribute within this measure of merit.

(1) *Contiguous Maneuver Acres*. This attribute was moved to the mission essentiality measure of merit since it is an essential requirement for major training areas. Major training areas need to provide maneuver units with contiguous acreage in which to operate for combined and joint exercises. This contiguous acreage permits training on the scale required to properly prepare for mission readiness.

(2) *Maneuver Training Acres*. This is a new attribute moved from the mission essentiality measure of merit to this measure of merit. The rationale for moving this attribute to the mission suitability measure of merit is that the essence of training acreage is already captured in the mission essentiality measure of merit in the contiguous maneuver acres attribute. To reflect the importance of this attribute, the total weight was raised from 75 to 135 to show its relative importance with the rest of the attributes.

(3) *Reserve Demographics*. This attribute was eliminated from this measure of merit since the importance of reserve support is already captured in the mission essentiality measure of merit. To try and capture its military value again in this measure of merit is redundant.

(4) *Construction Investment*. This is an added attribute. It is in use in the training category. It has been given a weight value of 10 points. This construction investment attribute

reflects the modernization of a post or training area and provides a measurement for future construction requirements.

(5) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit except for adjustments to the weights caused by the weighting shifts just discussed.

c. **Operational Efficiency Attributes.** For Army BRAC 91, this installation category used ten attributes with a total weight of 150 points. They were variable housing allowance, family housing cost, average civilian salary, hourly wage grade rate, manpower estimate relationship, cost estimate relationship, utilities cost, RPMA cost factor, military construction cost, and Backlog of maintenance and repair. Each attribute had 15 points for a weight. ESSC recommends for Army BRAC 93 that the weights for all attributes in Operational Efficiency should be lowered from 150 to 100. This is due to the importance of other measures of merit. Expandability for the Army of the future which was raised 50 points. Figure C-3 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Hourly Wage Grade Rate.*** This attribute is unnecessary since the cost of the civilian workforce can be captured in one attribute. That is the average civilian salary attribute. The split into two separate civilian wages is unnecessary.

(2) ***Utilities Cost Factor and RPMA Cost Factor.*** Both of these attributes can be eliminated since the essence of their contribution to military value is already captured in the manpower estimate relationship (MER) and cost estimate relationship (CER) attributes. The equation to determine MER and CER consider utility and RPMA costs. To capture the additional importance of MER and CER due to the elimination of these two attributes, ESSC recommends that the weights assigned to MER and CER be raised from 15 to 20.

(3) ***Backlog of Maintenance and Repair (BMAR).*** ESSC recommends that BMAR be eliminated. BMAR has often been an abused measure that is more closely related to budget expectations than true maintenance requirements. Certain installations have inflated BMAR figures to justify military construction. In some cases it provides a wish list for maintenance that in all likelihood will never be performed. Therefore, ESSC does not view it as an accurate measure of operational efficiency.

(4) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit. The point difference due to the elimination of four attributes, the lowering of the total attribute weight from 150 to 100, and the raising of the MER and CER weight should then be distributed proportionally among the remaining attributes.

d. **Expandability Attributes.** For Army BRAC 91, this installation category used five attributes with a total weight of 150 points. They were total buildable acres (20), total building square feet (45), encroachment (45), environment (20), and water/sewer facilities (20). Based on our analysis for BRAC 93, the expandability measure of merit is more important than previously thought. Therefore, the attributes within this measure of merit are probably the most changed within this analysis. To show this importance the total weight for all attributes should be raised from 150 to 200. Figure C-3 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Total Building Square Feet.*** This attribute should be eliminated since it does not show an ability of an installation to grow. In most cases, existing buildings are already being utilized. Thus, the total buildable acres attribute should be given more weight to show the ability of an installation to expand by raising the weight from 20 to 50.

(2) ***Environmental Carrying Capacity.*** Formerly the environment attribute, this is a newly revised attribute. The new name reflects the expanded nature of this attribute; an installation's capability to expand in consideration of noise pollution, wetlands, endangered species and flora areas, etc. Due to the importance of this attribute, the weight was raised from 20 to 50. The rationale for expanding this attribute, and an assessment of how to develop appropriate sub-attributes to better measure it, are presented in paragraph 21, New and Revised Candidate Attributes.

(3) ***Multi-function.*** This is an added attribute which shows the capability of an installation to expand through the acceptance of new missions and organizations. It is used in the training category and is added here for its ability to reflect diversity. ESSC proposes the number of activities with missions other than the primary mission in this installation category be used as an indicator of an installation's ability to support multiple functions now and in the future. This capability will become increasingly important for the Army of the future. For this reason ESSC gave the multi-function attribute 25 points.

(4) ***Water/Sewer Facilities.*** ESSC recommends changing the "Water/Sewer Facilities" attribute to Infrastructure. ESSC also recommends that land fill and electrical distribution capacity, be added to water and sewer systems in this attribute. They all impact expansion plans.

(5) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit. The point difference due to the suggested elimination of one attribute, the raising of the total attribute weight from 150 to 200, and the addition of one new attribute should be distributed proportionally among the remaining attributes.

e. **Quality of Life Attributes.** For Army BRAC 91, this installation category used eight attributes with a total weight of 100 points. They were percent permanent facilities (10), community of excellence score (0), Army family housing (0), unaccompanied officer housing (5), unaccompanied enlisted housing (5), community facilities (5), places rated almanac rating (0), and health care support (75). Due to the special uniqueness of major training areas, the quality of life measure of merit is not as important as in other installation categories. Therefore, the lower number of attributes and less total weight are applicable to this measure of merit for major training areas. Figure C-3 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Places Rated Almanac Rating.*** Due to the mission of the installations in the major training areas category, this attribute was given zero points in Army BRAC 91-Phase I. ESSC recommends leaving the weight of this attribute as zero points. ESSC believes, when measuring military value, it is more important to measure factors "within the fence" than those outside the fence. This is especially true for the major training areas category.

(2) ***Health Care Support Index.*** The weight of the health care support index attribute should be raised from 23 to 35. Health care support in the quality of life measure of merit is very important to the Total Army Community and should be weighted appropriately. The Army needs to ensure that the health care needs of its active duty personnel, dependents, government employees, and retirees are afforded the best care possible.

(3) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit except for adjustments to the weights caused by the weighting shifts just discussed.

10. INITIAL ENTRY/BRANCH SCHOOLS.

a. **Mission Essentiality Attributes.** For Army BRAC 91, this installation category used eight attributes with a total weight of 250 points. They were multi-function (41), Army readiness (34), unique capability (62), maneuver training acres (27), maneuver contiguous (16), impact range acres (28), deployment capability (16), and reserve component support (26). For BRAC 93, due to the importance of the mission essentiality measure of merit, the total points are raised from 250 to 275. This increase in weight is necessary to ensure those attributes which are paramount to mission preparedness are properly weighted. **Figure C-4** shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Multi-function.*** ESSC recommends that the value of this attribute is better served if moved to the expandability measure of merit. Future planning documents state that installations must be capable of expanding and becoming multi-functional. Attributes that solely pertain to mission preparedness should be captured in this measure of merit. This attribute shows the capability of an installation to expand through the acceptance of new missions and organizations. ESSC proposes the number of activities with missions other than the primary mission in this installation category be used as an indicator of an installation's ability to support multiple functions now and in the future. This capability will become increasingly important for the Army of the future. For this reason ESSC gave the multi-function attribute 30 points in the expandability measure of merit.

(2) ***Mobilization.*** ESSC also recommends that a mobilization attribute be included for this installation category. This new attribute captures the importance of our training and branch schools to deploy personnel and small units to support reconstitution. The capability of an installation to serve as a power projection platform in the future is essential to the Army preparedness mission. The rationale for adding this new attribute, and an assessment of how to develop relevant sub-attributes to measure it, are presented in paragraph 21, New and Revised Candidate Attributes. The recommended weight assigned to this new attribute is 40.

(3) ***Unique Capability.*** An analysis of this attribute revealed that the unique capability attribute does not provide any real value in mission essentiality. All military installations have a uniqueness that caters to a special branch, type of unit, operation, and, or

MISSION ESSENTIALITY

Attribute	Old	New
Multi-function	41	0
Mobilization	0	40
Army Readiness	34	55
Unique Capability	62	0
Maneuver Training Acres	27	50
Contiguous Maneuver Acres	16	0
Impact Range Acres	28	50
Deployment Network	16	35
Reserve Support	26	45
Total	250	275

EXPANDABILITY

Attribute	Old	New
Total Buildable Acres	15	50
Total Building Square Feet	39	0
Encroachment	21	20
Environmental Capacity	36	50
Multi-function	0	30
Infrastructure	0	50
Water/Sewer Facilities	39	0
Total	150	200

MISSION SUITABILITY

Attribute	Old	New
Contiguous Maneuver Acres	0	15
General Instruction Facils	42	45
Applied Instruction Facils	48	50
Ranges (BRM)	29	25
Maintenance Facilities	25	20
Operational/Admin Facils	25	20
Information Mission Area	27	25
Medical Facilities	25	0
Construction Investment	29	25
Total	250	225

QUALITY OF LIFE

Attribute	Old	New
% Permanent Facilities	23	20
Community of Excellence	15	10
Army Family Housing	28	30
Unaccomp Officer Housing	26	25
Unaccomp Enlisted Housing	38	40
Community Facilities	30	30
Places Rated Almanac Rating	16	10
Health Care Support Index	24	35
Total	200	200

OPERATIONAL EFFICIENCY

Attribute	Old	New
Variable Housing Allowance	12	15
Family Housing Cost Per Unit	15	15
Average Civilian Salary	11	10
Hourly Wage Grade Rate	10	0
Manpower Est Relationship	11	20
Cost Estimate Relationship	12	20
Utilities Cost Factor	25	0
RPMA Cost Factor	35	0
Military Construction Cost	19	20
Total	150	100

TOTAL ATTRIBUTE SCORE

	Old	New
Mission Essentiality	250	275
Mission Suitability	250	225
Operational Efficiency	150	100
Expandability	150	200
Quality of Life	200	200
Total	1,000	1,000

Figure C-4. REVISED ATTRIBUTES FOR INITIAL ENTRY/BRANCH SCHOOLS

function. The unique capability attribute only provides a "we are different" measure. Most of the installations throughout the Army contain one-of-a-kind resources that are too costly to transfer or replace. Recognition of these types of capabilities needs to be included within the BRAC process for oversight purposes during Phase II. The trend for the future will be for expandability and multi-functional installations. Therefore, this attribute should be eliminated and the points redistributed to capture the value of the remaining attributes within mission essentiality. This suggestion was offered by several installation managers and their staffs.

(4) *Contiguous Maneuver Acres.* An analysis of this attribute reveals that for training and branch schools the essential attribute is maneuver training acres. The value of the maneuver contiguous attribute would be better served if the attribute was moved to the Mission Suitability measure of merit. The maneuver contiguous attribute describes the suitability of an installation more than being a mission essential element.

(5) *Impact Range Acres.* The weight assigned to this attribute adequately portrays its importance for the Army of the future. Therefore, no change to the weight is necessary except for the proportional weight change due to other recommended changes within this measure of merit. Simply stated, this attribute measures impact areas. However, it is questionable whether the definition or the unit of measure for ranges adequately reflect the Army's range requirements in the future. Ranges in the future need to be larger and capable of accepting all Army weapon systems. Consideration of both air and ground weapons systems, to include the family of small arms, is an important asset to measure. The military value of an installation is very dependent on its capability to train its soldiers on the most recently fielded weapons systems. BRAC needs to measure this future requirement correctly and fully within this attribute and the expandability measure of merit.

(6) *Weighting Scheme.* ESSC proposes no substantive changes to the other attributes in this measure of merit except for adjustments to the weights caused by the weighting shifts just discussed.

b. **Mission Suitability Attributes.** For Army BRAC 91, this installation category used eight attributes with a total weight of 250 points. They were general instruction facilities (42), applied instruction facilities (48), ranges - BRM (29), maintenance facilities (25), administrative operations (25), information mission area support (27), medical facilities (25), and construction investment (29). For Army BRAC 93, due to the importance of the mission essentiality measure of merit, the total points within this measure of merit was lowered from 250 to 225. This reduction does not detract from the importance of this measure of merit since it still carries more weight than the remaining measures of merit. Figure C-4 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) *Contiguous Maneuver Acres.* This is a new attribute that replaces the attribute eliminated from the mission essentiality measure of merit. This attribute was placed in this measure of merit since the attribute pertains to the suitability of an installation rather than essentiality to mission preparedness. The weight given to this attrioute is 15.

(2) *Medical Facilities.* An analysis of this attribute revealed no contribution to military value in mission suitability with the medical facilities attribute. The value of the medical

facilities attribute is already captured in the quality of life measure of merit for training and branch schools. Therefore, this attribute should be eliminated from this measure of merit.

(3) *Weighting Scheme.* The bulk of the additional points gained from the deletion of the medical facilities attribute should be given to the maneuver contiguous attribute moved from the mission essentiality measure of merit to this measure of merit. The remaining points should be proportionally distributed to the remaining attributes.

c. **Operational Efficiency Attributes.** For Army BRAC 91, this installation category used nine attributes with a total weight of 150 points. They were variable housing allowance (12), family housing cost per unit (15), average civilian salary (11), hourly wage grade rate (10), manpower estimate relationship (11), cost estimate relationship (12), utilities cost (25), RPMA cost factor (35), and military construction cost (19). For Army BRAC 93, in keeping with the changes to the weights of the measures of merit in Annex A, the total weight for all attributes in Operational Efficiency should be lowered from 150 to 100. This is due to the importance of Expandability for the Army of the future which was raised 50 points. Figure C-4 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) *Hourly Wage Grade Rate.* This attribute is unnecessary since the cost of the civilian workforce can be captured in one attribute. That is the average civilian salary attribute. The split into two separate civilian wages is unnecessary.

(2) *Utilities Cost Factor and RPMA Cost Factor.* Both of these attributes can be eliminated since the essence of their contribution to military value is already captured in the manpower estimate relationship (MER) and cost estimate relationship (CER) attributes. The equation to determine MER and CER consider utility and RPMA costs. To capture the additional importance of MER and CER due to the elimination of these two attributes, ESSC recommends that the weights assigned to MER be raised from 11 to 20 and CER be raised from 12 to 20.

(3) *Weighting Scheme.* ESSC proposes no substantive changes to the other attributes in this measure of merit. The point difference due to the elimination of three attributes, the lowering of the total attribute weight from 150 to 100, and the raising of the MER and CER weight should then be distributed proportionally among the remaining attributes.

d. **Expandability Attributes.** For Army BRAC 91, this installation category used five attributes with a total weight of 150 points. They were total buildable acres (20), total building square feet (45), encroachment (45), environment (20), and water/sewer facilities (20). For Army BRAC 93, based on our analysis of the requirements of the Army in the future, the expandability measure of merit is more important than previously thought. Therefore, the attributes within this measure of merit are the most changed within this analysis. To show this importance the total weight for all attributes should be raised from 150 to 200. Figure C-4 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) *Total Building Square Feet.* This attribute should be eliminated since it does not show an ability of an installation to grow. In most cases, existing buildings are already being utilized. Thus, the total buildable acres attribute should be given more weight to show the ability of an installation to expand by raising the weight from 15 to 50.

(2) ***Environmental Carrying Capacity.*** Formerly the environment attribute, this is a newly revised attribute. The new name reflects the expanded nature of this attribute; an installation's capability to expand in consideration of noise pollution, wetlands, endangered species and flora areas, etc. Due to the importance of this attribute, the weight was raised from 36 to 50. The rationale for expanding this attribute, and an assessment of how to develop appropriate sub-attributes to better measure it, are presented in paragraph 21, New and Revised Candidate Attributes.

(3) ***Multi-function.*** This is an added attribute which shows the capability of an installation to expand through the acceptance of new missions and organizations. It is used in the training category and is added here for its ability to reflect diversity. ESSC proposes the number of activities with missions other than the primary mission in this installation category be used as an indicator of an installation's ability to support multiple functions now and in the future. This capability will become increasingly important for the Army of the future. For this reason ESSC gave the multi-function attribute 30 points.

(4) ***Water/Sewer Facilities.*** ESSC recommends changing the "Water/Sewer Facilities" attribute to Infrastructure. ESSC also recommends that land fill and electrical distribution capacity, be added to water and sewer systems in this attribute. They all impact expansion plans.

(5) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit. The point differences from Army BRAC 91 to Army BRAC 93 are due to the suggested elimination of one attribute, the raising of the total attribute weight from 150 to 200, and the addition of one new attribute.

e. **Quality of Life Attributes.** For Army BRAC 91, this installation category used eight attributes with a total weight of 200 points. They were percent permanent facilities (34), community of excellence score (10), Army family housing (33), unaccompanied officer housing (24), unaccompanied enlisted housing (33), community facilities (23), places rated almanac rating (20), and health care support (23). For Army BRAC 93, ESSC recommends no change to the total Quality of Life points. Figure C-4 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Community of Excellence.*** Since the value of most of this attribute is already captured in other attributes within this measure of merit, the weight of this attribute should be lowered from 15 to 10.

(2) ***Places Rated Almanac Rating.*** ESSC recommends reducing the weight of this attribute to 10 points. The places rated almanac rating attribute measures a place during a snapshot in time. The ratings change annually. Additionally, it is extremely difficult for an installation to change local and state administrative affairs, e.g. quality of dollars allocated to school budget. ESSC believes, when measuring military value, it is more important to measure factors "within the fence" than those outside the fence.

(3) ***Health Care Support Index.*** The weight of the health care support index attribute should be raised from 24 to 35. Health care support in the quality of life measure of merit is very important to the Total Army Community and should be weighted appropriately. The Army needs to ensure that the health care needs of its active duty personnel, dependents, government employees, and retirees are afforded the best care possible.

(4) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit. The point differences from Army BRAC 91 are due to the elimination of one attribute and the raising of the health care support attribute weight. The remaining points are then distributed proportionally among the remaining attributes.

11. PROFESSIONAL SCHOOLS.

a. Mission Essentiality Attributes. For Army BRAC 91, this installation category used seven attributes with a total weight of 250 points. They were multi-function (50), Army readiness (34), maneuver training acres (12), impact range acres (11), general instruction facilities (80), deployment capability (22), and reserve component support (41). For Army BRAC 93, due to the importance of the mission essentiality measure of merit, the total points were raised by ESSC from 250 to 275. This increase in weight is necessary to ensure those attributes which are paramount to mission preparedness are properly weighted. **Figure C-5** shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Multi-function.*** ESSC recommends that the value of this attribute is better served if moved to the expandability measure of merit. Future planning documents state that installations must be capable of expanding and becoming multi-functional. Attributes that solely pertain to mission preparedness should be captured in this measure of merit. This attribute shows the capability of an installation to expand through the acceptance of new missions and organizations. ESSC proposes the number of activities with missions other than the primary mission in this installation category be used as an indicator of an installation's ability to support multiple functions now and in the future. This capability will become increasingly important for the Army of the future. For this reason ESSC gave the multi-function attribute 30 points in the expandability measure of merit.

(2) ***Mobilization.*** ESSC also recommends that a mobilization attribute be included for this installation category. This new attribute captures the importance of our training and branch schools to deploy personnel and small units for any contingency quickly. The capability of an installation to serve as a power projection platform in the future is essential to the Army preparedness mission. The rationale for adding this new attribute, and an assessment of how to develop relevant sub-attributes to measure it, are presented in paragraph 21, New and Revised Candidate Attributes. The recommended weight assigned to this new attribute is 35.

(3) ***Maneuver Training Acres.*** An analysis of this attribute reveals that for training and professional schools the maneuver training acres attribute is not among the most essential attributes. ESSC recommends moving this attribute to the Mission Suitability measure of merit for training and professional schools. This attribute describes the suitability of an installation more than being a mission essential element. Training acreage is unnecessary to a professional school as an essential measure of merit.

MISSION ESSENTIALITY

Attribute	Old	New
Multi-function	50	0
Mobilization	0	35
Army Readiness	34	50
Maneuver Training Acres	12	0
Impact Range Acres	11	0
General Instruction Facils	80	100
Deployment Network	22	40
Reserve Support	41	50
Total	250	275

EXPANDABILITY

Attribute	Old	New
Total Buildable Acres	28	50
Total Building Square Feet	35	0
Encroachment	19	20
Environmental Capacity	33	50
Multi-function	0	30
Infrastructure	0	50
Water/Sewer Facilities	35	0
Total	150	200

MISSION SUITABILITY

Attribute	Old	New
Applied Instruction Facils	66	65
Maneuver Training Acres	0	10
Ranges	12	10
Maintenance Facilities	18	15
Operational/Admin Facils	48	50
Information Mission Area	54	50
Medical Facilities	22	0
Construction Investment	30	25
Total	250	225

QUALITY OF LIFE

Attribute	Old	New
% Permanent Facilities	23	20
Community of Excellence	15	10
Army Family Housing	28	30
Unaccomp Officer Housing	26	25
Unaccomp Enlisted Housing	38	40
Community Facilities	30	35
Places Rated Almanac Rating	16	10
Health Care Support Index	24	30
Total	200	200

OPERATIONAL EFFICIENCY

Attribute	Old	New
Variable Housing Allowance	12	15
Family Housing Cost Per Unit	15	15
Average Civilian Salary	11	10
Hourly Wage Grade Rate	10	0
Manpower Est Relationship	11	20
Cost Estimate Relationship	12	20
Utilities Cost Factor	25	0
RPMA Cost Factor	35	0
Military Construction Cost	19	20
Total	100	100

TOTAL ATTRIBUTE SCORE

	Old	New
Mission Essentiality	250	275
Mission Suitability	250	225
Operational Efficiency	150	100
Expandability	150	200
Quality of Life	200	200
Total	1,000	1,000

Figure C-5. REVISED ATTRIBUTES FOR PROFESSIONAL SCHOOLS

(4) ***Impact Range Acres.*** This attribute should be eliminated from this measure of merit. The value of the impact range acres can be captured in the ranges attribute in mission suitability. This attribute describes the suitability of an installation more than being a mission essential element for the installations listed as professional schools. This attribute measures impact areas. However, it is questionable whether the definition or the unit of measure for ranges adequately reflect the range requirements at professional schools.

(5) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit except for adjustments to the weights caused by the weighting shifts just discussed.

b. **Mission Suitability Attributes.** For Army BRAC 91, this installation category used seven attributes with a total weight of 250 points. They were applied instruction facilities (66), ranges - BRM (12), maintenance facilities (18), administrative operations (48), information mission area support (54), medical facilities (22), and construction investment (30). ESSC recommended several changes for Army BRAC 93. Due to the importance of the mission essentiality measure of merit, the total points within this measure of merit was lowered from 250 to 225. This reduction does not detract from the importance of this measure of merit since it still carries more weight than the remaining measures of merit. Figure C-5 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Maneuver Training Acres.*** This is a new attribute for this measure of merit that replaces the maneuver training acres attribute eliminated from the mission essentiality measure of merit. This attribute was placed in this measure of merit since the attribute pertains to the suitability of an installation rather than essentiality to mission preparedness. This reflects the mission of and role of professional schools in providing advanced training concepts. The weight given to this attribute is 10.

(2) ***Ranges.*** This attribute takes the place of impact range acres and the ranges - BRM attributes. ESSC is recommending changes to the ranges attribute that permits this replacement. For uniformity and simplicity reasons, one range attribute that encompasses the measuring of military value for all range attributes will benefit the measurement process. Ranges for professional schools is viewed as suitability measure of merit based on their mission and role.

(3) ***Medical Facilities.*** An analysis of these attributes revealed no contribution to military value in mission suitability with the "medical facilities" attribute. The value of the medical facilities attribute is already captured in the quality of life measure of merit for training and professional schools. Therefore, this attribute should be eliminated from this measure of merit.

(4) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit except for adjustments to the weights caused by the weighting shifts just discussed.

c. **Operational Efficiency Attributes.** For Army BRAC 91, this installation category used nine attributes with a total weight of 150 points. They were variable housing allowance (12), family housing cost per unit (15), average civilian salary (11), hourly wage grade rate (10), manpower estimate relationship (11), cost estimate relationship (12), utilities cost (25). RPMA cost factor (35), and military construction cost (19). ESSC recommends for Army BRAC 93 that

the weights for all attributes in operational efficiency should be lowered from 150 to 100. This is due to the importance of other measures of merit. Expandability for the Army of the future which was raised 50 points. Figure C-5 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Hourly Wage Grade Rate.*** This attribute is unnecessary since the cost of the civilian workforce can be captured in one attribute. That is the average civilian salary attribute. The split into two separate civilian wages is unnecessary.

(2) ***Utilities Cost Factor and RPMA Cost Factor.*** Both of these attributes can be eliminated since the essence of their contribution to military value is already captured in the manpower estimate relationship (MER) and cost estimate relationship (CER) attributes. The equation to determine MER and CER consider utility and RPMA costs. To capture the additional importance of MER and CER due to the elimination of these two attributes, ESSC recommends that the weights assigned to MER be raised from 11 to 20 and CER be raised from 12 to 20.

(3) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit. The point difference due to the elimination of four attributes, the lowering of the total attribute weight from 150 to 100, and the raising of the MER and CER weight should then be distributed proportionally among the remaining attributes.

d. **Expandability Attributes.** For Army BRAC 91, this installation category used five attributes with a total weight of 150 points. They were total buildable acres (28), total building square feet (35), encroachment (19), environment (33), and water/sewer facilities (35). Weighting Scheme. ESSC makes several new recommended changes for Army BRAC 93. Based on an analysis of the requirements of the Army in the future, the expandability measure of merit is more important than previously thought. Therefore, the attributes within this measure of merit are probably the most changed within this analysis. To show this importance the total weight for all attributes should be raised from 150 to 200. Figure C-5 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Total Building Square Feet.*** This attribute should be eliminated since it does not show an ability of an installation to grow. In most cases, existing buildings are already being utilized. Thus, the total buildable acres attribute should be given more weight to show the ability of an installation to expand by raising the weight from 28 to 50.

(2) ***Environmental Carrying Capacity.*** Formerly the environment attribute, this is a newly revised attribute. The new name reflects the expanded nature of this attribute; an installation's capability to expand in consideration of noise pollution, wetlands, endangered species and flora areas, etc. Due to the importance of this attribute, the weight was raised from 33 to 50. The rationale for expanding this attribute, and an assessment of how to develop appropriate sub-attributes to better measure it, are presented in paragraph 21, New and Revised Candidate Attributes.

(3) ***Multi-function.*** This is an added attribute which shows the capability of an installation to expand through the acceptance of new missions and organizations. It is used in the

training category and is added here for its ability to reflect diversity. ESSC proposes the number of activities with missions other than the primary mission in this installation category be used as an indicator of an installation's ability to support multiple functions now and in the future. This capability will become increasingly important for the Army of the future. For this reason ESSC gave the multi-function attribute 30 points.

(4) ***Water/Sewer Facilities.*** ESSC recommends changing the "Water/Sewer Facilities" attribute to Infrastructure. ESSC also recommends that land fill and electrical distribution capacity, be added to water and sewer systems in this attribute. They all impact expansion plans.

(5) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit. The point difference due to the suggested elimination of one attribute, the raising of the total attribute weight from 150 to 200, and the addition of one new attribute should be distributed proportionally among the remaining attributes.

e. **Quality of Life Attributes.** For Army BRAC 91, this installation category used eight attributes with a total weight of 200 points. They were percent permanent facilities (23), community of excellence score (15), Army family housing (28), unaccompanied officer housing (26), unaccompanied enlisted housing (38), community facilities (30), places rated almanac rating (16), and health care support (24). Figure C-5 shows ESSC's recommended weights for Army BRAC 93 for each attribute within this measure of merit.

(1) ***Community of Excellence.*** Since the value of most of this attribute is already captured in other attributes within this measure of merit, the weight of this attribute should be lowered from 15 to 10.

(2) ***Places Rated Almanac Rating.*** ESSC recommends reducing the weight of this attribute to 10 points. The places rated almanac rating attribute measures a place during a snapshot in time. The ratings change annually. Additionally, it is extremely difficult for an installation to change local and state administrative affairs, e.g. quality of dollars allocated to school budget. ESSC believes, when measuring military value, it is more important to measure factors "within the fence" than those outside the fence.

(3) ***Health Care Support Index.*** The weight of the health care support index attribute should be raised from 24 to 30. Health care support in the quality of life measure of merit is very important to the Total Army Community and should be weighted appropriately. The Army needs to ensure that the health care needs of its active duty personnel, dependents, government employees, and retirees are afforded the best care possible.

(4) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit. The point differences from Army BRAC 91 are due to the elimination of one attribute and the raising of the health care support attribute weight. The remaining points are then distributed proportionally among the remaining attributes.

12. COMMAND AND CONTROL INSTALLATIONS.

a. **Mission Essentiality Attributes.** For Army BRAC 91, this installation category used five attributes with a total weight of 250 points. They were major unit support (60), levels of command (71), reserve support (39), AR 5-9 support (36), and proximity (44). **Figure C-6** shows ESSC's recommended weights for Army BRAC 93. Due to the importance of the mission essentiality measure of merit, the total points were raised from 250 to 275. This increase in weight is necessary to ensure those attributes which are paramount to mission preparedness are properly weighted.

(1) ***AR 5-9 Support.*** ESSC found the name of this attribute to be unclear. This attribute should be changed to sub-installation support. Capturing the value of sub-installation support is more important and renaming the attribute provides a better understanding of the intent of the AR 5-9 support attribute.

(2) ***Proximity to Other Services.*** This attribute should be changed to joint synergy and moved to the mission suitability measure of merit. This attribute describes the suitability of an installation more than being a mission essential element for command and control installations. The name change is necessary to adequately describe what is being measured for command and control installations.

(3) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit except for adjustments to the weights caused by the weighting shifts just discussed.

b. **Mission Suitability Attributes.** For Army BRAC 91, this installation category used six attributes with a total weight of 250 points. They were accessibility (41), recruit and retain (36), total operational and administrative facilities (35), permanent operational and administrative facilities (50), transportation net (48), and information mission area support (40). For Army BRAC 93, Figure C-6 shows ESSC's recommended weights for each attribute within this measure of merit. Due to the importance of the mission essentiality measure of merit, the total points within this measure of merit was lowered from 250 to 225. This reduction does not detract from the importance of this measure of merit since it still carries more weight than the remaining measures of merit.

(1) ***Recruit and Retain.*** During the analysis of this attribute, there was confusion as to the meaning of the "recruit and retain" attribute. At first glance, it appears to measure recruiting and retaining active duty personnel. The attribute should be changed to Work Force Retention since the attribute actually measure civilian positions filled. Work force retention applies to maintaining a quality work force. This provides a better understanding of the intent of the attribute.

(2) ***Permanent Operational and Administrative Facilities.*** An analysis of this attribute shows that it should be eliminated from this measure of merit. This measure of merit already captures the value of operational and administrative facilities and the quality of life measure of merit captures the value of permanent facilities. Many buildings currently in use are rehabilitated and semi-permanent WWII buildings which are still capable of functioning as useful facilities. The name of this attribute, is therefore, misleading.

MISSION ESSENTIALITY

Attribute	Old	New
Major Unit Support	60	80
Levels of Command	71	90
Reserve Support	39	55
AR 5-9 Support	36	0
Sub-installation Support	0	50
Proximity	44	0
Total	250	275

EXPANDABILITY

Attribute	Old	New
Total Buildable Acres	33	45
Total Building Square Feet	31	0
Encroachment	26	30
Environmental Capacity	26	50
Multi-function	0	30
Infrastructure	0	45
Water/Sewer Facilities	34	0
Total	150	200

MISSION SUITABILITY

Attribute	Old	New
Accessibility	41	30
Recruit and Retain	36	0
Work Force Retention	0	20
Operational/Admin Facils	35	40
Permanent Op/Admin Facils	50	0
Mobilization	0	20
Construction Investment	0	20
Transportation Net	48	0
Airport Proximity	0	30
Joint Synergy	0	35
Information Mission Area	40	30
Total	250	225

QUALITY OF LIFE

Attribute	Old	New
% Permanent Facilities	31	35
Community of Excellence	22	10
Army Family Housing	29	35
Unaccomp Officer Housing	22	25
Unaccomp Enlisted Housing	24	25
Community Facilities	24	25
Places Rated Almanac Rating	23	10
Health Care Support Index	25	35
Total	200	200

OPERATIONAL EFFICIENCY

Attribute	Old	New
Variable Housing Allowance	15	15
Family Housing Cost Per Unit	15	15
Average Civilian Salary	14	15
Hourly Wage Grade Rate	15	0
Manpower Est Relationship	0	20
Cost Estimate Relationship	0	20
Utilities Cost Factor	17	0
RPMA Cost Factor	18	0
Military Construction Cost	16	15
Total	110	100

TOTAL ATTRIBUTE SCORE

	Old	New
Mission Essentiality	250	275
Mission Suitability	250	225
Operational Efficiency	110	100
Expandability	150	200
Quality of Life	200	200
Total	960	1,000

Figure C-6. REVISED ATTRIBUTES FOR COMMAND AND CONTROL INSTALLATIONS

(3) ***Mobilization.*** ESSC also recommends that a mobilization attribute be included for this installation category. This attribute captures the capability of our command and control centers to deploy personnel for any contingency and for reconstitution purposes. The capability of an installation to serve as a power projection platform in the future is essential to the Army preparedness mission. The rationale for adding this new attribute, and an assessment of how to develop relevant sub-attributes to measure it, are presented in paragraph 21, New and Revised Candidate Attributes. The recommended weight assigned to this new attribute is 25.

(4) ***Construction Investment.*** This is an added attribute. It is in use in the training category. It has been given a weight value of 25 points. This construction investment attribute reflects the modernization of a post or training area and provides a measurement for future construction requirements.

(5) ***Transportation Network.*** The transportation attribute should be eliminated from this measure of merit. The military value of the "transportation network" attribute can be captured in the airport proximity attribute. The name change is necessary to adequately describe what is being measured for command and control installations. The need for rail nets is unnecessary, but the location of the nearest airport is important as a suitability attribute for the ease of personnel to reach these locations for planning and coordination site visits.

(6) ***Airport Proximity.*** This attribute was moved to this measure of merit from the mission suitability measure of merit. This attribute describes the suitability of an installation more than being a mission essential element for command and control installations.

(7) ***Joint Synergy.*** ESSC recommends that an additional attribute called "joint synergy" be introduced for this installation category. This revised attribute was formerly the proximity to other services attribute. The joint synergy attribute captures the importance of joint operations, exercises, and common physical boundaries with other services. The capability of an installation to support inter-service exercises provides the Army with an advantage in training how we plan to fight. This attribute should be based on: support to other services (e.g. tenants on the installation); joint activities conducted with elements of the other services; and support agreements for Army use of their facilities and their use of Army facilities. The recommended weight assigned to this new attribute is 15.

(8) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit except for adjustments to the weights caused by the weighting shifts just discussed.

c. **Operational Efficiency Attributes.** For Army BRAC 91, this installation category used seven attributes with a total weight of 110 points. They were variable housing allowance (15), family housing cost per unit (15), average civilian salary (14), hourly wage grade rate (15), utilities cost (17), RPMA cost factor (18), and military construction cost (16). The decision to delete the MER and CER attributes for this installation category was made during Army BRAC 91 due to the uniqueness of these types of installations. In keeping with the changes to the weights of the measures of merit as recommended by ESC for Army BRAC 93 the total weight for all attributes in Operational Efficiency should be lowered from 110 for command and control centers to 100. This is due to the importance of Expandability for the Army of the future which

was raised 50 points. Figure C-6 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Hourly Wage Grade Rate.*** This attribute is unnecessary since the cost of the civilian workforce can be captured in one attribute. That is the average civilian salary attribute. The split into two separate civilian wages is unnecessary.

(2) ***Manpower Estimate Relationship and Cost Estimate Relationship.*** ESSC recommends that the MER and CER be placed back in this measure of merit as a valid measure of military value. Besides making the measure of merit uniform with the other installation categories, it permits the elimination of two other attributes within this measure of merit.

(3) ***Utilities Cost Factor and RPMA Cost Factor.*** Both of these attributes can be eliminated since the essence of their contribution to military value is already captured in the manpower estimate relationship (MER) and cost estimate relationship (CER) attributes. The equation to determine MER and CER consider utility and RPMA costs. To capture the additional importance of MER and CER due to the elimination of these two attributes, ESSC recommends that they be placed in this measure of merit for command and control centers. ESSC also recommends that 20 points be given to the weight of both MER and CER.

(4) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit. The point difference due to the elimination of three attributes, the lowering of the total attribute weight from 110 to 100, and the addition of the MER and CER weights should then be distributed proportionally among the remaining attributes.

d. **Expandability Attributes.** For Army BRAC 91, this installation category used five attributes with a total weight of 150 points. They were total buildable acres (33), total building square feet (31), encroachment (26), environment (26), and water/sewer facilities (34). Figure C-6 shows ESSC's recommended weights for Army BRAC 93 for each attribute within this measure of merit. Based on an analysis of the requirements of the Army in the future, the expandability measure of merit is more important than previously thought. Therefore, the attributes within this measure of merit are probably the most changed within this analysis. To show this importance the total weight for all attributes should be raised from 150 to 200.

(1) ***Total Building Square Feet.*** This attribute should be eliminated since it does not show an ability of an installation to grow. In most cases, existing buildings are already being utilized. Thus, the total buildable acres attribute should be given more weight to show the ability of an installation to expand by raising the weight from 33 to 45.

(2) ***Environmental Carrying Capacity.*** Formerly the environment attribute, this is a newly revised attribute. The new name reflects the expanded nature of this attribute; an installation's capability to expand in consideration of noise pollution, wetlands, endangered species and flora areas, etc. Due to the importance of this attribute, the weight was raised from 26 to 50. The rationale for expanding this attribute, and an assessment of how to develop appropriate sub-attributes to better measure it, are presented in paragraph 21, New and Revised Candidate Attributes.

(3) ***Multi-function.*** This is an added attribute which shows the capability of an installation to expand through the acceptance of new missions and organizations. It is used in the training category and is added here for its ability to reflect diversity. ESSC proposes the number of activities with missions other than the primary mission in this installation category be used as an indicator of an installation's ability to support multiple functions now and in the future. This capability will become increasingly important for the Army of the future. For this reason ESSC gave the multi-function attribute 30 points.

(4) ***Water/Sewer Facilities.*** ESSC recommends changing the "Water/Sewer Facilities" attribute to Infrastructure. ESSC also recommends that land fill and electrical distribution capacity, be added to water and sewer systems in this attribute. They all impact expansion plans.

(5) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit. The point difference due to the suggested elimination of one attribute, the raising of the total attribute weight from 150 to 200, and the addition of one new attribute should be distributed proportionally among the remaining attributes.

e. **Quality of Life Attributes.** For Army BRAC 91, this installation category used eight attributes with a total weight of 200 points. They were percent permanent facilities (34), community of excellence score (10), Army family housing (33), unaccompanied officer housing (24), unaccompanied enlisted housing (33), community facilities (23), places rated almanac rating (20), and health care support (23). For Army BRAC 93 ESSC recommends no change to the total Quality of Life points. Figure C-6 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Community of Excellence.*** Since the value of most of this attribute is already captured in other attributes within this measure of merit, the weight of this attribute should be lowered from 22 to 10.

(2) ***Places Rated Almanac Rating.*** ESSC recommends reducing the weight of this attribute to 10 points. The places rated almanac rating attribute measures a place during a snapshot in time. The ratings change annually. Additionally, it is extremely difficult for an installation to change local and state administrative affairs, e.g. quality of dollars allocated to school budget. ESSC believes, when measuring military value, it is more important to measure factors "within the fence" than those outside the fence.

(3) ***Health Care Support Index.*** The weight of the health care support index attribute should be raised from 25 to 35. Health care support in the quality of life measure of merit is very important to the Total Army Community and should be weighted appropriately. The Army needs to ensure that the health care needs of its active duty personnel, dependents, government employees, and retirees are afforded the best care possible.

(4) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit. The point differences from Army BRAC 91 are due to the

elimination of one attribute and the raising of the health care support attribute weight. The remaining points are then distributed proportionally among the remaining attributes.

13. **DEPOTS.**

a. **Mission Essentiality Attributes.** For Army BRAC 91, this installation category used six attributes with a total weight of 250 points. They were multi-mission (35), capacity - supply (50), capacity - maintenance (70), capacity - ammunition storage (60), unique mission (15), and reserve support (20). For Army BRAC 93, **Figure C-7** shows ESSC's recommended weights for each attribute within this measure of merit. Due to the importance of the mission essentiality measure of merit, the total points was raised from 250 to 300 for AMC installations. This increase in weight is necessary to ensure those attributes which are paramount to mission preparedness are properly weighted.

(1) ***Multi-Mission.*** ESSC recommends that the name of this attribute be changed from "multi-mission" to multi-function. This would provide uniformity with other installation categories that use the multi-function attribute. ESSC also recommends that the value of this attribute is better served if moved to the expandability measure of merit. Future planning documents state that installations must be capable of expanding and becoming multi-functional. Attributes that solely pertain to mission preparedness should be captured in this measure of merit.

(2) ***Unique Mission.*** An analysis of this attribute revealed that the unique mission attribute does not provide any real value in mission essentiality. All military installations have a uniqueness that caters to a special branch, type of unit, operation, and, or function. The unique mission attribute only provides a "we are different" measure. Most of the installations throughout the Army contain one-of-a-kind resources that are too costly to transfer or replace. Recognition of these type of capabilities needs to be included within the BRAC process for oversight purposes during Phase II. The trend for the future will be for expandability and multi-functional installations. Therefore, this attribute should be eliminated and the points redistributed to capture value of the remaining attributes within mission essentiality. This suggestion was offered by several installation managers and their staffs.

(3) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit except for adjustments to the weights caused by the weighting shifts just discussed.

b. **Mission Suitability Attributes.** For Army BRAC 91, this installation category used six attributes with a total weight of 250 points. They were transportation network (70), location (40), environmental compliance (30), capital investments (45), information mission area (30), and quantity - distance (35). Due to the importance of the mission suitability measure of merit, the total points within this measure of merit was kept at 250 for AMC installations. For Army BRAC 93, Figure C-7 shows the ESSC recommended weights for each attribute within this measure of merit.

(1) ***Transportation Network.*** For uniformity and simplicity reasons, this attribute should be eliminated and replaced with the deployment network attribute. The deployment

MISSION ESSENTIALITY

Attribute	Old	New
Multi-Mission	35	0
Capacity - Supply	50	75
Capacity - Maintenance	70	95
Capacity - Ammo Storage	60	85
Unique Mission	15	0
Reserve Component Support	20	45
Total	250	300

EXPANDABILITY

Attribute	Old	New
Total Buildable Acres	10	10
Total Unused Ammo Storge	20	15
Multi-function	0	10
Encroachment	10	10
Environmental Capacity	10	30
Infrastructure	0	10
Water/Sewer Facilities	10	0
Work Force Available	20	15
Total Unused Maintenance	40	30
Total Unused Supply	30	20
Total	150	150

MISSION SUITABILITY

Attribute	Old	New
Deployment Network	0	70
Transportation Network	70	0
Location	40	40
Environmental Compliance	30	30
Capital Investments	45	0
Construction Investment	0	45
Information Mission Area	30	30
Quantity - Distance	35	35
Total	250	250

QUALITY OF LIFE

Attribute	Old	New
% Permanent Facilities	40	30
Community of Excellence	20	10
Army Family Housing	10	15
Unaccomp Officer Housing	10	10
Unaccomp Enlisted Housing	10	15
Community Facilities	30	30
Places Rated Almanac Rating	30	10
Health Care Support Index	20	30
Community Economics	30	0
Total	200	150

OPERATIONAL EFFICIENCY

Attribute	Old	New
Variable Housing Allowance	10	20
Family Housing Cost Per Unit	10	20
Average Civilian Salary	25	25
Hourly Wage Grade Rate	30	0
Manpower Est Relationship	10	30
Cost Estimate Relationship	10	30
Utilities Cost Factor	20	0
RPMA Cost Factor	20	0
Military Construction Cost	15	25
Total	150	150

TOTAL ATTRIBUTE SCORE

	Old	New
Mission Essentiality	250	300
Mission Suitability	250	250
Operational Efficiency	150	150
Expandability	150	150
Quality of Life	200	150
Total	1,000	1,000

Figure C-7. REVISED ATTRIBUTES FOR DEPOTS

network attribute adequately describes the military value of depots having a rail, road, sea, and air capability in which to move materiel. The changing of this attribute permits the elimination of an attribute that measures the same elements already captured in an attribute used in several other installation categories.

(2) ***Capital Investment.*** When ESSC began to analyze this attribute, we thought it was referring to major maintenance and production equipment. It is not. It refers to MCA. ESSC recommends that this attribute be changed from "capital investment" to construction investment. This would provide uniformity with other installation categories.

(3) ***Weighting Scheme.*** The weights assigned to each of the attributes within this measure of merit reflect the appropriate values and should remain the same.

c. **Operational Efficiency Attributes.** For Army BRAC 91, this installation category used nine attributes with a total weight of 150 points. They were variable housing allowance (10), family housing cost per unit (10), average civilian salary (25), hourly wage grade rate (30), manpower estimate relationship (10), cost estimate relationship (10), utilities cost (20), RPMA cost factor (20), and military construction cost (15). Due to the unique missions of AMC installations, the total weight of the operational efficiency measure of merit should remain at 150. For Army BRAC 93, Figure C-7 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Hourly Wage Grade Rate.*** This attribute is unnecessary since the cost of the civilian workforce can be captured in one attribute. That is the average civilian salary attribute. The split into two separate civilian wages is unnecessary.

(2) ***Utilities Cost Factor and RPMA Cost Factor.*** Both of these attributes can be eliminated since the essence of their contribution to military value is already captured in the manpower estimate relationship (MER) and cost estimate relationship (CER) attributes. The equation to determine MER and CER consider utility and RPMA costs. To capture the additional importance of MER and CER due to the elimination of these two attributes, ESSC recommends that the weights assigned to MER and CER be raised from 10 to 30.

(3) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit. The point difference due to the elimination of three attributes and the raising of the MER and CER weight should then be distributed among the remaining attributes.

d. **Expandability Attributes.** For Army BRAC 91, this installation category used eight attributes with a total weight of 150 points. They were total buildable acres (10), total unused ammunition storage (20), encroachment (10), environment (10), water/sewer facilities (10), work force available (20), total unused maintenance (40), and total unused supply (30). Figure C-7 shows ESSC's recommended weights for each attribute within this measure of merit. Due to the unique missions of AMC installations, the total weight of the expandability measure of merit should remain at 150.

(1) ***Environmental Carrying Capacity.*** Formerly the environment attribute, this is a newly revised attribute. The new name reflects the expanded nature of this attribute: an

installation's capability to expand in consideration of noise pollution, wetlands, endangered species and flora areas, etc. Due to the importance of this attribute, the weight was raised from 10 to 30. The rationale for expanding this attribute, and an assessment of how to develop appropriate sub-attributes to better measure it, are presented in paragraph 21, New and Revised Candidate Attributes.

(2) ***Multi-function.*** This is an added attribute which shows the capability of an installation to expand through the acceptance of new missions and organizations. It is used in the training category and is added here for its ability to reflect diversity. ESSC proposes the number of activities with missions other than the primary mission in this installation category be used as an indicator of an installation's ability to support multiple functions now and in the future. This capability will become increasingly important for the Army of the future. For this reason ESSC gave the multi-function attribute 10 points.

(3) ***Water/Sewer Facilities.*** ESSC recommends changing the "Water/Sewer Facilities" attribute to Infrastructure. ESSC also recommends that land fill and electrical distribution capacity, be added to water and sewer systems in this attribute. They all impact expansion plans.

(4) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit. The point difference due to the inclusion of one new attribute and the raising of the environmental capacity weight should then be distributed among the remaining attributes.

e. **Quality of Life Attributes.** For Army BRAC 91, this installation category used nine attributes with a total weight of 200 points. They were percent permanent facilities (40), community of excellence score (20), Army family housing (10), unaccompanied officer housing (10), unaccompanied enlisted housing (10), community facilities (30), places rated almanac rating (30), health care support (20), and community economics (30). For Army BRAC 93, unique missions of AMC installations, the total weight of the quality of life measure of merit should be lowered from 200 to 150. For Army BRAC 93, Figure C-7 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Community of Excellence.*** Since the value of most of this attribute is already captured in other attributes within this measure of merit, the weight of this attribute should be lowered from 20 to 10.

(2) ***Places Rated Almanac Rating.*** ESSC recommends reducing the weight of this attribute to 10 points. The places rated almanac rating attribute measures a place during a snapshot in time. The ratings change annually. Additionally, it is extremely difficult for an installation to change local and state administrative affairs, e.g. quality of dollars allocated to school budget. ESSC believes, when measuring military value, it is more important to measure factors "within the fence" than those outside the fence.

(3) ***Health Care Support Index.*** The weight of the health care support index attribute should be raised from 20 to 30. Health care support in the quality of life measure of

merit is very important to the Total Army Community and should be weighted appropriately. The Army needs to ensure that the health care needs of its active duty personnel, dependents, government employees, and retirees are afforded the best care possible.

(4) *Community Economics*. An analysis of this attribute revealed that the community economics attribute does not provide any real value in quality of life. All military installations have an awareness of the opportunities afforded by the community surrounding an installation. To maintain uniformity and in keeping with simplicity, this attribute should be eliminated. Recognition of this value needs to included within the BRAC process for oversight purposes during Phase II.

(5) *Weighting Scheme*. ESSC proposes no substantive changes to the other attributes in this measure of merit. The remaining point difference due to the elimination of two attributes, the raising of the health care support attribute, the lowering of the community of excellence weight, and this new total weight should then be distributed proportionally among the remaining attributes.

14. PRODUCTION INSTALLATIONS.

a. **Mission Essentiality Atuributes**. For Army BRAC 91, this installation category used four attributes with a total weight of 250 points. They were mobilization (80), production flexibility (80), reserve support (10), and unique mission (80). ESSC recommends several changes for Army BRAC 93. Due to the importance of the mission essentiality measure of merit, the total points was raised from 250 to 300 for AMC installations. This increase in weight is necessary to ensure those attributes which are paramount to mission preparedness are properly weighted. For Army BRAC 93, **Figure C-8** shows ESSC's recommended weights for each attribute within this measure of merit.

(1) *Production Storage*. This is a new attribute for this measure of merit moved from the mission suitability measure of merit. This attribute more clearly defines the essential mission of production installations.

(2) *Plant Capacity*. This is a new attribute for this measure of merit moved from the mission suitability measure of merit. This attribute more clearly defines the essential mission of production installations.

(3) *Reserve Support*. An analysis of this attribute shows that it should be moved from this measure of merit and placed in the mission suitability measure of merit. The value of reserve support for this installation category is not mission essential.

(4) *Unique Mission*. An analysis of this attribute revealed that the unique mission attribute does not provide any real value in mission essentiality. All military installations have a uniqueness that caters to a special branch, type of unit, operation, and, or function. The unique mission attribute only provides a "we are different" measure. Most of the installations throughout the Army contain one-of-a-kind resources that are too costly to transfer or replace. Recognition of these type of capabilities needs to be included within the BRAC process for oversight purposes

MISSION ESSENTIALITY

Attribute	Old	New
Mobilization	80	85
Production Flexibility	80	85
Production Storage	0	60
Plant Capacity	0	70
Reserve Support	10	0
Unique Mission	80	0
Total	250	300

EXPANDABILITY

Attribute	Old	New
Total Buildable Acres	20	20
Unused Capacity - Plant	20	20
Encroachment	20	15
Environmental Capacity	20	35
Infrastructure	0	15
Water/Sewer Facilities	20	0
Work Force Available	20	15
Unused Ammo Storage	30	30
Total	150	150

MISSION SUITABILITY

Attribute	Old	New
Location	35	0
Deployment Network	0	80
Transportation Network	45	0
Production Storage	70	0
Plant Capacity	80	0
Reserve Support	0	40
Construction Investment	0	65
Information Mission Area	20	65
Total	250	250

QUALITY OF LIFE

Attribute	Old	New
% Permanent Facilities	40	30
Community of Excellence	20	10
Army Family Housing	20	15
Unaccomp Officer Housing	10	10
Unaccomp Enlisted Housing	10	15
Community Facilities	30	30
Places Rated Almanac Rating	30	10
Health Care Support Index	20	30
Community Economics	20	0
Total	200	150

OPERATIONAL EFFICIENCY

Attribute	Old	New
Variable Housing Allowance	10	15
Family Housing Cost Per Unit	10	15
Average Civilian Salary	25	20
Non DOD Financing Costs	20	25
Manpwer Est Relationship	5	25
Cost Estimate Relationship	5	25
Utilities Cost Factor	25	0
RPMA Cost Factor	25	0
Military Construction Cost	25	25
Total	150	150

TOTAL ATTRIBUTE SCORE

	Old	New
Mission Essentiality	250	300
Mission Suitability	250	250
Operational Efficiency	150	150
Expandability	150	150
Quality of Life	200	150
Total	1,000	1,000

Figure C-8. REVISED ATTRIBUTES FOR PRODUCTION INSTALLATIONS

during Phase II. The trend for the future will be for expandability and multi-functional installations. Therefore, this attribute should be eliminated and the points redistributed to capture the value of the remaining attributes within mission essentiality. This suggestion was offered by several installation managers and their staffs.

(5) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit except for adjustments to the weights caused by the weighting shifts just discussed.

b. **Mission Suitability Attributes.** For Army BRAC 91, this installation category used five attributes with a total weight of 250 points. They were location (35), transportation network (45), production storage (70), plant capacity (80), and information mission area (20). For Army BRAC 93 ESSC recommended several changes to the measures of merit. Due to the importance of the mission suitability measure of merit, the total points within this measure of merit was kept at 250 for AMC installations. Figure C-8 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Location.*** During the analysis of this attribute, ESSC determined that it should be eliminated. The value of the location attribute can be captured in the deployment network attribute within this measure of merit.

(2) ***Transportation Network.*** For uniformity and simplicity reasons, this attribute should be eliminated and replaced with the deployment network attribute. The deployment network attribute adequately describes the military value of production installations having a rail, road, sea, and air capability in which to move products. The changing of this attribute permits the elimination of an attribute that measures the same elements already captured in an attribute used in several other installation categories.

(3) ***Production Storage and Plant Capacity.*** Both of these attributes were removed from this measure of merit and placed in the mission essentiality measure of merit. These attributes are mission essential elements of a production installation.

(4) ***Reserve Support.*** This is a new attribute for this measure of merit moved from the mission essentiality measure of merit. The reserve support capability for a production installation is better reflected as a suitable criteria rather than an essential function.

(5) ***Construction Investment.*** This is an added attribute. It is in use in the training category. It has been given a weight value of 65 points. This construction investment attribute reflects the modernization of a post or training area and provides a measurement for future construction requirements.

(6) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit except for adjustments to the weights caused by the weighting shifts just discussed.

c. **Operational Efficiency Attributes.** For Army BRAC 91, this installation category used nine attributes with a total weight of 150 points. They were variable housing allowance (10), family housing cost per unit (10), average civilian salary (25), non DOD financing costs (20),

manpower estimate relationship (5), cost estimate relationship (5), utilities cost (25), RPMA cost factor (25), and military construction cost (25). Due to the unique missions of AMC installations, the total weight of the operational efficiency measure of merit should remain at 150. For Army BRAC 93, Figure C-8 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Utilities Cost Factor and RPMA Cost Factor.*** Both of these attributes can be eliminated since the essence of their contribution to military value is already captured in the manpower estimate relationship (MER) and cost estimate relationship (CER) attributes. The equation to determine MER and CER consider utility and RPMA costs. To capture the additional importance of MER and CER due to the elimination of these two attributes, ESSC recommends that the weights assigned to MER and CER be raised from 5 to 25.

(2) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit. The point difference due to the elimination of two attributes and the raising of the MER and CER weight should then be distributed among the remaining attributes.

d. **Expandability Attributes.** For Army BRAC 91, this installation category used seven attributes with a total weight of 150 points. They were total buildable acres (20), unused capacity - plant (20), encroachment (20), environment (20), water/sewer facilities (20), work force available (20), and unused ammunition storage (30). Due to the unique missions of AMC installations, the total weight of the expandability measure of merit should remain at 150. For Army BRAC 93, Figure C-8 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Environmental Carrying Capacity.*** Formerly the environment attribute, this is a newly revised attribute. The new name reflects the expanded nature of this attribute; an installation's capability to expand in consideration of noise pollution, wetlands, endangered species and flora areas, etc. Due to the importance of this attribute, the weight was raised from 20 to 35. The rationale for expanding this attribute, and an assessment of how to develop appropriate sub-attributes to better measure it, are presented in paragraph 21, New and Revised Candidate Attributes.

(2) ***Water/Sewer Facilities.*** ESSC recommends changing the "Water/Sewer Facilities" attribute to Infrastructure. ESSC also recommends that land fill and electrical distribution capacity, be added to water and sewer systems in this attribute. They all impact expansion plans.

(3) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit. The point difference due to the raising of the environmental capacity weight should then be distributed among the remaining attributes.

e. **Quality of Life Attributes.** For Army BRAC 91, this installation category used nine attributes with a total weight of 200 points. They were percent permanent facilities (40), community of excellence score (20), Army family housing (20), unaccompanied officer housing (10), unaccompanied enlisted housing (10), community facilities (30), places rated almanac rating (30), health care support (20), and community economics (20). ESSC made several changes to the weighting scheme for Army BRAC 93. Due to the unique missions of AMC installations, the

total weight of the quality of life measure of merit should be lowered from 200 to 150. Figure C-8 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) *Community of Excellence.* Since the value of most of this attribute is already captured in other attributes within this measure of merit, the weight of this attribute should be lowered from 20 to 10.

(2) *Places Rated Almanac Rating.* ESSC recommends reducing the weight of this attribute to 10 points. The places rated almanac rating attribute measures a place during a snapshot in time. The ratings change annually. Additionally, it is extremely difficult for an installation to change local and state administrative affairs, e.g. quality of dollars allocated to school budget. ESSC believes, when measuring military value, it is more important to measure factors "within the fence" than those outside the fence.

(3) *Health Care Support Index.* The weight of the health care support index attribute should be raised from 20 to 30. Health care support in the quality of life measure of merit is very important to the Total Army Community and should be weighted appropriately. The Army needs to ensure that the health care needs of its active duty personnel, dependents, government employees, and retirees are afforded the best care possible.

(4) *Community Economics.* An analysis of this attribute revealed that the community economics attribute does not provide any real value in quality of life. All military installations have an awareness of the opportunities afforded by the community surrounding an installation. To maintain uniformity and in keeping with simplicity, this attribute should be eliminated. Recognition of this value needs to included within the BRAC process for oversight purposes during Phase II.

(5) *Weighting Scheme.* ESSC proposes no substantive changes to the other attributes in this measure of merit. The remaining point difference due to the elimination of two attributes, the raising of the health care support attribute, the lowering of the community of excellence weight, and this new total weight should then be distributed proportionally among the remaining attributes.

15. OCEAN TERMINAL PORTS.

a. **Mission Essentiality Attributes.** For Army BRAC 91, this installation category used five attributes with a total weight of 350 points. They were deep piers and wharfs (100), rail and road linkages (85), hard surface staging areas (40), transportation infrastructure (75), and support facilities (50). Due to the importance of the mission essentiality measure of merit, the total points was raised from 250 to 300 for AMC installations. Since the port installation category used 350 points for Army BRAC 91, ESSC recommends that this total weight be lowered to 300. This would allow for uniformity and simplicity for all AMC installations. This reduction in weight will not impact the importance of the mission essentiality attributes since 300 points is more that any other measure of merit weight for this installation category. For Army BRAC 93, **Figure C-9** shows ESSC's recommended weights for each attribute within this measure of merit.

MISSION ESSENTIALITY

Attribute	Old	New
Deep Piers and Wharfs	100	0
Rail and Road Linkages	85	90
Hard Surface Staging Areas	40	0
Transportation Infrastructure	75	0
Support Facilities	50	75
Normal Throughput Capacity	0	100
Reserve Support	0	35
Total	350	300

EXPANDABILITY

Attribute	Old	New
Total Buildable Acres	38	35
Total Building Square Feet	37	0
Environmental Capacity	37	40
Mobilization Thruput Capacity	0	45
Infrastructure	0	30
Water/Sewer Facilities	38	0
Total	150	150

MISSION SUITABILITY

Attribute	Old	New
Deep Piers and Wharfs	100	80
Rail and Road Linkages	80	0
Hard Surface Staging Areas	35	45
Transportation Infrastructure	70	65
Support Facilities	50	0
Material Handling Equipment	0	25
Construction Investment	0	20
Information Mission Area	15	15
Total	350	250

QUALITY OF LIFE

Attribute	Old	New
% Permanent Facilities	12	30
Community of Excellence	12	10
Army Family Housing	10	20
Unaccomp Officer Housing	10	20
Unaccomp Enlisted Housing	10	20
Community Facilities	10	25
Health Care Support Index	11	25
Total	75	150

OPERATIONAL EFFICIENCIES

Attribute	Old	New
Variable Housing Allowance	0	25
Family Housing Cost Per Unit	12	20
Average Civilian Salary	15	25
Hourly Wage Grade Rate	12	0
Manpower Est Relationship	0	25
Cost Estimate Relationship	0	30
Utilities Cost Factor	12	0
RPMA Cost Factor	12	0
Military Construction Cost	12	25
Total	75	150

TOTAL ATTRIBUTE SCORE

	Old	New
Mission Essentiality	350	300
Mission Suitability	350	250
Operational Efficiency	75	150
Expandability	150	150
Quality of Life	75	150
Total	1,000	1,000

Figure C-9. REVISED ATTRIBUTES FOR OCEAN TERMINAL PORTS

(1) ***Deep Piers and Wharfs, Hard Surface Staging Areas, and Transportation Infrastructure.*** An analysis of these attributes reveals the military value of all three of these attributes is already captured in the attributes of the mission suitability measure of merit. Therefore, all three of these attributes should be eliminated from this measure of merit. ESSC used a new attribute, normal throughput capacity as the attribute to determine the mission essentiality of the ports.

(2) ***Normal Throughput Capacity.*** The true value of a port that captures mission essentiality should be a new attribute termed normal throughput capacity. Normal throughput capacity is the MTMC calculation that shows a port's capability to load measurement tons per day.

(3) ***Reserve Support.*** This is a new attribute for this measure of merit for this installation category. In accordance with the future planning documents, reserve support in the mission essentiality measure of merit will become increasingly important as Army force reductions continue. Therefore, this attribute was given a weight value of 35.

(4) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit except for adjustments to the weights caused by the weighting shifts just discussed.

b. **Mission Suitability Attributes.** For Army BRAC 91, this installation category used six attributes with a total weight of 350 points. They were deep piers and wharfs (100), rail and road linkages (80), hard surface staging areas (35), transportation infrastructure (70), support facilities (50), and information mission area (15). For uniformity and simplicity, ESSC recommends that AMC installations use a total weight of 250 points for the mission suitability measure of merit. Since the port installation category used 350 points for this installation category in Army BRAC 91, ESSC recommends that this total weight be lowered to 250. This reduction in weight will not impact the importance of the mission suitability attributes since 250 points is more than the operational efficiency, expandability, and quality of life measures of merit. For Army BRAC 93, Figure C-9 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Rail and Road Linkages.*** The value of this attribute is already captured in the mission essentiality measure of merit and should be eliminated from this measure of merit. Double counting the military value is unnecessary.

(2) ***Support Facilities.*** The value of this attribute is already captured in the mission essentiality measure of merit and should be eliminated from this measure of merit. Double counting the military value is unnecessary.

(3) ***Material Handling Equipment.*** One attribute that needs to be added is "materiel handling equipment". This new attribute will capture the ports capability to load and off load sea and land transportation conveyances. This new attribute was given a weight value of 25.

(4) ***Construction Investment.*** This is an added attribute. It is in use in the training category. It has been given a weight value of 20 points. This construction investment attribute

reflects the modernization of a post or training area and provides a measurement for future construction requirements.

(5) *Weighting Scheme.* ESSC proposes no substantive changes to the other attributes in this measure of merit. The remaining point difference due to the elimination of two attributes, the addition of two new attributes, and this new total weight need distributed proportionally among the remaining attributes.

c. **Operational Efficiency Attributes.** For Army BRAC 91, this installation category used six attributes with a total weight of 75 points. They were family housing cost per unit (12), average civilian salary (15), hourly wage grade rate (12), utilities cost (12), RPMA cost factor (12), and military construction cost (12). The decision to delete the variable housing allowance, MER, and CER attributes for this installation category was made during Army BRAC 91 due to the uniqueness of these types of installations. For uniformity and simplicity, ESSC recommends that AMC installations use a total weight of 150 points for the operational efficiency measure of merit. Since the port installation category used 75 points for this installation category in Army BRAC 91, ESSC recommends that this total weight be raised to 150. For Army BRAC 93, Figure C-9 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) *Variable Housing Allowance.* ESSC recommends that this attribute be included in this measure of merit. Besides ensuring uniformity and simplicity, logic dictates that most of these installations would not have the available government quarters to house all of its assigned military personnel. Therefore, the variable housing allowance attribute is a necessary attribute in determining the operational efficiency of this installation category.

(2) *Hourly Wage Grade Rate.* This attribute is unnecessary since the cost of the civilian workforce can be captured in one attribute. That is the average civilian salary attribute. The split into two separate civilian wages is unnecessary.

(3) *Manpower Estimate Relationship and Cost Estimate Relationship.* ESSC recommends that the MER and CER be placed back in this measure of merit as a valid measure of military value. Besides making the measure of merit uniform with the other installation categories, it permits the elimination of two other attributes within this measure of merit.

(4) *Utilities Cost Factor and RPMA Cost Factor.* Both of these attributes can be eliminated since the essence of their contribution to military value is already captured in the manpower estimate relationship (MER) and cost estimate relationship (CER) attributes. The equation to determine MER and CER consider utility and RPMA costs. To capture the additional importance of MER and CER due to the elimination of these two attributes, ESSC recommends that MER be given a weight of 25 points and CER be given 30 points.

(5) *Weighting Scheme.* ESSC proposes no substantive changes to the other attributes in this measure of merit. The remaining point difference due to the elimination of three attributes, the addition of three new attributes, and this new total weight need distributed proportionally among the remaining attributes.

d. **Expandability Attributes.** For Army BRAC 91, this installation category used four attributes with a total weight of 150 points. They were total buildable acres (38), total building

square feet (37), environment (37), and water/sewer facilities (38). Due to the unique missions of AMC installations, the total weight of the expandability measure of merit should remain at 150. For Army BRAC 93, Figure C-9 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Environmental Carrying Capacity.*** Formerly the environment attribute, this is a newly revised attribute. The new name reflects the expanded nature of this attribute; an installation's capability to expand in consideration of noise pollution, wetlands, endangered species and flora areas, etc. Due to the importance of this attribute, the weight was raised from 37 to 40. The rationale for expanding this attribute, and an assessment of how to develop appropriate sub-attributes to better measure it, are presented in paragraph 21, New and Revised Candidate Attributes.

(2) ***Mobilization Throughput Capacity.*** ESSC has added a mobilization attribute to other categories. This new attribute captures the true mobilization value of a port. This new attribute termed mobilization throughput capacity captures the expandability of a port. Mobilization throughput capacity calculates the ports ability to load measurement tons per day during a contingency/mobilization.

(3) ***Water/Sewer Facilities.*** ESSC recommends changing the "Water/Sewer Facilities" attribute to Infrastructure. ESSC also recommends that land fill and electrical distribution capacity, be added to water and sewer systems in this attribute. They all impact expansion plans.

(4) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit. The remaining point difference due to the addition of one new attribute and raising the weight of another attribute, the points need to be distributed proportionally among the remaining attributes.

e. **Quality of Life Attributes.** For Army BRAC 91, this installation category used seven attributes with a total weight of 75 points. They were percent permanent facilities (12), community of excellence (12), Army family housing (10), unaccompanied officer housing (10), unaccompanied enlisted housing (10), community facilities (10), and health care support index (11). In keeping with the trends of the future force and realizing that the Total Army Community includes its civilian force as well, more weight was needed to show the true value of the quality of life measure of merit. For uniformity and simplicity, ESSC recommends that the total weight for this measure of merit be raised from 75 to 150. For Army BRAC 93, Figure C-9 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Attributes.*** The attributes used to determine miliary value for ports in this measure of merit are adequate. No changes are necessary.

(2) ***Weighting Scheme.*** ESSC proposes no substantive changes to the attributes in this measure of merit except for adjustments to the weights caused by the increase in weight just discussed.

16. AMMUNITION PORTS.

a. **Mission Essentiality Attributes.** For Army BRAC 91, this installation category used six attributes with a total weight of 450 points. They were deep piers and wharfs (110), rail and road linkages (90), hard surface staging areas (50), transportation infrastructure (80), support facilities (60), and reserve support (60). Due to the importance of the mission essentiality measure of merit, the total points was raised from 250 to 300 for AMC installations. Since the port installation category used 450 points for Army BRAC 91, ESSC recommends that this total weight be lowered to 300. This would allow for uniformity and simplicity for all AMC installations. This reduction in weight will not impact the importance of the mission essentiality attributes since 300 points is more that any other measure of merit weight for this installation category. For Army BRAC 93, **Figure C-10** shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Deep Piers and Wharfs, Hard Surface Staging Areas, and Transportation Infrastructure.*** An analysis of these attributes reveals the military value of all three of these attributes is already captured in the attributes of the mission suitability measure of merit. Therefore, all three of these attributes should be eliminated from this measure of merit. ESSC used a new attribute, normal throughput capacity as the attribute to determine the mission essentiality of the ports.

(2) ***Normal Throughput Capacity.*** The true value of a port that captures mission essentiality should be a new attribute termed normal throughput capacity. Normal throughput capacity is the MTMC caiculation that shows a port's capability to load measurement tons per day.

(3) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit. The remaining point difference due to the elimination of three attributes, the addition of one new attribute, and this new total weight, the points need to be distributed proportionally among the remaining attributes.

b. **Mission Suitability Attributes.** For Army BRAC 91, this installation category used six attributes with a total weight of 450 points. They were deep piers and wharfs (130), rail and road linkages (105), hard surface staging areas (45), transportation infrastructure (85), support facilities (60), and information mission area (25). For uniformity and simplicity, ESSC recommends that AMC installations use a total weight of 250 points for the mission suitability measure of merit. Since the port installation category used 450 points for this installation category in Army BRAC 91, ESSC recommends that this total weight be lowered to 250. This reduction in weight will not impact the importance of the mission suitability attributes since 250 points is more than the operational efficiency, expandability, and quality of life measures of merit. For Army BRAC 93, Figure C-10 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Rail and Road Linkages.*** The value of this attribute is already captured in the mission essentiality measure of merit and should be eliminated from this measure of merit. Double counting the military value is unnecessary.

MISSION ESSENTIALITY

Attribute	Old	New
Deep Piers and Wharfs	110	0
Rail and Road Linkages	90	90
Hard Surface Staging Areas	50	0
Transportation Infrastructure	80	0
Support Facilities	60	60
Normal Throughput Capacity	0	100
Reserve Support	60	50
Total	450	300

EXPANDABILITY

Attribute	Old	New
Total Buildable Acres	11	35
Total Building Square Feet	9	0
Environmental Capacity	9	40
Mobilization Thruput Capacity	0	45
Infrastructure	0	30
Water/Sewer Facilities	11	0
Total	40	150

MISSION SUITABILITY

Attribute	Old	New
Deep Piers and Wharfs	130	80
Rail and Road Linkages	105	0
Hard Surface Staging Areas	45	45
Transportation Infrastructure	85	65
Support Facilities	60	0
Material Handling Equipment	0	25
Construction Investment	0	20
Information Mission Area	25	15
Total	450	250

QUALITY OF LIFE

Attribute	Old	New
% Permanent Facilities	5	30
Community of Excellence	5	10
Army Family Housing	4	20
Unaccomp Officer Housing	4	20
Unaccomp Enlisted Housing	4	20
Community Facilities	3	25
Health Care Support Index	5	25
Total	30	150

OPERATIONAL EFFICIENCIES

Attribute	Old	New
Variable Housing Allowance	0	25
Family Housing Cost Per Unit	4	20
Average Civilian Salary	10	25
Hourly Wage Grade Rate	4	0
Manpower Est Relationship	0	25
Cost Estimate Relationship	0	30
Utilities Cost Factor	4	0
RPMA Cost Factor	4	0
Military Construction Cost	4	25
Total	30	150

TOTAL ATTRIBUTE SCORE

	Old	New
Mission Essentiality	450	300
Mission Suitability	450	250
Operational Efficiency	30	150
Expandability	40	150
Quality of Life	30	150
Total	1,000	1,000

Figure C-10. REVISED ATTRIBUTES FOR AMMUNITION PORTS

(2) ***Support Facilities.*** The value of this attribute is already captured in the mission essentiality measure of merit and should be eliminated from this measure of merit. Double counting the military value is unnecessary.

(3) ***Material Handling Equipment.*** One attribute that needs to be added is "materiel handling equipment". This new attribute will capture the ports capability to load and off load sea and land transportation conveyances. This new attribute was given a weight value of 25.

(4) ***Construction Investment.*** This is an added attribute. It is in use in the training category. It has been given a weight value of 20 points. This construction investment attribute reflects the modernization of a post or training area and provides a measurement for future construction requirements.

(5) ***Weighting Scheme.*** ESSC proposes no substantive changes to the other attributes in this measure of merit. The remaining point difference due to the elimination of two attributes, the addition of two new attributes, and this new total weight need distributed proportionally among the remaining attributes.

c. **Operational Efficiency Attributes.** For Army BRAC 91, this installation category used six attributes with a total weight of 30 points. They were family housing cost per unit (4), average civilian salary (10), hourly wage grade rate (4), utilities cost (4), RPMA cost factor (4), and military construction cost (4). The decision to delete the variable housing allowance, MER, and CER attributes for this installation category was made during Army BRAC 91 due to the uniqueness of these types of installations. For uniformity and simplicity, ESSC recommends that AMC installations use a total weight of 150 points for the operational efficiency measure of merit. Since the port installation category used 30 points for this installation category in Army BRAC 91, ESSC recommends that this total weight be raised to 150. For Army BRAC 93, Figure C-10 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Variable Housing Allowance.*** ESSC recommends that this attribute be included in this measure of merit. Besides ensuring uniformity and simplicity, logic dictates that most of these installations would not have the available government quarters to house all of its assigned military personnel. Therefore, the variable housing allowance attribute is a necessary attribute in determining the operational efficiency of this installation category.

(2) ***Hourly Wage Grade Rate.*** This attribute is unnecessary since the cost of the civilian workforce can be captured in one attribute. That is the average civilian salary attribute. The split into two separate civilian wages is unnecessary.

(3) ***Manpower Estimate Relationship and Cost Estimate Relationship.*** ESSC recommends that the MER and CER be placed back in this measure of merit as a valid measure of military value. Besides making the measure of merit uniform with the other installation categories, it permits the elimination of two other attributes within this measure of merit.

(4) ***Utilities Cost Factor and RPMA Cost Factor.*** Both of these attributes can be eliminated since the essence of there contribution to military value is already captured in the manpower estimate relationship (MER) and cost estimate relationship (CER) attributes. The equation to determine MER and CER consider utility and RPMA costs. To capture the

additional importance of MER and CER due to the elimination of these two attributes, ESSC recommends that MER be given a weight of 25 points and CER be given 30 points.

(5) *Weighting Scheme.* ESSC proposes no substantive changes to the other attributes in this measure of merit. The remaining point difference due to the elimination of three attributes, the addition of three new attributes, and this new total weight need distributed proportionally among the remaining attributes.

d. **Expandability Attributes.** For Army BRAC 91, this installation category used four attributes with a total weight of 40 points. They were total buildable acres (11), total building square feet (9), environment (9), and water/sewer facilities (11). For uniformity and simplicity, ESSC recommends that AMC installations use a total weight of 150 points for the expandability measure of merit. Since the port installation category used 40 points for this installation category in Army BRAC 91, ESSC recommends that this total weight be raised to 150. For Army BRAC 93, Figure C-10 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) *Environmental Carrying Capacity.* Formerly the environment attribute, this is a newly revised attribute. The new name reflects the expanded nature of this attribute; an installation's capability to expand in consideration of noise pollution, wetlands, endangered species and flora areas, etc. Due to the importance of this attribute, the weight was raised from 9 to 40. The rationale for expanding this attribute, and an assessment of how to develop appropriate sub-attributes to better measure it, are presented in paragraph 21, New and Revised Candidate Attributes.

(2) *Mobilization Throughput Capacity.* ESSC has added a mobilization attribute to other categories. This new attribute captures the true mobilization value of a port. This new attribute termed mobilization throughput capacity captures the expandability of a port. Mobilization throughput capacity calculates the ports ability to load measurement tons per day during a contingency/mobilization.

(3) *Water/Sewer Facilities.* ESSC recommends changing the "Water/Sewer Facilities" attribute to Infrastructure. ESSC also recommends that land fill and electrical distribution capacity, be added to water and sewer systems in this attribute. They all impact expansion plans.

(4) *Weighting Scheme.* ESSC proposes no substantive changes to the other attributes in this measure of merit. The remaining point difference due to the addition of one new attribute, raising the weight of another attribute, and this new total weight, the points need to be distributed proportionally among the remaining attributes.

e. **Quality of Life Attributes.** For Army BRAC 91, this installation category used seven attributes with a total weight of 30 points. They were percent permanent facilities (5), community of excellence (5), Army family housing (4), unaccompanied officer housing (4), unaccompanied enlisted housing (4), community facilities (3), and health care support index (5). In keeping with the trends of the future force and realizing that the Total Army Community includes its civilian force as well, more weight was needed to show the true value of the quality of life measure of merit. For uniformity and simplicity, ESSC recommends that the total weight for

this measure of merit be raised from 30 to 150. For Army BRAC 93, Figure C-10 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) *Attributes*. The attributes used to determine miliary value for ports in this measure of merit are adequate. No changes are necessary.

(2) *Weighting Scheme*. ESSC proposes no substantive changes to the attributes in this measure of merit except for adjustments to the weights caused by the increase in weight just discussed.

17. **COMMODITY ORIENTED INSTALLATIONS.** Figure C-11 shows the attributes and weights of the commodity oriented installations used for BRAC 91. ESSC recommended in Annex B that the commodity installation category be divided into three separate categories. These categories are inventory control points (ICPs), proving grounds (PGs), and research and development (R&D) centers. **Figures C-12** through **Figure C-14** show these new categories' attributes, and are discussed in the following paragraphs. Due to the different missions of these commodity oriented installations, one set of attributes could not be used to describe the military value of each of these industrial installations.

18. **INVENTORY CONTROL POINTS (ICP).** The weighting scheme for ICPs is similar to other industrial categories. 1000 total points are allocated to five measures of merit. The mission essentiality measure of merit was given 300 points. The mission suitability measure of merit was given 250 points. The operational efficiency, quality of life, and expandability measures of merit were given 150 points each.

a. **Mission Essentiality Attributes.** This measure of merit was allocated 300 points which were distributed among three attributes. **Figure C-12** shows ESSC's recommended weights for each attribute within this measure of merit.

(1) *Operations/Administrative Facilities*. As an essential element for ICPs, this attribute was given a weight value of 125 points. Facility space is a vital factor to ICPs. Inventory control points must have adequate administrative work space to operate efficiently.

(2) *Accessibility*. Accessibility is the second most important attribute with 100 points. Accessibility is a critical factor to ICPs. It measures the number of miles to the four most traveled destinations, one of which must be higher headquarters.

(3) *Airport Proximity*. Proximity is also an important attribute that should be included in the mission essentiality measure of merit. It is given a weight value of 75 points. ICPs needed to be able to provide effective and efficient service to their customers--depots. Consequently, they must be able to get to and from airports easily.

b. **Mission Suitability Attributes.** The inventory control points were allocated 250 points within this measure of merit which were distributed among three attributes. Figure C-12 shows ESSC's recommended weights for each attribute within this measure of merit.

MISSION ESSENTIALITY

Attribute	Weight
Land Ownership	75
Industrial Base	50
Skill Base	50
Reserve Component Support	20
Location	30
Unique Mission	25
Total	250

EXPANDABILITY

Attribute	Weight
Total Buildable Acres	35
Total Unused Building Admin	25
Encroachment	20
Environment	10
Water/Sewer Facilities	10
Total Unused Building - R&D	10
Work Force Available	20
Work Force Skills	20
Total	150

MISSION SUITABILITY

Attribute	Weight
Total Acres	70
Administrative Facilities	50
R&D Facilities	30
Capital Investments	30
Test Ranges	20
Information Mission Area	30
Transportation Network	10
Environmental Compliance	10
Total	250

QUALITY OF LIFE

Attribute	Weight
Percent Permanent Facilities	40
Community of Excellence Score	20
Army Family Housing	20
Unaccompanied Officer Housing	10
Unaccompanied Enlisted Housing	10
Community Facilities	30
Places Rated Almanac Rating	30
Health Care Support Index	10
Community Economics	30
Total	200

OPERATIONAL EFFICIENCY

Attribute	Weight
Variable Housing Allowance	10
Family Housing Cost Per Unit	10
Average Civilian Salary	30
Hourly Wage Grade Rate	15
BASOPS MER Factor	5
BASOPS CER Factor	0
Utilities Cost Factor	25
RPMA Cost Factor	25
Military Construction Cost	30
Total	150

TOTAL ATTRIBUTE SCORE

Mission Essentiality	250
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	200
Total	1,000

Figure C-11. BRAC 91 ATTRIBUTES FOR COMMODITY ORIENTED INSTALLATIONS

MISSION ESSENTIALITY

Attribute	Weight
Ops/Admin Facilities	125
Accessibility	100
Airport Proximity	75
Total	300

EXPANDABILITY

Attribute	Weight
Total Buildable Acres	30
Environment	50
Infrastructure	40
Multi-Function	30
Total	150

MISSION SUITABILITY

Attribute	Weight
Work Force Retention	100
Construction Investment	50
Information Mission Area	100
Total	250

QUALITY OF LIFE

Attribute	Weight
Percent Permanent Facilities	30
Community of Excellence Score	15
Army Family Housing	15
Unaccompanied Officer Housing	15
Unaccompanied Enlisted Housing	15
Community Facilities	25
Places Rated Almanac Rating	10
Health Care Support Index	25
Total	150

OPERATIONAL EFFICIENCY

Attribute	Weight
Varible Housing Allowance	25
Family Housing Cost Per Unit	25
Average Civilian Salary	30
Manpower Estimate Relationship	25
Cost Estimate Relationship	25
MILCON Cost Factor	20
Total	150

TOTAL ATTRIBUTE SCORE

Mission Essentiality	300
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	150
Total	1,000

Figure C-12. RECOMMENDED ATTRIBUTES FOR INVENTORY CONTROL POINTS

(1) ***Work Force Retention.*** This attribute is considered necessary to an effective ICP. Its purpose is to assess the ability of an installation to provide continuity in the workforce over time. It is given a weight value of 100 points.

(2) ***Construction Investment.*** A weight value of 50 points is allocated to this attribute. It is an important attribute in the mission suitability measure of merit because it measures the overall value of the facilities as well as modernization on post that supports the mission of inventory control points.

(3) ***Information Mission Area.*** Due to the importance of this attribute, it was also given a weight value of 100 points in this measure of merit. ICPs need good telephone, computer, and tele-communications systems to do their job efficiently and correctly.

c. **Operational Efficiency Attributes.** The inventory control points were allocated 150 points within this measure of merit, which were distributed among six attributes. The six attributes variable housing allowance, family housing cost per unit, average civilian salary, manpower estimate relationship, cost estimate relationship, and military construction cost factor. These attributes are the same attributes used for other industrial categories for this measure of merit. Figure C-12 shows ESSC's recommended weights for each attribute within this measure of merit.

d. **Expandability Attributes.** Figure C-12 shows ESSC's recommended weights for each attribute within this measure of merit. 150 points are allocated to the attributes within this measure of merit. Four attributes share the 150 points. These attributes are total buildable acres, environment, infrastructure, multi-function. These attributes are the same attributes used for other industrial categories measures of merit.

e. **Quality of Life Attributes.** 150 points are allocated to the attributes within this measure of merit. Eight attributes share the 150 points. These attributes are: percent permanent facilities, community of excellence score, Army family housing, unaccompanied officer housing, unaccompanied enlisted housing, community facilities, places rated almanac rating, and health care support index. These attributes are the same attributes used for other industrial categories measures of merit. Figure C-12 shows ESSC's recommended weights for each attribute within this measure of merit.

19. **PROVING GROUNDS.** The weighting scheme for proving grounds is similar to other industrial categories. 300 and 250 points are allocated to the mission essentiality and suitability measures of merit respectively, while 150 points each is allocated to operational efficiency, quality of life, and expandability.

a. **Mission Essentiality Attributes.** 300 points are allocated to the mission essentiality measure of merit and divided among three attributes. **Figure C-13** shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Test & Evaluation Facilities.*** 150 points are allocated to this attribute because of its dominance over other attributes. Test and evaluation facilities are a vital factor to these

MISSION ESSENTIALITY

Attribute	Weight
T&E Facilities	150
T&E Ranges	100
Total Acres	50
Total	300

EXPANDABILITY

Attribute	Weight
Total Buildable Acres	25
Encroachment	20
Environment	50
Infrastructure	30
Multi-function	25
Total	150

MISSION SUITABILITY

Attribute	Weight
Operational/Admin Facilities	125
Work Force Retention	75
Information Mission Area	50
Total	250

QUALITY OF LIFE

Attribute	Weight
Percent Permanent Facilities	30
Community of Excellence Score	15
Army Family Housing	15
Unaccompanied Officer Housing	15
Unaccompanied Enlisted Housing	15
Community Facilities	25
Places Rated Almanac Rating	10
Health Care Support Index	25
Total	150

OPERATIONAL EFFICIENCY

Attribute	Weight
Varible Housing Allowance	25
Family Housing Cost Per Unit	25
Average Civilian Salary	30
Manpower Est. Relationship	25
Cost Estimate Realationship	25
MILCON Cost Factor	20
Total	150

TOTAL ATTRIBUTE SCORE

Mission Essentiality	300
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	150
Total	1,000

Figure C-13. RECOMMENDED ATTRIBUTES FOR PROVING GROUNDS

installations. Test and evaluation must have the proper facilities and work space to operate efficiently.

(2) ***Test & Evaluation Ranges.*** 100 points are given for this attribute. It is second in importance only to T & E facilities. It is critical that T & E installations have the proper ranges to conduct their missions.

(3) ***Total Acres.*** 50 points are given for this attribute. It is essential that proving ground have the proper acreage to conduct their mission, provide for security, and insure adequate room for new and emerging missions. Particularly in light of more lethal and more capable weapon systems.

b. **Mission Suitability Attributes.** 250 points are allocated to the mission suitability measures of merit. These points are divided among three attributes. Figure C-13 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Operations/Administrative Facilities.*** 125 points allocated to this attribute because of its dominance. Facility space is a vital factor to the efficient operation of proving grounds. Proving grounds must have adequate administrative work space to operate efficiently.

(2) ***Work Force Retention.*** 75 points are provided for this attribute. It is critical to proving grounds to be able to draw from an adequately trained workforce in the surrounding community.

(3) ***Information Mission Area.*** 50 points are allocated to this attribute. It is the third most important attribute in mission suitability. However it plays a necessary role. R & D installations need good telephone, computer, and tele-communications systems to do their job right.

c. **Operational Efficiency Attributes.** 150 points are allocated to the attributes within this measure of merit. Six attributes share the 150 points. These attributes are variable housing allowance, family housing cost per unit, average civilian salary, manpower estimate relationship, cost estimate relationship and military construction cost factor. These attributes are the same attributes used for other industrial categories measures of merit. Figure C-13 shows ESSC's recommended weights for each attribute within this measure of merit.

d. **Expandability Attributes.** 150 points are allocated to the attributes within this measure of merit. Four attributes share the 150 points. These attributes are total buildable acres, environment, infrastructure, multi-function. These attributes are the same attributes used for other industrial categories measures of merit. Figure C-13 shows ESSC's recommended weights for each attribute within this measure of merit.

e. **Quality of Life Attributes.** 150 points are allocated to the attributes within this measure of merit. Eight attributes share the 150 points. These attributes are: percent permanent facilities, community of excellence score, army family housing, unaccompanied officer housing, unaccompanied enlisted housing, community facilities, places rated almanac rating, and health care support index. These attributes are the same attributes used for other industrial categories

measures of merit. Figure C-13 shows ESSC's recommended weights for each attribute within this measure of merit.

20. **RESEARCH AND DEVELOPMENT CENTERS.** The weighting scheme for research and development centers is similar to other industrial categories with appropriate changes to the attributes to reflect the developmental research functions performed at these installations. A 1000 point total is provided for this category. 300 and 250 points are allocated to the mission essentiality and suitability measures of merit, while 150 points is allocated to operational efficiency, quality of life, and expandability.

a. **Mission Essentiality Attributes.** The 300 points allocated to this research and development measure of merit are divided among three attributes. Figure C-14 shows ESSC's recommended weights for each attribute within this measure of merit.

(1) ***Research & Development Facilities.*** 150 points allocated to this attribute because of the absolute necessity for these facilities. R & D facilities are a vital factor to research and development installations. R & D Centers must have suitably equipped work space to operate efficiently.

(2) ***Work Force Retention.*** 100 points are provided for this attribute. It is critical to R & D installations to be able to draw from an adequately trained workforce.

(3) ***Total Acres.*** 50 points are given for this attribute. It is essential that R & D facilities have the proper acreage to conduct their mission, provide for security, and insure adequate room for new and emerging missions.

b. **Mission Suitability Attributes.** 250 points are allocated to the mission suitability measures of merit. These points are divided among four attributes

(1) ***Operations/Administrative Facilities.*** 100 points allocated to this attribute because of its importance to R & D centers. Facility space is a vital factor to the efficient operation of research and development installations. R & D installations must have adequate administrative work space to operate efficiently.

(2) ***Construction Investment.*** 50 points are allocated to this attribute. It is the second important attribute in mission suitability because it measures the overall value of the facilities functioning in the mission of research and development centers.

(3) ***Airport Proximity.*** Airport proximity is given 25 points. Accessibility to a major airport with regularly scheduled service is necessary.

(4) ***Information Mission Area.*** This attribute is provided with 75 points. It plays a necessary role. R & D installations need good telephone, computer, and tele-communications systems to do their job correctly and efficiently.

c. **Operational Efficiency Attributes.** 150 points are allocated to the attributes within this measure of merit. Six attributes share the 150 points. These attributes are variable housing

MISSION ESSENTIALITY

Attribute	Weight
R & D Facilities	150
Work Force Retention	100
Total Acres	50
Total	300

EXPANDABILITY

Attribute	Weight
Total Buildable Acres	25
Encroachment	20
Environment	50
Infrastrucuture	30
Multi-Function	25
Total	150

MISSION SUITABILITY

Attribute	Weight
Operational/Admin Facilities	100
Construction Investment	50
Airport Proximity	25
Information Mission Area	75
Total	250

QUALITY OF LIFE

Attribute	Weight
Percent Permanent Facilities	30
Community of Excellence Score	15
Army Family Housing	15
Unaccompanied Officer Housing	15
Unaccompanied Enlisted Housing	15
Community Facilities	25
Places Rated Almanac Rating	10
Health Care Support Index	25
Total	150

OPERATIONAL EFFICIENCY

Attribute	Weight
Varible Housing Allowance	25
Family Housing Cost Per Unit	25
Average Civilian Salary	30
Manpower Estimate Relation.	25
Cost Estimate Relationship	25
MILCON Cost Factor	20
Total	150

TOTAL ATTRIBUTE SCORE

Mission Essentiality	300
Mission Suitability	250
Operational Efficiency	150
Expandability	150
Quality of Life	150
Total	1,000

Figure C-14. RECOMMENDED ATTRIBUTES FOR R & D CENTERS

allowance, family housing cost per unit, average civilian salary, manpower estimate relationship, cost estimate relationship and military construction cost factor. These attributes are the same attributes used for other industrial categories measures of merit. Figure C-14 shows ESSC's recommended weights for each attribute within this measure of merit.

d. **Expandability Attributes.** 150 points are allocated to the attributes within this measure of merit. Four attributes share the 150 points. These attributes are total buildable acres, environment, infrastructure, multi-function. These attributes are the same attributes used for other industrial categories measures of merit. Figure C-14 shows ESSC's recommended weights for each attribute within this measure of merit.

e. **Quality of Life Attributes.** 150 points are allocated to the attributes within this measure of merit. Eight attributes share the 150 points. These attributes are: percent permanent facilities, community of excellence score, army family housing, unaccompanied officer housing, unaccompanied enlisted housing, community facilities, places rated almanac rating, and health care support index. These attributes are the same attributes used for other industrial categories measures of merit. Figure C-14 shows ESSC's recommended weights for each attribute within this measure of merit.

21. **NEW & REVISED CANDIDATE ATTRIBUTES.** Throughout ESSC's discussions with various installation, Army MACOM, and DA BRAC subject matter experts many topics were broached. Many suggested the use of new attributes not used during Army BRAC 91 or completely restructured attributes. Our objective is to analyze several of these suggestions for use during Army BRAC 93.

a. ***Geographic Location.*** It was proposed to ESSC that the Army's measure of an installation's military value would improve if a geographic location attribute were added. This attribute would be a completely new attribute. This geographic location attribute would attempt to capture the characteristics of an installation that is located in an ideal geographic location. The geographically ideal installation is an installation that is not affected by severe weather, enjoys the benefit of convenient air, sea, and land transportation hubs, and maintains an excellent deployability travel time.

b. ***Environment.*** The Army, like the rest of our society is committed to meeting their total environmental responsibilities. This includes the environmental stewardship of the Army's installations. In today's BRAC environment, not only is the Army engaged in environmental cleanup on excess properties, but restoring the environmental quality of current installations. To accomplish that mission of restoration, knowledge of each Army installation environmental condition must be assessed. These conditions are of particular importance to the BRAC process because it allows the Army to recognize the capacity limitations of its installations. It has been suggested to ESSC that environmental attributes play a larger role in determining the military value of an installation in Army BRAC 93.

c. ***Mobilization.*** The Army of the future will be a smaller, more lethal force, with the ability to expand to respond to large, extended conflicts. Many in the Army community are concerned with the readiness of the US Army to expand to meet these situations. Specifically, are we as an Army community allowing installations that are valuable as mobilization assets to

record that expandability as a military value attribute? This attribute was suggested as a new addition.

22. **CANDIDATE ATTRIBUTE: GEOGRAPHIC LOCATION.** Would the measure of an installation's military value improve if a geographic location attribute were added? This question is examined in the following subparagraphs.

a. **Rationale.** The Army's Chief of Staff envisions our installations as power projection platforms.[1] These installations respond to future regional threats to the national security, by acting as platforms for deployment, hubs for sustainment, and nuclei for reconstitution. In light of these factors, it would seem reasonable to assume that an installation's military value is enhanced if its location within the United States is in an ideal geographic location.

b. **Purpose.** A proposed geographic location attribute would measure the geographic suitability of an installation from four perspectives: deployability, climatic advantage, transportability, and prominence.

(1) ***Deployability.*** The geographic location of an installation located on the coastal regions of the United States enjoys deployability benefits that an installation located in the interior of the United States does not. For example, the travel time of units located at Fort Stewart to locations in Southwest Asia is better than those of units located at Fort Riley simply because of the travel distance. Coastal plain installations responding to a crisis or reinforcing forward deployed forces maintain a built in advantage in air and ground transport time.

(2) ***Climatic Zone.*** The geographically ideal installation is a post that is not affected by severe weather patterns and is located in climatic zones that match the threat, regional focus, and force packages listed in the US national military strategy [2]. ESSC recognizes the Army must train in all weather, for all contingencies, and thus requires units training in a variety of climatic zones. This, however, must be balanced against the new reality of emerging regional threats. For example, the demand for installations located in sub-arctic climate regions is not as high as when the Soviet threat was the US' primary security concern. We can still point to a North Korea (humid mid-latitude), Iraq and Iran (semi-arid mid-latitude) as specific threats for which we must train and maintain forces. We also balance the reality of recent conflict climatic zones: Desert Storm (semi-arid, mid-latitude), Just Cause and Urgent Fury (rainy tropical) with the location of our bases. Further still, we must orient our military force packages towards the Atlantic, Pacific, and crisis response. All these factors point towards training in climatic zones of the mid-latitudes.

(3) ***Transportability.*** Coastal installations enjoy the synergistic benefit of air, sea, and land transportation hubs being co-located. For example, Fort Lewis enjoys the unique capability of using national and international air, sea, and land transportation hubs all co-located

---

[1] Speech to the DOD Western Regional Commanders Conference by the Vice Chief of Staff of the Army, Scottsdale Arizona, 9 December 1991.

[2] The Chairman Joint Chiefs of Staff, *The National Miluary Strategy of the United States*, January 1992.

within the city of Seattle. Fort Carson, an inland installation does not maintain those advantages --especially the advantage of an adjacent seaport.

(4) *Geographic Prominence.* The location of some installations is of strategic geographic importance. These installations are of such importance to the Army and Department of Defense because of its strategic geographic location that this characteristic must be considered. For example, Schofield Barracks in Hawaii is a major source of active component troops for the Pacific rim, and is located in the Pacific rim. It is geographically unique. There are no others located in such a geographically strategic position. That characteristic must be recorded.

c. **BRAC Studies.** The concept of using a geographic location related attribute is not new. Geographic attributes have been used and demonstrated in previous BRAC processes. During BRAC 88[3] one of the mission suitability attributes used was weather/terrain/land use. The Air Force during BRAC 91 used geographic location and weather as criteria for their evaluations.[4] The precedent has been set.

d. **Army BRAC 91.** Several attributes used in BRAC 91 emulate the concept of a geographic location attribute. Most of these geographic related attributes focus mainly on an installation's ability to measure their use of nearby transportation networks. The categories and attributes relating to an installation's ability to use nearby transportation networks were: fighting category-deployment network; training category-deployment; command and control category-transportation network, proximity, accessibility; commodity category-location; ports category-rail and road linkages; production category-location; depots category-transportation network.

e. **Applicability.** Does a geographic location attribute apply to all installations in all categories? The use of a geographic location is well suited for use in the fighting category. The Army must have its fighting installations in the best geographic locations possible for depioyment and training. However, its applicability to those installations listed in the industrial categories is questionable. The demand for locating R & D centers, proving grounds, and inventory control points and command and control installations on coastal plain is not well supported. Locating production facilities and depots near to fighting installations is understandable. The training categories seem suited for aspects of a geographic location attribute, but not all. Professional schools are location independent, while branch schools would enjoy the benefits of being located in a climatically suitable environment.

f. **Measurability.** The data is partially available to support a geographic location attribute. One part of the equation would measure an installation's current proximity to coastal regions. Less than 60 miles from the coastline scores high, while interior regions score lower. A second part would measure the climatic regions classifications for an installation. These are available in any atlas. Mid-latitude climatic regions justify a higher score than an arctic climate. Another part incorporates existing attributes that measure proximity to air, sea, and land

---

[3] *Base Realignments and Closures*, Report of the Defense Secretary's Commission (U.S. Department of Defense, December 1988), p. 50.

[4] *Base Closure and Realignment Recommendations-Detailed Analysis*, Flying Category-Tactical Subcategory Tab (Department of the Air Force, April 1991).

transportation hubs. The single shortfall to this geographic location attribute is a source justifying or predicting the strategic nature of installations.

g. **Summary: Geographic Location Attribute Analysis.** The Army has stated its desire to locate installations in optimal geographic locations. Certain BRAC 91 categories used attributes to measure an installations geographic proximity to transportation hubs in many categories. Others BRAC efforts have also used a geographic related attribute during their analysis. Additionally, a geographic location attribute is partially measurable for all installations and categories. However, because it is currently embedded in other attributes, and only partially measurable, ESSC does not recommend the addition of geographic location as another attribute.

23. **CANDIDATE ATTRIBUTE: MOBILIZATION.** Does the mobilization and deployment capability of an Army installation affect its military value? More specifically, is the Army recognizing and emphasizing installation mobilization and deployment readiness sufficiently? These questions are examined in the following subparagraphs.

a. **Rationale.** Today's Army leadership places a premium on the ability of Army installations to do critical tasks--particularly mobilization. "They must be able to support the mobilization necessary to sustain and reconstitute the force."[5] This point is particularly significant because of the future role installations play in Army mobilization. They are the cornerstone for the reconstitution of the Army's forces. All Army vision statements and planning documents are emphatic. The Army must preserve the potential for expansion of its ground forces. Logically, an installation's military value must include a measurement capacity for mobilization.

b. **Purpose.** The purpose of a mobilization attribute is to measure an installation's capacity to train, equip, and deploy units in time of a national emergency. Research done be ESSC, as part of the Mobilization Stationing Strategy and Requirements (MS^2R) Study[6] sponsored by DA DCSOPS, identified the following critical mobilization attributes an installation must possess.

(1) ***Billeting.*** Installations must have the ability to accommodate an expanding number of additional troop units during mobilization. Of particular significance is the ability to house these troops in suitable facilities.

(2) ***Deployment Network.*** Installations must have a suitable transportation network that links the installation to its planned air and seaport of embarkation. Installations used for deployments should be within 100 miles of their supporting airport. For many installations there are requirements for direct access to rail networks. This is a critical element in an installation's ability to project land forces to locations outside the United States. Ideally installations from which units with wheeled vehicles deploy should be less than 350 miles from a major seaport.

---

[5] Chief of Staff of the Army, *Keynote Address to the Worldwide DEH Training Conference* (Baltimore, Maryland, 10 December 1991).

[6] *Statement of Work, Mobilization, Stationing Strategy and Requirements Study (MS^2R)* (U.S. Army Corps of Engineers, Engineer Strategic Study Center, 12 February 1992).

Installation from which units with tracked vehicles or other heavy equipment deploy must have a railhead with sufficient loading facilities.

(3) *Maintenance Facilities*. Often overlooked is the maintenance capability of an installation. Wheeled and tracked vehicle maintenance and rotary and fixed wing aviation maintenance facilities are in high demand during mobilization.

(4) *Ranges & Training*. Ranges and training areas are also in high demand during mobilization. There are extensive requirements for ranges of all types beyond individual and crew served weapons training and qualifications. Major training areas are required to conduct squad to brigade unit maneuver training.

(5) *Geographic Dispersion*. Geographic dispersion addresses installations that are dispersed to minimize travel distance for USAR and ARNG units, both for annual training and mobilization purposes.

c. **BRAC Studies**. It is possible to obtain insight on the use of a mobilization and deployment attribute by examining other BRAC studies. A precedent has been set through the use of mobilization attributes in other BRAC studies.

(1) *BRAC 88*. A specific mobilization attribute was not used during BRAC 88. However some of the component parts of a mobilization attribute were present. BRAC 88 used deployment means, and infrastructure as attributes, which correspond to two of ESSC's mobilization attribute criteria: deployment network and billeting.

(2) *Air Force BRAC 91*. The Air Force during BRAC 91 placed considerable value on an installation's mobilization capacity. The Air Force measured the mobilization capacity of their installations explicitly. The Air Force used "the ability to accommodate contingency, mobilization, and future total force requirements at both the existing and potential receiving locations" as a measure of merit. The Air Force used two attributes to define this measure of merit: contingency and mobilization; and future force requirements. The Air Force's contingency and mobilization attribute uses 5 sub-attributes. They are: geographic location, parking apron capacity, hot cargo area present, munitions storage capacity, fuel hydrant system, C-141 maximum working on ground.

d. **Army BRAC 91**. Except for the production installation category, the Army did not explicitly consider the mobilization capacity of an installation as part of its military value during BRAC 91. Implicitly, many of the characteristics of mobilization are considered through many attributes used in Army BRAC 91.

(1) *Billeting*. Housing troops during mobilization and deployment is an important factor. Army BRAC 91 did not measure billeting explicitly. Army BRAC 91 did however measure different classes of housing under the quality of life measure of merit.

(2) *Deployment Network*. The deployment network of an installation is an essential characteristic of a mobilization attribute. Army BRAC 91 used several attributes to measure an installation's deployment network. The fighting category used deployment network; the training category used deployment capability; command and control installation used transportation

network and accessibility; and the depot, production and commodity categories used transportation network.

(3) ***Maintenance Facilities.*** Wheeled, tracked and aviation maintenance facilities are a necessary component of a mobilization attribute. During Army BRAC 91 three categories explicitly measured the ability of a post to perform maintenance. They were fighting category (vehicle and aviation maintenance), training category (maintenance facilities), and depots (capacity-maintenance).

(4) ***Ranges & Training.*** Ranges and training areas, a key component during mobilization, were measured in Army BRAC 91. Ranges and maneuver training areas were two specific attributes in the fighting category. The training category used four range and training attributes.

(5) ***Geographic Dispersion.*** Geographic dispersion addresses installations that are dispersed in advantageous locations to serve as mobilization stations throughout the United States. This attribute is indirectly addressed in Army BRAC 91 in the reserve support attribute.

e. **Applicability.** Is the issue of mobilization and deployment a critical issue to the military value of installations in the Army? Upon examination, the use of a mobilization attribute would have universal application with a few minor exceptions. The Army must have its fighting installations, training, ports and command and control installations capable of supporting the reconstitution of the total Army. However, its applicability to those installations listed in the industrial categories is questionable. Mobilization demands on R & D centers, proving grounds, and professional schools is minimal compared to the role of fighting installations. Inventory control points, depots, and production installations plan for mobilization and an attribute would be applicable.

f. **Measurability.** The data is available to support a mobilization attribute. Currently, several characteristics of the mobilization attribute are resident in the Army BRAC 91 attributes. Three characteristics that are currently measured in some form through Army BRAC 91 attributes are training land, maintenance capacity, and deployment networks. Billeting information is currently included as part of quality of life. However, the measurement of mobilization billeting requires the identification of an installation's billeting capacity under the space allowances authorized during mobilization. This information is available from installation Mobilization planners. ESSC does not know of a more direct method for determining the optimal geographic dispersion factor than the reserve support attribute that was used in Army BRAC 91.

g. **Summary: Mobilization Attribute Analysis.** The Army of the future is an Army that must have the capability to mobilize and deploy. Part of an Army installation's value is the ability to sustain this mobilization. This is done through billeting, transportation throughput, and maintenance support. Army BRAC 91 measured some of these traits, but not in a complete fashion. The information needed to capture mobilization characteristics is available and can be captured. ESSC sees the addition of a mobilization attribute as a key part in measuring the military value of an Army installation. We recommend that the existing attributes covering training land, maintenance capacity, deployment network, and reserve support be retained as separate factors that also contribute to an installation's military value in support of mobilization.

We also propose an additional mobilization attribute to measure billeting capacity under mobilization space allowances.

24. **CANDIDATE ATTRIBUTE: ENVIRONMENTAL CARRYING CAPACITY.** Would the measure of an installation's military value improve if a restructured environmental attribute were added? Specifically, is the Army best served by measuring the environmental carrying capacity of an installation? These questions are examined in the following subparagraphs.

a. **Rationale.** The Army's leadership wants its installations to lead in environmental stewardship.[7] Particularly significant is the drive towards a balance between staying trained and ready, and the legal and ethical charge to protect the environment. It is a logical assumption that installations with balanced environmental conditions are of higher value to the Army than those installations not in balance with nature.

b. **Purpose.** The purpose of a revised environmental attribute is to measure the environmental carrying capacity of an installation. This measure would reflect an installation's environmental capacity from several perspectives. Discussions with the Army's Environmental community[8] clarified some of the perspectives that would be needed to measure environmental carrying capacity.

(1) ***Archeology & Historical Buildings.*** Installations must be able to recognize and preserve potential and existing archeological sites and historical buildings and centers. Importantly for Army BRAC purposes, are these sites constraints to potential construction and expansion operations?

(2) ***Endangered Species.*** If there are federally listed endangered species (flora and fauna) habitats on the installation causing stationing issues, this situation must be recognized and balanced with the operational requirements of a post.

(3) ***Wetlands.*** The role of wetlands can be a highly constraining factor to operations, or require extensive "work arounds," to support current operations.

(4) ***Air Quality.*** This environmental attribute component is particularly significant for the Army's industrial related installations. Recognition of a base's condition in attainment for air pollutants is needed to determine the entire range of constraining factors on an installation.

(5) ***Water Quality.*** An assessment of the contamination of ground water is a vital part of recognizing whether a base is able to expand and accept a growing population. Ground water quality is exclusive of water supply issues, which are addressed in the expandability measure of merit, infrastructure attribute.

---

[7] Chief of Staff of the Army, *Keynote Address to the Worldwide DEH Training Conference* (Baltimore, Maryland, 10 December 1991).

[8] *Environmental Workshop in Support of BRAC 93 Process* (U.S. Army Engineer Strategic Studies Center, Fort Belvoir, Virginia, 6 March 1992).

(6) ***Noise Quality.*** Army installations in Europe face the challenge of noise pollution. Many installations solve noise problems through unique noise abatement solutions. CONUS Army bases are increasingly facing the same situation and solution--restrictions on operations. This impacts an installation's ability to grow and expand.

(7) ***Land Quality.*** Many Army installations train and operate in regions where soil and vegetation do not have great strength or durability. These inherent weaknesses cause training land rotation problems. These problems can inhibit the number of units based on an installation.

(8) ***Hazmat-Asbestos.*** If the predominant presence of asbestos in buildings precludes incoming units from readily occupying buildings, this threatens the military value of a post. In most cases, asbestos management programs are capable of mitigating risks.

(9) ***Hazmat-Radon.*** The presence of extensive radon contamination presents a similar situation to that of asbestos contamination. Like asbestos contamination, many solutions are simple hazardous materials management programs. More pervasive situations need recognition for BRAC.

(10) ***Contaminated Sites.*** This factor recognizes the Army's Defense Environmental Restoration Program (DERA) program. Problems such as underground storage tank leakages are surveyed and corrected within this program. Recognition of a base's general condition regarding contaminated sites is necessary for consideration in BRAC.

c. **BRAC Studies.** Other military services have found that environment is an important measure of the military value of an installation. The Air Force during BRAC 91 placed important value on an installation's environmental situation. The Air Force measured the consequences of their activities on installations using "the environmental impact " measure of merit. They used six attributes to define this measure of merit: air quality, water, hazardous material, biological, cultural, geology and soils. Within several of these attributes there are sub-attributes. For example within the hazardous material attribute, asbestos, radon, and solid waste are assessed. The Air Force used a measure of merit, six attributes, some with sub-attributes to determine the impact of environment on the military value of their installations.

d. **Army BRAC 91.** The Army during BRAC 91 used an environmental attribute under the expandability measure of merit. The Army explicitly within this attribute focused upon three environmental constraints upon mission activity. The Army measured these three components in a composite sub-model.

(1) ***Endangered Flora/Fauna.*** If there are federally listed endangered species habitat on the installation causing stationing issues, the number of species is entered in the evaluation.

(2) ***Archaeological Site.*** Total archaeological sites on the installation are determined. This value is then divided by the surveyed acreage on the installation.

(3) ***Historical Buildings.*** The total historical sites on the installation are determined. This value is then divided by the total number of permanent buildings on the installation.

e. **Applicability.** Mandating a new BRAC environmental carrying capacity attribute must be considered carefully. Does an environmental carrying capacity (ECC) attribute apply to all installation in all categories? The use of a new environmental attribute is well suited for use with installations in the fighting, training, command and control categories. Today, we see the constraining effects of woodpeckers on Fort Bragg, bats at Fort Huachuca, and eagles at Fort Belvoir. Certain installations within the industrial category will have limited use for an environmental carrying capacity. An environmental carrying capacity attribute is, however, well suited to installations in the depot, proving grounds, and production categories. Reserve component installations face many of the same requirements and problems as active Army installations. Likewise, RC installations need to determine their environmental constraints. Ports, unique assets to the Army, do not face the exact number and type of environmental constraints as land locked installations, but that does not make their environmental constraints any less serious.

f. **Measurability.** One of the major complications encountered with establishing an environmental carrying capacity attribute is in measuring the data at installations. Specific problems are data availability, consistency, and integration.

(1) ***Data Availability and Consistency.*** How does the installation know its environmental condition? The answer varies by installation and by environmental issue across the Army. Environmental data is available and does exist--but how much and on what topics. Some baseline information exists on high visibility environmental issues. For example, the Preliminary Assessment/Site Investigation (PA/SI) phase of Defense Environmental Restoration Program (DERA) provides information on contaminated sites such as leaks from polychlorinated biphenyl (PCB) transformers. Low visibility issues are different. The number of archeological sites on an installation may not have the benefit of a baseline assessment. Information may be non-existent, located in an state or local data base, or in the archives of the USA Toxic and Hazardous Material Agency (THAMA). Assuming that some level of information on the environmental issues is available, now data validity problems arise. Is the information too old to use and were proper collection techniques used at the time of collection? The key point is that if a survey, investigation, or collection is not initiated for that environmental issue for that installation-- data gaps occur. The magnitude of the problem is exacerbated when the total Army is examined.

(2) ***Data Integration.*** Let us assume that the environmental data we need to calculate an environmental carrying capacity analysis is available. We now encounter what we shall term a series of data integration problems, of which the following are by no means all inclusive. First, can we retrieve the environmental data in a usable format? Is the environmental information in a common retrievable format--hard or soft copy, electronic or manual, graphic or textual? Second, is the data understandable? What does >20pic/l of radon mean to a BRAC analyst, and how can it be used to make a decision? Third, is the data in a usable system? What good is a database of Fort Hood land use in the Integrated Training Area Management (ITAMS) data base if it cannot be accessed and integrated into one central decision support system at HQDA?

g. **Summary-Environmental Carrying Capacity Attribute.** The Army leadership wants its installations to be leaders in the field of environmental stewardship. This insures the value of installations for the future. One method to assure environmental stewardship is maintained in Army installations of the future is to measure the environmental carrying capacity through a BRAC attribute. Army BRAC 91 began by using an environmental attribute. The expansion of

this attribute to an environmental carrying capacity attribute is a logical progression. The Army environmental community is able to identify important environmental issues that can constrain installations. However, it is ESSC judgment that environmental data and methods to transmit that environmental data have not yet fully matured to conduct a quantitative analysis. Yet, it is advisable to begin the framework of an environmental carrying capacity in a qualitative manner for Army BRAC 93. Army environmental subject matter experts are capable of performing a qualitative ECC. This would form the basis for a more quantitative approach for Army BRAC 95.

III. RESULTS

25. **GENERAL.** This section synthesizes our discussion of the Army's use of attributes during the BRAC-Phase I Process into findings and recommendations.

26. **FINDINGS.**

- **FINDING 1.** ESSC found the need for new or substantially revised attributes. These new attributes address weaknesses in the set of attributes used for Army BRAC 91, and add to the Army's effort of measuring an installation's military value. These candidate attributes are: geographic location, mobilization, and environmental carrying capacity.

  DISCUSSION.

  Geographic Location. The purpose of a geographic location attribute is to measure the value of an installation that is located in a geographically optimal setting. This attribute is designed to weigh the climatic conditions, deployability, transportablity, and prominence of an Army installation. Many of these criteria are established in attributes used in Army BRAC 91.

  Mobilization. The purpose of a mobilization attribute is intended to gauge the ability of an installation to support the Army's reconsititution efforts. This is done by measuring the billeting, maintenance, and transportation throughput of an installation. ESSC realized that all installation categories have special needs. ESSC adjusted the mobilization attribute to incorporate the special needs of certain categories. For example, in the Ports categories, mobilization throughput capacity is offered for use instead of the mobilization attribute.

  Environmental Carrying Capacity. The environmental carrying capacity attribute is meant to determine the receivership ability of Army installations in light of their environmental constraints. It is a substantially revised environment attribute that was used in Army BRAC 91. For Army BRAC 93 the intent is to capture additional data beyond the historical/archaeological sites, and endangered species, specifically to gain access to air quality, noise quality, hazardous materials such as asbestos and radon, and contaminated sites information.

  RECOMMENDATION. ESSC recommends that two new attributes--mobilization and environmental carrying capacity--be implemented for Army BRAC 93. The geographic location attribute duplicates the traits of other attributes and is not recommended as a new attribute.

- **FINDING 2.** ESSC found attributes that were duplicating the intent of other attributes.

  DISCUSSION. ESSC found attributes used in Army BRAC 91 that could be eliminated since they duplicate the purpose of other attributes already used. These attributes are medical facilities, reserve demographics, and port attributes.

  Medical Facilities. The value of the medical facilities in the training and branch and training and professional schools is already captured in the health care support index attribute.

  Reserve Demographics. The value of the reserve demographics in the major training areas installation category can be captured in the reserve support attribute.

  Port Attributes. In the port installation category, five attributes are repeated between the mission essentiality and the mission suitability measures of merit. These attributes are deep piers and wharfs, rail and road linkages, hard surface staging areas, transportation infrastructure, and support facilities. ESSC only used each attribute once and developed new attributes that determine the true military value of a port. These new attributes are normal throughput capacity, mobilization throughput capacity, and material handling equipment.

  RECOMMENDATION. Reduce the duplication through uniform and standardized attributes that do not double count the same value.

- **FINDING 3.** The names of several attributes used during Army BRAC 91 are unclear and in need of clarification.

  DISCUSSION. ESSC discovered during its analysis that the names of several attributes did not make clear the intent of the attributes. It was unclear what was being measured. The attributes that were unclear are: AR 5-9 support, proximity to other services, transportation network, recruit and retain, maneuver acres.

  AR 5-9 Support. The attribute name "AR 5-9," when encountered in the list of Command and Control attributes, has an unclear intent. Its actual purpose is to measure the number of active Army sub-installations supported by the installation. The intent of an attribute should be clear upon reading its name.

  Transportation Network. The aim of the transportation network attribute in the command and control category seems fairly straightforward at first glance. Upon thought, however, is it measuring on-post infrastructure or proximity to air, sea, and land transportation? The real purpose is to measure the installation's accessiblity to airline transportation. Compounding the uncertainty of this attribute is the fact that there is another attribute, called transportation network, that measures how close an installation is to an airport, a rail head, ports, and a major highway.

Retain and Recruit. When first encountering the "recruit and retain" attribute, ESSC analysts thought of the capability to measure an Army installation's success in recruiting soldiers. The real intent is to measure the percentage of authorized civilian positions filled on an installation.

Maneuver Acres. ESSC felt that the name of the "maneuver acres" attribute in the fighting category suggested the concept of maneuver area land for mechanized units of battalion size or larger. A strict interpretation would indicate that only facility category codes 17985 (maneuver area group/brigade) and 17986 (maneuver area brigade or larger) can be used to measure this attribute. In actuality the intent is to measure the total acreage of the installation available for maneuver and training. This includes confidence courses, field fortification areas, driving courses, rapelling areas, demolitions areas, and float bridge sites that may not normally be considered as "maneuver areas" and in some cases not located within maneuver acreage or classified as maneuver acres.

Proximity to Other Services. ESSC decided to change the name of "proximity to other services" to "joint synergy" for one reason--to shorten it.

RECOMMENDATION. ESSC recommends that the following attribute name changes to strengthen their meaning:

From	*To*
Recruit and retain	Workforce retention
Transportation net	Airport proximity
AR 5-9 support	Sub-installation support
Proximity to other services	Joint synergy
Maneuver acres	Maneuver-Training Acres

- **FINDING 4.** ESSC found several attribute used during BRAC 91 are more valuable when revised and expanded.

DISCUSSION. Several attributes used during Army BRAC 91 are in need of revision and expansion in light of ongoing changes in the Army.

Water and Sewer. The water and sewer attribute used in many expandabilty measures of merit is incomplete. There are other system besides water and sewers that need to be considered when an installation is experiencing expansion. Impacts on other infrastructure systems such as electrical distribution systems, and landfill capacity need to be determined. This attribute needs to consider the needs of the entire infrastructure of an installation.

Multi-function. The multi-function attribute used in the training category is very similar to the multi-mission attribute used in the industrial category. The purpose is

to quantify the variety of missions executed on an installation. By expanding the current multi-function definition to incorporate industrial missions a standardized attribute can be used by all categories measuring several different activities. In addition, it allows an industrial installation such as Letterkenny Army depot to take credit for tenant activities that they support on post.

Deployment Network. Another attribute of real military value is deployment network. This attribute was used in the fighting category. It measured an installation's ability to support deployments through air, sea, rail network. The deployment network attribute is very similar to the transportation network attribute used in the industrial category. The transportation network has the benefit of an additional criteria--interstate highway. ESSC did not see any appreciable difference between the intent of these two attributes. By expanding the deployment network definition, the Army BRAC process gains from a more precise and standardized attribute.

RECOMMENDATION. ESSC recommends the attribute expansions discussed above be incorporated and the following attribute name changes made to strengthen their meaning:

From	*To*
Water and Sewer	Infrastructure
Multi-mission	Multi-function
Transportation network	Deployment network

- **FINDING 5.** Several attributes need to be eliminated since their contribution to measuring an installation's military value is secondary to that of other attributes.

DISCUSSION. ESSC's analysis found that eight of the attributes were found to be unnecessary and should be eliminated from the BRAC-Phase I process. These attributes are total acres, hourly wage grade rate, utilities cost factor, RPMA cost factor, total building square feet, unique capability, permanent operational and administrative facilities, and community economics.

Total Acres. An analysis of this attribute revealed that "total acres" does not provide any real value in mission essentiality. The total acres attribute only provides a big, bigger, and biggest measure. The total acres attribute measures land unsuitable for training. This attribute would consider areas such as swamps, wildlife preserves, and ground under parking lots, buildings, and parks which are captured in other attributes.

Hourly Wage Grade Rate. ESSC feels this attribute is unnecessary since the cost of the civilian workforce can be captured in one attribute--the average civilian salary attribute. The split into two separate civilian wages is unnecessary.

Utilities Cost Factor and RPMA Cost Factor. Both of these attributes can be eliminated since the essence of their contribution to military value is already captured in the manpower estimate relationship (MER) and cost estimate relationship (CER) attributes. The equation to determine MER and CER consider utility and RPMA costs. To capture the additional importance of MER and CER due to the elimination of these two attributes, ESSC recommends that the weights assigned to MER and CER be raised from 15 to 20.

Total Building Square Feet. This attribute should be eliminated since it does not show an ability of an installation to grow. In most cases, existing buildings are already being utilized. The more valuable attribute is total buildable acres. Thus, the total buildable acres attribute should be given more weight to show the ability of an installation to expand by raising the weight from 30 to 50.

Unique Capability. All Army installations have a uniqueness that supports a special mission, capability, unit, organization, or function. To try to capture uniqueness in an attribute is futile since every installation can rate itself highly in this area. Any uniqueness should be determined during Phase II of the BRAC process by the BRAC personnel. Installations can rate their military value or uniqueness through the remaining attributes that emphasize the importance of what is actually located at the installation or where the installation is situated.

Permanent Operational and Administrative Facilities. An analysis of this attribute shows that it should be eliminated. This attribute duplicates another attribute: operational/administrative facilities. The quality of life measure of merit captures the value of permanent facilities. Many buildings currently in use are semi-permanent or rehabilitated WWII buildings which are still capable of functioning as useful facilities.

Community Economics. The purpose of this attribute is to determine the economic robustness of the surrounding community as an indication of the flexibility to realign an installation as to its impact on the region. The attribute is based on a cost of living factor--how expensive it is to live in an area. Cost of living is one of the factors considered in the places rated almanac rating. It is redundant to measure it again. In keeping with uniformity and simplicity, ESSC chose to eliminate this attribute.

RECOMMENDATION. For uniformity and simplicity, these eight attributes should be eliminated from the BRAC-Phase I process.

- **FINDING 6.** ESSC found the use of standardized attributes increases the simplicity and utility of measuring an installation's military value.

DISCUSSION. ESSC identified attributes, intended for use in other categories, that can be of benefit to all Army BRAC categories. Standardization is an additional benefit gained by using exact attributes. The attributes are construction investment, and deployment network.

Construction Investment. Construction investment measures the overall investment in facilities and real property over the past 10 years. This is an indicator of an installation's modernization. The logic behind this attribute is that newer facilities are expected to be available longer into the future before replacement facilities must be built. This attribute is used, however, in only two installation categories: training and branch schools, and training and professional schools. For uniformity and as a true indicator of long-term military value, this attribute should be considered for all installation categories. A shrinking budget will make this attribute increasingly demanding in the Army's future. The addition of this attribute across the spectrum of all installation categories also permits the elimination of two attributes that repeat its value: capital investments, and backlog of maintenance and repair.

Deployment Network. Another attribute of real value is deployment network. This attribute was used in the fighting category to measure an installation's ability to support deployments through air, sea, and rail networks. Almost all categories attempted to measure this factor. The deployment network attribute is very similar to the trasportation network attribute used in the industrial category. The transportation network has the benefit of an additional criteria--interstate highway. ESSC expanded the deployment network definition, and used one definition and term across the board.

RECOMMENDATION. Use these two standardized attributes to effect a measure of utility and standardization across all Army BRAC categories.

LAST PAGE OF ANNEX C

ANNEX D

INSTALLATION DATA

ANNEX D

INSTALLATION DATA

Blank Page

I. INTRODUCTION

1. **PURPOSE.** This annex examines the suitability of installation data and installation-related data bases used by the Army in the Base Relocation and Closure (BRAC) 91-Phase I process.

2. **SCOPE.** This annex--

a. Identifies the installation data and data bases used to support the Army BRAC 91 Phase I assessments.

b. Discusses the suitability of installation data and data bases supporting the Army BRAC 91 military value calculations.

c. Examines how the Army defined and selected its inventory of real property data for use in the BRAC 91-Phase I process.

d. Suggests improvements in the use of installation data for use in Army BRAC 93.

3. **BACKGROUND.** The Engineer Strategic Study Center (ESSC) arranged this study into a main paper and five annexes. The main paper summarizes the key points of each annex and provides ESSC's overall conclusions and recommendations. The five annexes provide an in-depth analysis of the Army BRAC phase I process. This annex is focused on the use of Army installation data and data bases to support Army BRAC decisions.

4. **APPROACH.** Our overall analysis approach in this annex is similar to other annexes in this report. ESSC examines the state of Army installation data, analyzes the individual components, and recommends improvements to the current state based upon our findings. More specifically, ESSC structured its examination of the Army's BRAC 91 use of installation data and data bases into four parts.

a. The first part of this analysis looks at the Army BRAC 91 use of installation data and data bases.

b. The second part of the analysis looks at how the Army uses various types of installation data in its military value calculation. In other words, we examine the condition of the data feeding the quantitative analysis.

c. The third part of this annex examines how the Army selects installations for use in the BRAC process. We examine the sources for the Army's selection of installations for BRAC--its real property inventory (RPI).

d. In the last part of this annex we summarize our findings, and provide recommendations for improvements based on these findings.

5. **ESSENTIAL ELEMENTS OF ANALYSIS.** ESSC uses a query-based format to facilitate its discussion and focus its analysis. The essential elements of analysis that are crucial to our discussion of the Army's installation data and data bases are:

- Are the Army's installation data sufficiently accurate, reliable, complete, and consistent to support BRAC military value analysis?

- Is the Army's real property inventory sufficiently accurate, reliable, complete, and consistent to support identification of installations for inclusion in BRAC?

6. **DEFINITIONS.**

a. **Installation.** Land and the improvements thereon under the control of the DA at a fixed location at which functions of the Army are or may be carried on, and which has been established by order of the DA or by an overseas command under delegated authority. Such land and improvements within a common boundary utilized as a post or camp, with function such as airfield, hospital, depot, arsenal, industrial plant, cemetery, harbor or port, generally will be designated as a single installation. For the purpose of inventory reporting, sub-installations and property at separate locations (other than leaseholding not part or all of an installation and assigned space in Federal public buildings) accommodating an activity, whether or not established by general order, will be reported as an installation.[1]

b. **Facilities.** All items of improvements on land. Examples of such items are buildings, roads, parking areas, fences, communication lines, waterlines, and railroads storage tanks. For purpose of this inventory, buildings will be distinguished in the report from other facilities.[2]

c. **Real Property.** Land and rights therein, ground improvements, utility systems, and buildings and structures excluding plant equipment.[3] Terminology and classification of items of real property to report for inventory purposes are contained in AR 415-28.[4]

d. **Installation Data.** ESSC uses this phrase to define information on, about, or relating to the operation of Army installations, their facilities, and real property. This includes information, data, and data bases pertaining to the environment, base operations, personnel, and the locale immediate to the installation.

---

[1] *Inventory of Army Military Real Property, AR 405-45, Change 2* (Department of the Army, 15 April 1982).
[2] Ibid.
[3] Ibid.
[4] *Department of the Army Facility Classes and Construction Categories (Category Codes), AR 415-28* (Department of the Army, 1 December 1981).

II. DISCUSSION

7. **THE ROLE OF INSTALLATION DATA IN ARMY BRAC 91.** The calculation of the military value of installations during Army BRAC 91 depended heavily on data--particularly installation-related data. During many steps in Phase I (see **Figure D-1**), forms of installation data were used in various ways to support the decision-making process. In early steps, installation data is needed to determine what BRAC categories and installations to consider. In later steps, analysts need to know if the installation data exist before establishing attributes for categories. The data can then be gathered from a number of sources. For example, some data are gathered from installation subject matter experts through data calls. Other information is available through Army regulations, The Red Book[5], Places Rated Almanac, local pamphlets, the MACOM Resource Factor Handbooks, the Blue Book[6], and automated data bases. ESSC examined the accuracy and completeness of the installation data contained in these sources.

8. **ARMY INSTALLATION DATA USE AND SUITABILITY.** **Figure D-2** shows a sample of the wide range of regulations, MACOM publications, and Army-wide data bases used during Army BRAC 91 to support the quantitative evaluation of an installation's military value. Many of the references in Figure D-2 are one of a kind; however, a large percentage of the information is derived from automated data bases. ESSC examines a few of these data sources from an Army-wide perspective, with an eye towards improving their performance.

a. **Data Weaknesses.** Many of ESSC's discussions with various installation, Army MACOM, and BRAC subject matter experts focused on ways to improve weaknesses. Our objective in this section is to discuss the two significant weaknesses we found in the suitability of Army-wide installation data used in Army BRAC 91.

(1) ***Army Stationing and Installation Plan (ASIP).*** The number of units, organizations, and agencies (both military and non-military) on an installation are important to the BRAC process because normally all of these entities require space and facilities. The ASIP is used as the primary data source for this information. A frequent comment from many installation personnel and BRAC points of contact is that the ASIP is not 100% accurate or complete. This is a key point because the Army uses this information to support the analysis of many BRAC calculations. The ASIP also serves as a basis for other data bases, such as Real Property Planning and Analysis System (RPLANS), that are used to meet Army-wide planning and reporting requirements.

(2) ***Data Standardization.*** The consistency of the information used during the Army BRAC 91 process was mentioned in many interviews as a source of discrepancies. One example of an installation data discrepancy is the number of training acres on a post. Assuming

---

[5] *Facilities and Housing Annual Summary of Operations*,(Department of the Army, FY 1990).

[6] *Inventory of Army Military Real Property* (Department of the Army, Office of the Chief of Engineers, 30 September 1989).

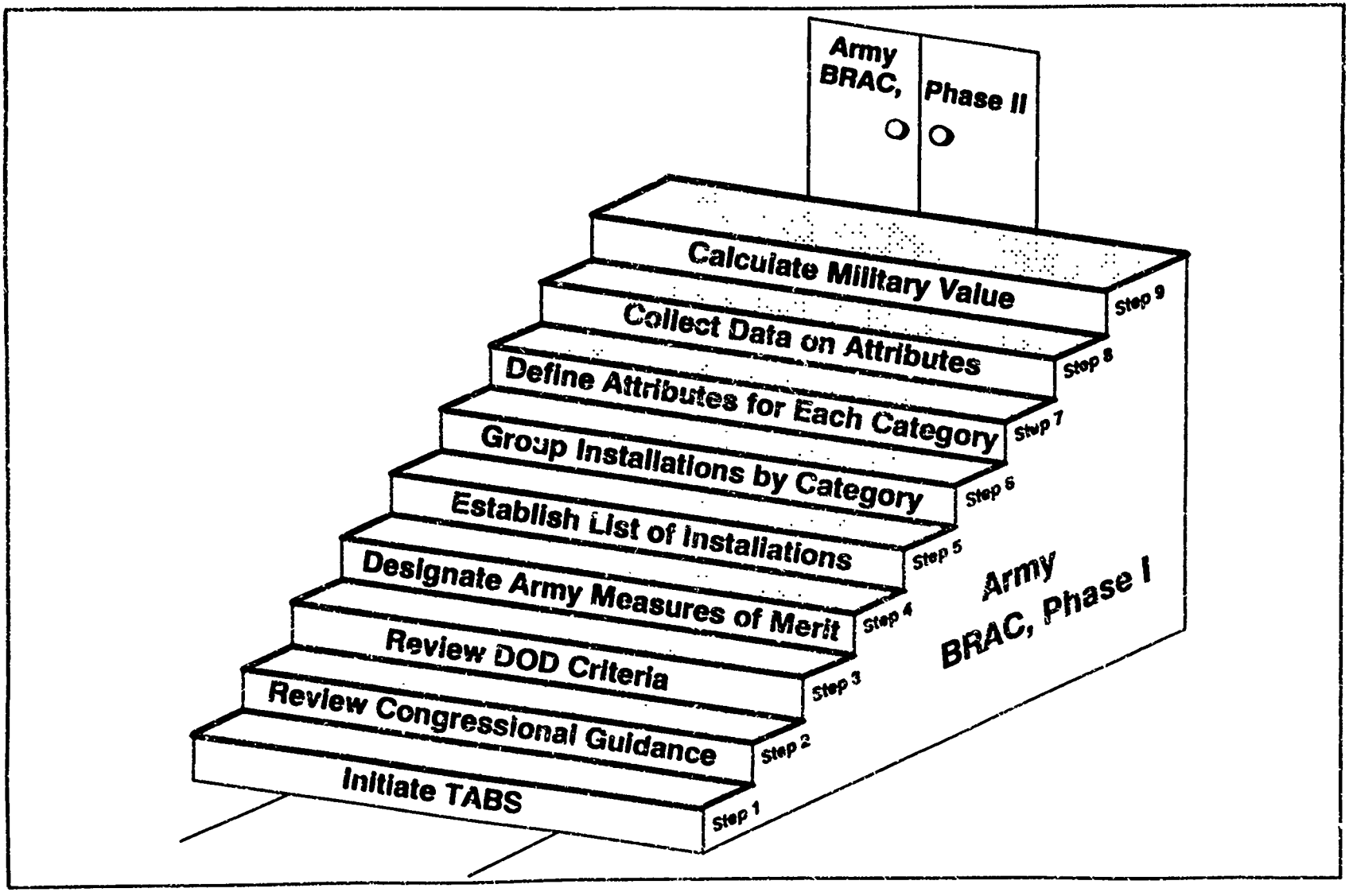

Figure D-1. ARMY BRAC 91-PHASE I PROCESS

ATTRIBUTE	ATTRIBUTE DATA SOURCES		
	FIGHTING CATEGORY	TRAINING CATEGORY	COMMAND & CONTROL CATEGORY
Maneuver/ Training Acres	HQRPLANS	TRADOC PAM 210-1, Data Call	N/A
Ranges	HQRPLANS	TRADOC PAM 210-1	N/A
Deployment Network	FORSCOM Mob. Expansion Capability	TRADOC Pam 210-1, Data Call	N/A
Total Acres	HQRPLANS	N/A	N/A
Reserve Component Support	AMOPS Training Data Units & Ctrs.	AMOPS TMOPS Data Call	AMOPS, Training Data Units & Ctrs.
Contiguous Maneuver Acres	Data Call	ATSC	N/A
Operational Administrative Facilities	HQRPLANs	HQRPLANS	HQRPLANS, HQ IFS
Vehicle Maintenance Facilities	HQRPLANS	HQRPLANS	N/A
Supply Storage Facilities	HQRPLANS	N/A	N/A
Distance to Training Area	Data Call	N/A	N/A
IMA	Data Call	Data Call	Data Call
Variable Housing Allow.	FORSCOM Pamphlet 11-2	DOD VHA Tables	DOD VHA Tables
Army Family Housing Cost	Housing Report Housing Directorate	Housing Reports Housing Directorate	Housing Reports, Housing Dir.
Average Civilian Sal.	FORSCOM Pamphlet 11-2	TRADOC Resource Factor Hndbk.	MACOM Data Factors

FIGURE D-2. SELECTED DATA SOURCES FOR INSTALLATION EVALUATION
(Continued on next page)

ATTRIBUTE	ATTRIBUTE DATA SOURCES		
	FIGHTING CATEGORY	TRAINING CATEGORY	COMMAND & CNTL CATEGORY
Hourly Wage Grade Rate	DOD Wage Fixing Auth.	DOD Wage Fixing Auth.	DOD Wage Fixing Auth.
Manpower Estimating Factor	FORSCOM Pamphlet 37-1	TRADOC Resource Factor Hndbk.	N/A.
Cost Estimating Relationship	FORSCOM Pamphlet 37-1	TRADOC Resource Factor Hndbk.	N/A
Utilities Cost Factor	Red Book	HQ IFS, Red Book	HQ IFS, Red Book
Real Property Maintenance Account	Red Book	HQ IFS, Red Book	HQ IFS, Red Book
Military Construction Cost Factor	EIRS Bulletin	EIRS Bulletin	EIRS Bulletin
Backlog Maintenance and Repair	BMAR Analysis	N/A	N/A
Total Buildable Acres	Installation Analysis	MACOM Engineer Analysis	MACOM Engineer Analysis
Total Building Square Feet Storage Facilities	HQRPLANs	HQ IFS, Data Call, TRADOC Engineer Review	HQ IFS, Data Call, Engineer Review
Encroachment	Department of Commerce Pubs.	Department of Commerce Pubs.	Department of Commerce Pubs.
Environment	AR 420-40, PL 93-205, CFRs	AR 420-40, PL 93-204, CFRs	AR 420-40, PL 93-204, CFRs
Water/Sewer Facilities	MACOM Engineer Analysis	TRADOC Engineer Analysis	MACOM Engineer Analysis
Percent Permanent Facilities	HQRPLANs	HQRPLANS	HQRPLANS

Figure D-2. SELECTED DATA SOURCES FOR INSTALLATION EVALUATION
(Continued on next page)

ATTRIBUTE	ATTRIBUTE DATA SOURCES		
	FIGHTING CATEGORY	TRAINING CATEGORY	COMMAND & CNTL CATEGORY
Army Community of Excellence	DA PAM 600-45	DA Pam 600-45	ACOE Historical Files
Army Family Housing	DD Form 1523	AR 415-15, AR 210-50	AR 415-15, AR 210-50, HQRPLANS
Unaccompanied Officer Personnel Housing	DD Form 1657	DD Form 1657	DD Form 1657
Unaccompanied Enlisted Personnel Housing	DD Form 1657	DD Form 1657	DD Form 1657
Community Facilities	HQRPLANs	HQRPLANS	HQRPLANS
Place Rated Score	Places Rated Almanac	Place Rated Almanac	Places Rated Almanac
Unique Capability	N/A	TRADOC Pam 210-10	N/A
Multi-function	N/A	TRADOC PAM 210-10, ASIP, Data Call	N/A
Major Units Supported	N/A	N/A	ASIP
Levels of Command Supported	N/A	N/A	ASIP

Figure D-2. SELECTED DATA SOURCES FOR INSTALLATION EVALULATION (Continued)

the definition of training acres is agreed upon, various levels of command have different interpretations of the answer. Installation personnel have one figure measured from the DEH master plan, the MACOM has a different number from the Army Training Support Center (ATSC), and DA obtains another figure from HQRPLANS. In addition, DOD can extract their figure from the Defense Installation Ranges and Training Areas (DIRT) data base, and the BRAC commission is able to obtain yet another figure from the Reserve Component Training Data System (RCTDS). The example is illustrative, but reflects the lack of use of a single authoritative source and a final standard data element.

b. **Army Stationing and Installation Plan (ASIP).** The Army Stationing and Installation Plan (ASIP) is the Army's baseline for installation planning. The ASIP is a data base compiled and produced by the Office of the Assistant Chief of Engineers (OACE). The data within ASIP is a synthesis of other approved Army-wide data bases including: the Structure and Manpower Allocation System (SAMAS), The Army Authorization Documents System (TAADS), the Army training requirements and resources system (ATRRS), and other tenant data bases. Simply put, the ASIP measures the level of tenant or resident usage of a post. Uses of the ASIP are many; however, its relevance in this annex is its relation to the BRAC process. It is particularly significant because it serves as the foundation for other data bases referenced in **Figure D-2.**

(1) ***The ASIP Process.*** The ASIP begins its update cycle when the OACE reviews and processes corrections to the previous ASIP submitted by MACOMs and installations. Data from the supporting data bases (TAADS, ATRRS, SAMAS) is downloaded into an ASIP template. Installation ASIP data is matched and contrasted to the downloaded data and finalized. The ASIP installation report is produced and distributed. The installations and MACOMS then review and correct the ASIP based on their present condition. These corrections are then submitted to the ACE for reconciliation. The cycle begins again on a semi-annual basis.

(2) ***ASIP Weaknesses.*** The ASIP does a good job of representing the users of an Army post for most planning and statistical reporting purposes. However, as with many hardware and software products, the user must understand its shortcomings. As mentioned previously, the key shortcoming is one of completeness. Many interviews indicated that the ASIP is still a growing instrument, and as such, contains some inaccuracies. Specifically, there is a lack of information on tenants other than Army (TOTA) such as other service, local, state and federal tenants. Additionally, information on space eligible non-appropriated funds (NAF) is also cited as an example of sometimes incomplete or missing data. Compounding the situation of trying to maintain an accurate and up-to-date data base is the turbulence in the force structure (e.g. units returning from Germany and BRAC movements). While these shortcomings have many causes, the ASIP data base could be improved with proper personnel management, stronger command interest, and proper training at all levels--installation, MACOM, and DA.

(3) ***ASIP Improvements.*** The ASIP is improving. The work done to update the data for Army BRAC 91 went a long way toward improving the quality of the ASIP data. This effort is continuing in preparation for Army BRAC 93. The Director of Management, Office of the Chief of Staff, in his letter to the Army staff and MACOMs stressed the importance of

maintaining high quality information in the ASIP.[7] Additionally, the Assistant Chief of Engineers (ACE) has notified the Army community of the need for updating the ASIP in time for Army BRAC 93.

c. **Army Audit Agency (AAA) Report.** A recent AAA report discusses many Army BRAC 91 lessons learned, particularly the issue of installation data accuracy and control.[8]

(1) *Data Defects.* AAA stated that several steps could be taken towards resolving certain installation data inaccuracies. One would be to require major commands to use common data sources and approaches. More specifically, AAA stated that efforts should be made to improve the accuracy of data extracted from standard information systems. Also, AAA saw the clarification of procedures for collecting and analyzing data at the installation level as key to the success of the Army BRAC process.

(2) *AAA Data Recommendations.* AAA recommended two courses of action in response to the problems of data accuracy. First, have the OACE emphasize to all installations the need to update and maintain real property records in the Integrated Facility System (IFS). Second, establish procedures to notify major commands and installations to purify data in all their data bases prior to the start of the Army BRAC process.

d. **Army Information Management Trends.** Pertinent to our discussion of the accuracy and consistency of the installation data used in the BRAC process is the Army's position on information management, and how it applies to BRAC. Ideally, the use of installation data in the BRAC process should attempt to follow the Army's information management goals. First, there is a consistent goal in the Army to move away from manual data systems towards automated systems. Second, there are ongoing Army efforts to promote multi-purpose information systems to replace one-of-a-kind, single purpose data bases. Finally, the Army is also engaged in promoting information systems that serve the Army from a community-wide perspective, as opposed to a single installation, MACOM, or branch perspective. It should be the intention of the ARMY TABS group to incorporate these goals into its BRAC 93 goals.

e. **Army BRAC 91 Data Standardization Lessons Learned.** ESSC talked to a large number of people involved with the Army's BRAC 91 process. It is the desire of many of these BRAC subject matter experts that we improve our performance by learning from our mistakes. Two crucial lessons were learned from Army BRAC 91 with regards to data standardization. The first is to establish the "rules of the game" of the installation data collection process before it starts. Different versions of installation data must not be condoned. Many comments suggested that there was simply too much data in too many revised versions floating around. The second lesson is to establish an information cutoff date. The information gathered as of a certain date should become the definite set of data--for everyone. At that point in time, the inaccuracies and incomplete data become relative. All levels (BRAC Commission, DOD, DA, Army MACOMS, and installations) engaged in the Army BRAC 93 process must agree to accept this single data set.

---

[7] "Preparation for Base Realignment and Closure (BRAC) 93," Memorandum from the Department of the Army, Chief of Staff, dated 26 March 1992.

[8] *Lesson Learned for Future Basing Studies, AAA Report HQ 91-710* (Department of the Army, Office of the Auditor General, 17 September 1991).

This creates a level playing field for all players. It is inefficient to allow the installations to c· erate with a newly revised set of data, while DA evaluates an older version, and the BRAC commission measures still a third set of data.

f. **Army Installation Data Uses and Suitability Summary.** The Army realizes that its installation data must be as complete and as precise as possible. Many Army activities are working towards updating and completing installation data. The Army also realizes that all parties share in the responsibility for this task, from the installations to the DA staff.[9] Steps are being taken to this end. Notices of data updates are being issued, information cutoff dates established, quality assurance is being integrated into the loop, and Army information management goals are being pursued.[10]

9. **DETERMINATION OF ARMY REAL PROPERTY.** The installations chosen for consideration during Army BRAC 91 are shown in **Figure D-3**. How did the Army determine its pool of installations and related installation data? First, using guidance contained in Title 10, U.S. Code 2687, the TABS group established an installation consideration threshold.[11] These thresholds are reached when the installati· n to be closed is authorized to employ at least 300 direct hire, permanent civilian personnel, or where a proposed realignment of an installation that is authorized to employ at least 300 civilians would be reduced by more than 1,000, or by more than 50% (whichever is less) in the number of authorized civilian employees.[12] The new AR 5-10 (now in draft) will set a lower threshold.[13] During the next step, the TABs group and MACOM BRAC staff recognized their need for installation data. Information on real property (land, buildings, structures, etc) was of critical importance. Much of the installation real property information was obtained from the U.S. Army Corps of Engineers.[14] The data used was extracted from manual and automated real property data bases. Prominent among these are Real Property Planning and Analysis System (RPLANS), and Headquarters RPLANS (HQRPLANS) with its supporting data bases: the Army Stationing and Installation Plan (ASIP), and Integrated Facilities System (IFS). Our discussions below look at the potential for improving several weaknesses in the real property inventory (RPI) process. Our objective, as in other parts of this discussion, is to insure the Army has considered all of the appropriate installations and the correct installation data.

---

[9] "Preparation for Base Realignment and Closure (BRAC) 93," Memorandum from the Department of the Army, Chief of Staff, dated 26 March 1992.

[10] "Base Realignment and Closure 1993 (BRAC 93) Engineer Guidance," Memorandum from the Department of the Army, Assistant Chief of Engineers, dated 21 April 1992.

[11] *Title 10*, U.S. Code 2687.

[12] *BRAC Briefing Slide #39*, Department of the Army, Base Realignment and Closure Office, LTC Mike Lavine, Washington D.C., May 1992.

[13] *Reduction and Realignment Actions, AR 5-10*, Final Draft of Change to AR 5-10 in review. (Department of the Army). Realignments resulting in dislocation of 200 or more military or 50 or more civilian jobs, or 10% of authorized military or civilian strength, whichever is less.

[14] The Office of the Assistant Chief of Engineers is the HQDA staff proponent for the real property management program, while the U.S. Engineer and Housing Support Center (EHSC) is the program manager. Major commands, field operating agencies, and installations share responsibility for real property activities within their area of interest.

FIGHTING INSTALLATIONS

MANEUVER

- Fort Bragg
- Fort Campbell
- Fort Carson
- Fort Drum
- Fort Hood
- Fort Lewis
- Fort Ord
- Fort Polk
- Fort Richardson
- Fort Riley
- Schofield Barracks
- Fort Stewart
- Fort Wainwright

TRAINING AREAS

- Fort A.P. Hill
- Fort Chaffee
- Fort Dix
- Fort Greeley
- Fort Indiantown Gap
- Fort Hunter Liggett
- Fort Irwin
- Fort McCoy
- Fort Pickett

TRAINING INSTALLATIONS

INITIAL ENTRY BRANCH SCHOOLS

- Fort Benjamin Harrison
- Fort Bennin
- Fort Bliss
- Fort Eustis
- Fort Story
- Fort Gordon
- Fort Huachuca
- Fort Jackson
- Fort Knox
- Fort Lee
- Fort Leonard Wood
- Fort McClellan
- Fort Rucker
- Fort Sam Houston
- Fort Sill

PROFESSIONAL SCHOOLS

- Carlisle Barracks
- Fort Leavenworth
- Fort McNair
- Presidio of Monterey
- West Point

COMMAND & CONTROL INSTALLATIONS

- Fort Belvoir
- Fort Devens
- Fort Gillem
- Fort Hamilton
- Fort Totten
- Fort McPherson
- Fort Meade
- Fort Monroe
- Fort Myer
- Fort Ritchie
- Fort Shafter

INDUSTRIAL INSTALLATIONS

DEPOTS

- Anniston
- Blue Grass
- Letterkenny
- Red River
- Sacramento
- Savanna
- Seneca
- Sierra
- Tobyhanna
- Tooele

COMMODITY ORIENTED

- Aberdeen Proving Grounds
- Belvoir Fuels
- Detroit Arsenal
- Dugway Proving Grounds
- Fort Detrick
- Fort Monmouth
- Harry Diamond Laboratory
- Natick RD&E
- Picatinny Arsenal
- Redstone Arsenal
- Vint Hill Farm Station
- White Sands Missile Range
- C.M. Price Support Ctr.
- Yuma Proving Grounds

PRODUCTION ORIENTED

- Hawthorne
- Holston
- Iowa
- Lake City
- Lone Star
- McAlester
- Milan
- Radford
- Pine Bluff Arsenal
- Rock Island Arsenal
- Watervliet Arsenal

PORTS

- Bayonne, NJ
- Oakland, CA
- Sunny Point, NC

Figure D-3. ARMY BRAC 91 INSTALLATION ALLOCATION TO CATEGORIES

a. **Data Weaknesses.** ESSC's research and data collection uncovered several weaknesses in BRAC 91 real property data. These weaknesses can be grouped into two categories:

(1) ***Data Quality.*** A consistent comment from many installation personnel and BRAC points of contact is that the Army's real property inventory is not 100% accurate. This is a key point because the Army's real property inventory provides the foundation for not only the land and rights therein, but also ground improvements, utility systems, and buildings and structures.[15]

(2) ***Leased Space.*** The Army BRAC 91 RPI did not consider the Army's significant number of leased space holdings across the United States. These holdings need to be considered and reconciled within the Army BRAC 93 process. In some cases it may be more cost effective to move out of leased space onto an installation and keep it open rather than close the installation and continue to pay for leases.

b. **Real Property Data Quality.** The foundation for the Army's installation data lies within each installation's Directorate of Engineering and Housing (DEH) real property accounting section.

(1) ***The Process.*** The process of real property accounting generally flows upward from the installation to a central data base--Integrated Facility System (IFS) and a central management level--the Office of the Assistant Chief of Engineers (OACE). The OACE serves as the DA staff proponent for IFS. The real property inventory technician reports and updates the installations real property records. The records are then forwarded either through a MACOM (as in the case of Army Materiel Command), or directly to the Engineering and Housing Support Center (EHSC) for quality assurance and technical management responsibility. Once verified, the data is transmitted by EHSC to its central IFS repository.

(2) ***The Uses.*** BRAC withstanding, DA, MACOMs, and installation personnel use the real property information in a number of ways and through a number of products. The Army's "Blue Book"[16] is an annual hardcopy version of the Army's real property. The Army's "Red Book"[17] also uses real property data extensively. The IFS serves as the electronic soft-copy data repository for real property information. It also is a source for other automated data bases such as RPLANS.

(3) ***Real Property Weaknesses.*** Inherent in the real property accounting process mentioned above are a number of problems that result in data discrepancies.

(a) *Real Property Accounting Tools.* Turbulence in the real property reporting tools available to installations has caused data inaccuracies. At the present time, four different real property reporting tools are in use: Integrated Facility System-1 (IFS-1), IFS-Mini/Micro (IFS-M), Desktop Resource for Real Property (DR. PEAL), and Manual Methods.

---

15 *Inventory of Army Real Property, AR 405-45* (Department of the Army, 15 April 1982).
16 Inventory of Army Military Real Property (U.S. Army Corps of Engineers, 30 September 1990).
17 *Facilities and Housing Annual Summary of Operations* (Department of the Army, FY 1990).

Each of these systems has its own hardware and process. Many are in the process of transitioning from older systems to newer, more reliable, and more efficient systems. Training, experience, and tool upgrades all take time and effort to bring an installations RPI up to speed, and also introduce opportunities for errors to creep in.

(b) *Real Property Personnel Management.* Variations in the management of real property personnel also cause data quality problems. On some installations, the real property management program (RPMP) is a part-time mission assigned to available personnel. In other cases, a full-time, adequately trained, properly paid real property technician is in residence in the DEH master planners shop. In recent years the trend has been towards the latter; however, personnel turnover, low job visibility, inadequate training, and force cuts still plague the Army's real property management programs.

(c) *Command Interest.* Traditionally the installation commander and the DEH have focused their attention on the information they need for day-to-day running of their installation. Maintenance of real property accounting and management data for reports submitted to higher headquarters often received a low priority. Currently a transition is occurring. Installations commanders and DEHs now realize the value placed upon the data resident in their RPI, particularly with reference to its use in BRAC. Problems of past neglect are now in the process of being rectified--however, it does take time to correct.

(d) *Real Property Accounting System.* There are inefficiencies in the real property reporting system caused by the reporting system itself. Like the RPI system tools, there are variations in the reporting system. Installations subordinate to FORSCOM and TRADOC use IFS-M, Dr. REAL, manual systems and IFS-1 to transmit their RPIs to EHSC. U.S. Army Reserve units submit to their parent active Army installation, which in turn transmits to EHSC. The National Guard, using Dr. REAL and manual systems, transmits directly to EHSC. Army Materiel Command (AMC) sites, using manual systems, Dr. REAL, and IFS-M, transmit to the U.S. Army AMC Installations and Services Activity at Rock Island, Illinois, which verifies, consolidates, and in turn transmits to EHSC. Ports under the control of the Military Traffic Management Command (MTMC) submit their RPI manually to EHSC.

c. **Leased Space.** The amount of the Army's leased space holdings is important from two aspects. First, as the Army reduces in size, facilities on Army posts may become available, particularly where closure is imminent. It is important to attempt to provide the most cost effective space for the U.S. Army--especially in light of the high cost of leased space. Second, it is part of the Army's total real property picture. The Army as a whole must determine its total requirement for real property, which includes leased space holdings.

(1) *Army Process.* The Real Estate Directorate, U.S. Army Corps of Engineers, is the Army proponent for leased space. It tracks the Army's leased space through a management information system called Recruiting Facility Management Information System (RFMIS). Leases included in the RFMIS data base are gathered from USACE district and division Real Estate Offices. These offices conduct leased space transactions for U.S. Army installations within their jurisdiction, and record them in RIFMIS.

(2) ***Leased Space Weaknesses.*** Inherent in the Army's leased space inventory are a number of shortcomings that prevent the Army from determining its entire range of real property requirements.

(a) *Lack of Leased Space Data in IFS.* There is no linkage between the installation data referenced in BRAC and leased space information. Currently their is little leased space data in the Army's real property data base--IFS. The majority of available information on the Army's leased space data is resident in RIFMIS. Two problems exist. First, there currently is no connection between IFS and RIFMIS. Efforts are ongoing to integrate the two data bases[18] in time for Army BRAC 93 use. The second problem involves the quality of information in the RIFMIS data base. It is not 100% complete. As with other Army data bases, efforts are ongoing to improve the quality of the data within RIFMIS.

(b) *Army's Total Leased Space Picture.* To obtain a total accounting, the Army will have to capture leased space holding information from sources not available in RIFMIS. Currently, the RFMIS data base excludes leases for: Black programs, medical facilities, JAG school, the Engineer Proving Ground, Public Affairs Office, Armed Forces Radio and Television, Army Audit Agency, the Military District of Washington, and the National Capital Region. Additionally, consideration of leases obtained through the General Services Agency must be counted.

d. **Summary: Determination of the Army Real Property.** Ongoing efforts within the Engineer community are aimed at improving the current shortcomings of the Army's real property management program. Improvements in the Integrated Facility System and the Army's leased space inventory management will lead to higher data quality and a more complete picture.

---

[18] *Key Action: Lease Reduction Program* (Office of the Assistant Chief of Engineers, 16 March 1991).

III. RESULTS

10. **GENERAL.** This section synthesizes our discussion of the Army's use of installation data during the Army BRAC Phase I Process into findings and recommendations.

11. **FINDINGS.**

- **FINDING 1.** The Army BRAC process makes extensive use of real property data and automated data bases--especially the ASIP and the IFS. These data bases are sound and effective systems for tracking installation data. These systems are improving, but are not 100% accurate or complete.

  DISCUSSION. The extensive use of installation data in Army BRAC 91 has heightened the Army's awareness of its need for installation data that is as complete and as precise as possible. All Army echelons are working towards updating and completing their installation data. The Army also realizes that all parties share in the responsibility for this task, from the installations to the DA staff. Notices of data updates are being issued, quality assurance is being integrated into the loop, and Army information management goals are being pursued.

  RECOMMENDATION. Construct an adequate project management plan that insures sufficient time to properly update and correct installation data bases. Notify installation commanders and DEH of the key role that installation data bases play in the Army BRAC process, and of the importance of their accuracy and completeness, not only for Army BRAC 93, but also for all future planning in a resource-constrained environment.

- **FINDING 2.** Various versions or editions of installation data are used during the Army BRAC process. This leads to data discrepancies, endless verifications loops, and inaccuracies.

  DISCUSSION. The lack of a consistent and standard set of installation data used during the entire BRAC process was mentioned throughout many interviews as a major difficulty. Continuous data haggling detracted from important analysis efforts. Let us illustrate by attempting to determine the number of training acres on Camp Swampy. The Camp Swampy commander believes one figure measured from the DEH master plan, the Camp Swampy's higher headquarters has a different number from Army Training Support Center (ATSC), and DA another figure obtained from HQRPLANS. DOD obtains their figure from the Defense Installation Ranges and Training Areas (DIRT) data base, and the BRAC commission has yet another figure from the Reserve Component Training Data System (RCTDS).

RECOMMENDATION. Establish an information cutoff date. Verify the data. Establish a standard Army BRAC 93 installation data set. This standard data set is to be used and referenced by all BRAC players--installations, MACOMs, DA, DOD, and the BRAC Commission.

- **FINDING 3.** The Army's BRAC process makes little consideration of the significant number of Army leased space holdings throughout the fifty states. These holdings should be considered and reconciled within the Army BRAC process.

  DISCUSSION. The amount of the Army's leased space holdings is important from two aspects. First, as the Army reduces in size, facilities on Army posts may become available, particularly where closure is imminent. It is important to attempt to provide the most cost effective space for the U.S. Army--especially in light of the high cost of leased space. It also may be a backfill outlet for other relocations. Second, it is part of the Army's total real property picture. The Army as a whole must determine it's total requirement for real property, which includes leased space holdings.

  RECOMMENDATION. Initiate an assessment of the Army's leased space. Consider the leased space assessment in BRAC 93-Phase II when closure and realignment options are studied.

LAST PAGE OF ANNEX D

ANNEX E

INSTALLATION RATING PROCESS

ANNEX E

INSTALLATION RATING PROCESS

Section **Page**

Figure

Blank Page

I. INTRODUCTION

1. **PURPOSE.** This annex reviews the decision analysis method used to evaluate the military value of Army installations during BRAC 91-Phase I in order to propose improvements to the process prior to the commencement of Army BRAC 93.

2. **SCOPE.** This annex--

a. Examines decision analysis methods including (but not limited to) the type of method used in Army BRAC 91.

b. Determines which class of methods is theoretically appropriate for analyzing a problem like the Army BRAC assessment of the military value of Army installations.

c. Compares the different techniques within that class of methods to see which specific technique offers the best combination of features to meet the Army's needs for BRAC 93.

3. **BACKGROUND.** A key reason the Army BRAC Office asked ESSC to review the methodology used in Army BRAC 91 was ESSC's combination of experience in installation assessments, stationing analysis, and decision analysis techniques.

a. Throughout the 1960's, 1970's, and 1980's, ESSC (known as Engineer Strategic Studies Group and then Engineer Studies Center) prepared division and brigade stationing studies, base development plans, special stationing scenarios, and long-range stationing strategies for U.S. Army, Europe.

b. More recently, ESSC has completed an Army stationing alternatives analysis, developed a restationing master plan for U.S. Forces, Korea, and supported the Corps of Engineers reorganization task force (first as part of Army BRAC 91 and then as an independent program when the Corps reorganization was separated from Army BRAC 91).

c. The analytic tool the Army used for BRAC 91-Phase I analysis was a commercially available software program called Decision Pad (D-PAD).[1] ESSC has experience with this particular software program from both the restationing work done for U.S. Forces, Korea, and the Corps of Engineers reorganization efforts. The references to D-PAD and other commercial software programs in this report should not be construed as an official endorsement of these products.

d. In addition to the D-PAD program, ESSC has used decision analysis methods, to include developing its own decision models, in such diverse study efforts as obstacle breaching analysis, unit stationing, and the engineer model improvement program.

---

[1] *Decision Pad* (Apian Software, Menlo Park, CA 94026).

e. As part of the research for this Army BRAC 91 review project, ESSC held an Operations Research Systems Analysis Special Topics Seminar during February 1992. The seminar was led by Dr. Charles Correia of the Army Logistics Management College, Fort Lee, Virginia. The purpose of this seminar was to review the latest developments in the field of decision analysis with particular regard for possible Army BRAC implications. ESSC extends its appreciation to Dr. Correia for his assistance in conducting the seminar and for his constructive review of this annex prior to publication.

4. **ORGANIZATION.** This annex is divided into three sections:

a. **Section I:** Introduction--establishes the frame of reference for the analysis presented in this annex.

b. **Section II:** Discussion--examines the measurement of an installation's military value from two perspectives: The first is theoretical; the second is operational.

c. **Section III:** Results--gives ESSC's findings and recommendations for using decision analysis techniques to augment the Army BRAC 93-Phase I assessment of the military value of Army installations.

II. DISCUSSION

5. **THEORY.** The task of comparing military installations with widely different missions and facilities is a complex and challenging problem. The formulation of the problem and the underlying assumptions associated with different theories of decision analysis are examined in this section to see which approaches are most suitable to the needs of the Army BRAC analysis.

a. Since making decisions is common to all human activity, it is not surprising that many different systems have been developed to help make better decisions. Some approaches simply try to collect and organize information in such a way that people can make decisions more easily (e.g. a computer spreadsheet that can help arrange, analyze, and display data to assist in making decisions). Other approaches attempt to capture the thought processes that go into making the "right" decision in order to suggest what decision to make--or, in the ultimate case, to act without human intervention (e.g., a robotic vehicle that makes navigation "decisions" on its own).

b. There is no rigid consensus within the Operations Research community as to a unique way to arrange decision analysis systems. This is largely due to the fact that many decision techniques (particularly the more sophisticated) can be adapted to fit more than one type of problem. However, there is a fundamental, logical pattern to the development of different methods to address problems of increasing complexity. **Figure E-1** is adapted from the decision analysis taxonomy used by the Army Logistics Management College in its Multiple Criteria Decision making course.[2]

c. It is not the purpose of this annex to develop a tutorial on all of the methods shown in Figure E-1. Therefore, we will quickly proceed through the taxonomy to identify the different categories and rule out those that clearly don't fit the type of problem faced by the Army in the BRAC process. We can then limit our more detailed review to the classes of analysis that are potentially applicable to use in the Army BRAC process

d. The first distinction made in the taxonomy shown in Figure E-1 is to separate decision analysis into two categories: Multiple Criteria Decision making (MCDM) and Single Criterion Decision making (SCDM). Since the Army BRAC installation assessment problem clearly has more than one criterion, we can rule out the single criterion methods. However (as noted in paragraph 5.b.), some techniques are sophisticated enough to permit adaptation to more complicated problems than what their classification might indicate (e.g., the Mathematical Programming techniques under the SCDM category). Linear Programming and its extensions to

---

[2] The original graphic from which Figure E-1 was derived was provided by Dr. Correia in the February 1992 seminar cited in paragraph 3.e. However, ESSC has modified the taxonomy for presentation in the context of this annex.

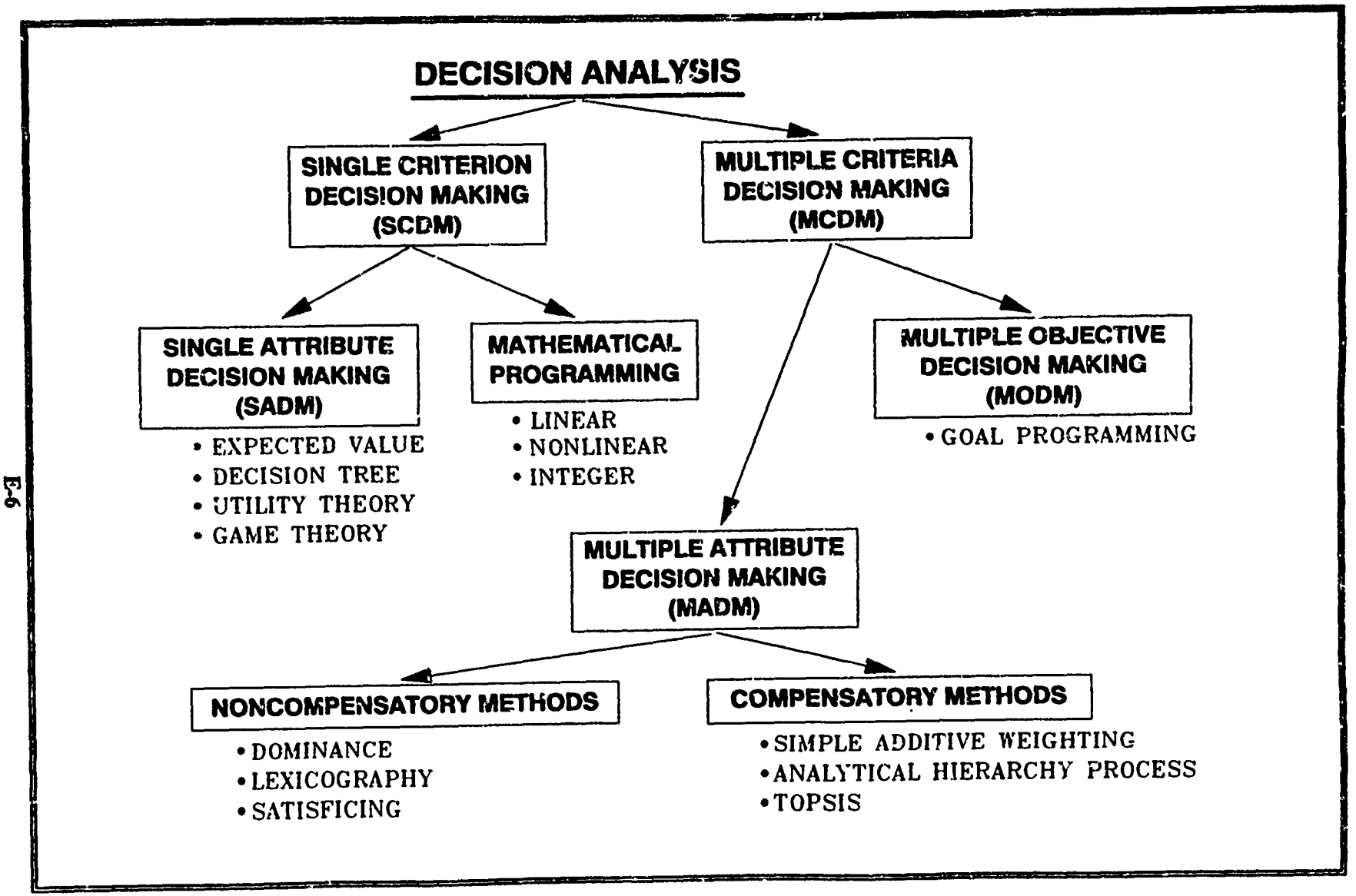

Figure E-1. DECISION ANALYSIS TAXONOMY

Non-linear and Integer Programming were originally intended to optimize one objective function (e.g., one criterion). However, there have been many clever refinements to these techniques that allow for the simultaneous solution of more than one objective function. A noteworthy example of the use of just such an approach for the Army BRAC problem has been developed by a student at the Naval Postgraduate School, Monterey, California.[3]

e. Under MCDM there are two groups: Multiple Objective Decision making (MODM) and Multiple Attribute Decision making (MADM). The fundamental difference between the two is that MODM techniques are designed to explore problems with a limitless set of alternatives (e.g., continuous variables), while MADM techniques are designed to examine a limited number of alternatives (e.g., discrete variables). MODM is best suited to exploratory analysis such as developing new design concepts or research and development projects where there are no predefined alternatives from which to choose. MADM is best suited to problems of choice from among a group of competing things that can be identified in advance. The formulation of BRAC as a problem of selecting which installations to retain from the set of existing installations makes it clearly suited to solution using MADM techniques.

f. Within MADM, the two basic groups are--Noncompensatory Methods and Compensatory Methods. Noncompensatory Methods are useful for problems where tradeoffs between attributes are not allowed. The lack of tradeoffs means there is no attempt to compare the relative importance of the attributes by assigning weights. The Compensatory Methods, on the other hand, all deal with ways to reflect the relative value of the attributes by devising different weighting schemes. While the Noncompensatory Methods are simpler and easier to solve, it is a virtual necessity to use the added complexity of the Compensatory Methods for Army BRAC analysis. The ability of the Compensatory Methods to capture the relative weights of attributes is needed in order to adequately portray the intricate mix of features on Army installations.

g. The decision analysis taxonomy in Figure E-1 made it possible to quickly zero in on the category of methods that are designed to solve problems of the type presented in the Army BRAC process. We should point out, however, that just because categories were eliminated from consideration for the purposes of this annex, this does not mean the techniques contained in these categories are necessarily inferior or invalid. Quite the contrary, there is no one "right" approach to decision making. Every new problem must be examined so that the best technique for that problem can be applied to its solution. We have, in fact, just used one of the noncompensatory decision making methods (Dominance) to "decide" which decision making method to use for Army BRAC 93. For information on the entire field of decision analysis techniques, the Operations Research Systems Analysis courses offered by the Army Logistics Management College provide an excellent training opportunity.[4]

---

[3] Captain James G. Singleton, *Stationing United States Army Units to Bases: A Bi-Criteria Mixed Integer Programming Approach* (Naval Postgraduate School, Monterey, CA, June 1990).

[4] *Continuing Education Program* (United States Army Logistics Management College, Fort Lee, Virginia 23801-6050).

6. **CANDIDATE TECHNIQUES.** As we discovered in paragraph 5, the specific approaches that fall within the category of Compensatory Methods seem best suited to the Army BRAC-Phase I analysis. There are many different variations and unique applications of the basic mathematical procedures included under the general heading of Compensatory Methods. However, these different approaches are generally based on one of three theoretical techniques for quantifying the relative importance of multiple attributes and how the importance of the individual attributes are combined to arrive at a final ranking of alternatives. The key features of these three techniques are discussed in turn:

a. **Simple Additive Weighting (SAW).** This is the technique found in the D-PAD software used by the Army for BRAC 91-Phase I analysis.

(1) At the heart of this methodology is the theory that a rational decision about a complex problem can be made by decomposing the problem into its component parts, developing quantitative measures for those component parts, and then recombining the parts to reach an overall evaluation.

(2) For Army BRAC this involves evaluating the relative "military value" of U.S. Army installations based on how well each installation rates against a set of criteria that define the important characteristics of each installation. Such an analysis technique provides an organized way of making decisions about which alternative is the best when the impact of many different criteria must be balanced in making the final decision.

(3) One frequently used example that demonstrates the gist of using this technique is the problem of choosing which car to purchase. The evaluation is done by ranking each car being considered against different criteria (e.g., cost, reliability, and gas mileage), weighing the criteria based on their importance, combining the ranking for each car by the appropriate criterion weight, and computing the overall score for each car to see which one has the highest score (in the case of base closures, the installations with the lowest scores would be candidates for closure).

(4) The strength of this theory lies in its ability to handle subjective opinions as well as quantitative data. In the car buying example, purchasers could make "style" one of the judgment criterion and score each car on its style. People would have their own opinion about style and would, therefore, rank cars according to their preference. But, as long as purchasers use their own ranking system the theory is internally consistent.

b. **Analytical Hierarchy Process (AHP).** This method is an extension of the SAW technique. The AHP method was developed by Dr. Thomas L. Saaty, University of Pittsburgh.[5] The most significant areas where AHP expands on SAW are--

---

[5]Dr. Thomas Saaty has published extensively on his AHP methodology. Two of his publications that provide the foundations of AHP are--

Multicriteria Decision Making: The Analytic Hierarchy Process, Vol I, AHP Series (1990 extended edition), pp. 502.
Decision Making for Leaders, Vol II, AHP Series (1990), pp. 291.

(1) Emphasis on the way the alternatives are organized into their component parts (hierarchy).

(2) Development of a rigorous method of devising the attribute weights by comparing in turn every alternative to every other alternative (pairwise comparison).

(3) Application of a computational approach that uses the information contained in the pairwise comparisons to calculate the ranking of alternatives and also to ensure the consistency of the attribute weight assignments. This method uses a particular matrix algebra formulation that computes the characteristic roots of the matrix of pairwise comparisons (eigenvalues).

c. **Technique for Ordered Preference by Similarity to the Ideal Solution (TOPSIS).** This technique is also an extension of the basic SAW method. TOPSIS was developed by Dr. C. L. Hwang and K. Yoon, Kansas State University.[6] TOPSIS can determine attribute weights using either the basic SAW approach or the pairwise method used by AHP.

(1) The unique feature in the TOPSIS method is its use of the concept that the chosen alternative should have the shortest distance from some theoretical "ideal" solution and the farthest distance from the "negative ideal" solution. The "ideal" solution is composed of the best attribute values attainable; and similarly, the "negative ideal" solution is composed of the worst attribute values attainable.

(2) The TOPSIS methodology develops the "ideal" and "negative ideal" solutions by examining each attribute across all alternatives to identify the highest and lowest values each attribute received. These extreme values then define, in effect, the composite best and composite worst possible alternatives within the limits of the problem set. TOPSIS then calculates the relative ranking of the alternatives by measuring how close they are to the "ideal" solution--or the reverse, how far they are from the "negative ideal" solution.

(3) TOPSIS interprets the measurement of the distances of the alternatives from the "ideal" and "negative ideal" solutions as a geometric problem. The attribute scores of each alternative are used as the alternative's coordinates in euclidean space (with as many dimensions as there are attributes). The distances of the alternatives to the "ideal" and "negative ideal" solutions can then be solved using vector formulas.

7. **OPERATIONAL CONSIDERATIONS.** In Paragraph 6, we identified the most promising methods for solving the BRAC installation assessment problem from a purely theoretical perspective. Specific software programs incorporating those theories are examined in this paragraph. The following programs are evaluated on how well they function in terms of practical considerations such as--data requirements, ease of use, ability to do sensitivity analysis, and limitations on problem size:

---

[6] C. L. Hwang and K. Yoon, *Multiple Attribute Decision Making - Methods and Applications* (Springer-Verlag, New York, 1981), pp. 128-140.

a. **SAW Software.** Simple additive weighting techniques can be easily adapted to any basic spreadsheet program. However, there are advantages to using a commercially available software program that provides added features to simplify problem formulation, data entry, the display of results, and the performance of sensitivity analysis. There are several software programs on the market that use SAW techniques. As mentioned at the beginning of this annex, the software program called D-PAD was used for Army BRAC 91. D-PAD is quite good in its use of SAW techniques, and the Army BRAC community is familiar with it. Therefore, it is included in ESSC's examination as the most reasonable SAW candidate for possible use in Army BRAC 93. The version of D-PAD used in this evaluation is release 2.04.

b. **AHP Software.** The commercial software program developed specifically around the AHP method is a program called Expert Choice.[7] Other software programs make use of some of AHP's techniques. For instance, as noted above, TOPSIS can use the AHP pairwise comparison technique. However, Expert Choice is more thoroughly steadfast to the complete AHP theory. For this reason, Expert Choice is used as the AHP candidate for possible use in BRAC 93. The version of Expert Choice used in this evaluation is release 7.2 (release 8.0 is due soon but was not available for ESSC's review).

c. **TOPSIS Software.** TOPSIS is available as a public domain software. Computer users within DOD can obtained a copy of the program from the Command and Control Microcomputer Users' Group (C^2MUG), Fort Leavenworth, Kansas.[8] TOPSIS can use either of the weighting schemes used by the SAW or AHP methods. However, it is the only software program we have found that uses the vector distance from the "ideal" and "negative ideal" solutions in computing its ranking of alternatives. This feature makes it unique enough to include it as a candidate for possible use in BRAC 93.

d. **Comparison of Candidate Software.** ESSC selected six features to use in evaluating each of the software programs. **Figure E-2** shows the side-by-side comparison of the three candidate software programs rated against the six features. It is not a coincidence that this figure looks like a decision analysis problem--with alternatives (candidate software) and attributes (features).

(1) We originally intended to use each of the three software programs to perform this analysis, to demonstrate their techniques, and to use the results to select which program is "best" for use in Army BRAC 93. However, a quick inspection of the candidates' features shows that it is not necessary to go through the rigorous steps of weighing the importance of the features and computing a ranking of candidates.

---

[7] *Expert Choice* (Decision Support Software, Inc. and Expert Choice, Inc., Pittsburgh, PA 15213).

[8] *C^2MUG Software Catalog* (Associate Director, CECOM, MCSD, ATTN: AMSEL-RD-LC-MC (C^2MUG), Building 138, Fort Leavenworth, KS 55027-5600).

SOFTWARE PROGRAMS			
FEATURES	**D-PAD**	**EXPERT CHOICE**	**TOPSIS**
Problem Size (assuming no computer constraints)	250 alternatives 250 attributes	hierarchy with 7 levels, 117,649 attributes	1000 alternatives 10 attributes
Weighting Scale	15 predefined or user defined	1-3-5-7-9 with intermediate values allowed	1-3-5-7-9 or scaled 0-1
Sensitivity Analysis	up to 12 what-if experiments	graph of crossover points	none, user can change and rerun model
User Interface	multiple menus on-line help on-line demo "jump start"	multiple menus on-line help	rudimentary menu
Documentation	300 page manual with installation tutorial and reference sections	250 page manual with installation, theory, examples, & references	10 page manual supplied as an ASCI file on disk
Ease of Use	relatively straightforward	pairwise comparisons are tedious for large problems	poor manual and interface but simple to use

Figure E-2. CANDIDATE SOFTWARE

(2) Following the principle that the decision analysis method should fit the problem, simpler decision analysis techniques were applied:

(a) First, we inspected the candidates to see if any one could be ruled out for not meeting a minimum requirement (infeasible alternative).

(b) Second, we checked to see if any one of the candidates was inferior in all features (dominated alternative).

(3) TOPSIS is clearly dominated by the other two candidates. In fact, the problem size constraint of 10 attributes is enough to eliminate it from consideration. It would be possible to use TOPSIS for problems with more than 10 attributes by breaking the problem into layers--the results of each layer serving as input to the next layer. However, this would be both difficult to accomplish and complicated to explain (not exactly an infeasible alternative, but quite impractical).

(4) While someone with personal preference for some specific feature in Expert Choice might argue to the contrary, on objective grounds D-PAD has the advantage in all the features (with the possible exception of problem size). This is more of a theoretical advantage than an advantage in actual practice because both programs usually exceed available computer memory before they reach their maximum problem size.

III. RESULTS

8. **FINDINGS.** A thorough review of decision analysis theories leads to the conclusion that the most appropriate decision analysis techniques are those in the category of Multiple Attribute Decision making, Compensatory Methods. Based on the operational considerations, the specific software program in the preferred category is D-PAD.

a. **Discussion.** To provide an unbiased assessment, the fact that D-PAD was used for BRAC 91 was not considered as a factor in its favor. However, there are added benefits to using the same software program again for BRAC 93:

(1) Start up time is minimized--since the BRAC personnel on the TABS group, in the MACOMs, and at installations will not have to learn a new program. (Even the people who are new will have the BRAC 91 documentation to help them learn the program.)

(2) The presentations to DOD, The BRAC Commission, audit agencies, and Congress will be easier--since there will not be a need to explain a new methodology.

(3) The use of the same software program avoids the possibility of a discontinuity that might occur between past and future BRAC decisions if a new software program produced a drastically different ranking of installations.

b. **Recommendation.** Retain D-PAD as the software program used to assess the military value of Army installations during BRAC 93-Phase I.

Blank Page

LAST PAGE OF ANNEX E

ANNEX F

STUDY REVIEW COMMENTS

ANNEX F

STUDY REVIEW COMMENTS

Section — Page

Blank Page

I. INTRODUCTION

1. PURPOSE. On 17 June 1992 at the final IPR of this project, the Engineer Strategic Studies Center (ESSC) provided a draft of this report to the sponsor for review and comment. This annex documents the sponsor's comments and explains ESSC's responses to them.

2. SCOPE. This annex quotes the comments which are contained in the sponsor's memorandum, dated 16 July 1992, to ESSC.[1] Following each comment is ESSC's reply to that comment. If ESSC agrees with the comment and revises the report to satisfy the comment, the reply identifies what changes were made. If ESSC agrees with the comment, but no change could be made in the report, the reply suggests follow-on actions to address the comment. If ESSC disagrees with the comment, the reply explains the rationale behind ESSC's position.

[1] "Comments on 'A Review of the Army's BRAC Installation Assessment Methodology,'" Memorandum from the Department of the Army, Base Realignment and Closure Office, to ESSC, 16 July 1992.

Blank Page

II. DISPOSITION OF COMMENTS

3. MEASURES OF MERIT.

• *Comment.* "Agree with all five of the recommendations subject to a review of any comments that might be raised by the MACOMs during their review."

Reply. No change is necessary in the report. Refining the BRAC 93 methodology based on MACOM comments is an integral part of the TABS process. ESSC's report in no way supplants that process.

4. INSTALLATIONS & CATEGORIES.

• *Comment.* "Finding/Recommendation #1. Agree with the recommendation to further divide the industrial category of installations. Disagree that there should be a separate sub-category for inventory control points (ICPs). There is only one installation whose primary mission is as an ICP — St Louis Support Center. This installation is already being assessed in the command and control category. Breaking the former industrial category into two groups, proving grounds and research & development centers, will correct the weaknesses identified during the BRAC 91 process."

Reply. Conversations with Army Materiel Command (AMC) BRAC personnel indicate AMC classifies more than one installation as an ICP. Specifically, AMC considers the ICP as the primary mission at four of its sites: Fort Monmouth is home to Communications-Electronics Command (CECOM); Tank-Automotive Command (TACOM) is the predominant activity at Detroit Arsenal Tank Plant; Redstone Arsenal is home to Missile Command (MICOM); and the Aviation Systems Command (AVSCOM) and Troop Support Command (TROSCOM) are housed in federally leased space in St Louis. These are in addition to the presence of ICPs -- Depot System Command (DESCOM) and Armament, Munitions and Chemical Command (AMCCOM) at Rock Island Arsenal. ESSC suggests coordination with AMC on the designation of installations as inventory control points, proving grounds, arsenals, and RDT&E centers.

• *Comment.* "Finding/Recommendation #2. The recommendation to create a special purpose category for space, intelligence, communications, special operations and other installations does not provide sufficient specificity to implement. It would have been helpful if the study listed specific installations to be included in the special purpose category."

Reply. The development of a definitive inventory of Army installations was beyond the scope of this methodology assessment. However, we recognize that the identification and categorization of all installations is an essential step in the Army BRAC-Phase I process (see Figure 2, steps 5 and 6, on page 4 of the main paper). While it is easy to say that such steps are part of execution and not methodology, ESSC does not wish to dismiss the effort as trivial. If the

TABS group needs assistance in developing an authoritative list of installations for BRAC 93, ESSC is willing to provide the assistance as part of its follow-on support to the Army BRAC process.

- *Comment.* "Finding/Recommendation #3. The only category of installations exempted from review during BRAC 91 was medical centers, since the Military Departments were told that OSD(Health Affairs) would conduct an independent review. Agree with the recommendation to include medical centers for review during BRAC 93."

Reply. No change is necessary in the report.

- *Comment.* "General comment. It would have been beneficial for the report to include a complete list of the proposed categories for BRAC 93 along with the corresponding installations, similar to Figure 6."

Reply. See our reply to the comment in Finding/Recommendation #2, above.

5. **ATTRIBUTES.**

- *Comment.* "Finding/Recommendation #1. Agree with the proposed addition of two new attributes --- mobilization and environmental carrying capacity. However, no precise definition or quantitative measurement of environmental carrying capacity is offered, leaving it open to some speculation on how to implement the recommendation."

Reply. As noted in Annex C of the report, the lack of consistent data makes it difficult to develop a detailed quantitative data analysis for environmental carrying capacity in time for BRAC 93. However, the issue is too important to postpone for later rounds of BRAC In Annex C, ESSC recommends that the Army environmental subject matter experts provide the qualitative judgments for rating each installation's environmental carrying capacity for BRAC 93. The coordination necessary to survey the environmental experts was beyond the scope of this methodology assessment. However, ESSC and the Office of the Assistant Chief of Engineers are willing to provide assistance, if the TABS group needs assistance in developing and collecting input for an environmental carrying capacity attribute for BRAC 93.

- *Comment.* "Finding/Recommendation #2. Concur with the recommendation to reduce duplication through the elimination of three attributes."

Reply. No change is necessary in the report.

- *Comment.* "Finding/Recommendation #3. Agree with the recommendation renaming five attributes to clarify and strengthen their meaning."

Reply. No change is necessary in the report.

• *Comment.* "Finding/Recommendation #4. Concur with the proposal to revise and expand three attributes."

Reply. No change is necessary in the report.

• *Comment.* "Finding/Recommendation #5. Partially agree with the recommendation to eliminate nine attributes, since their contribution to measuring military value is minimal. However, believe that the study misunderstood the purpose of using such attributes as 'Places Rated Almanac Rating' and 'Community Economics.' These attributes address DoD criterion number seven, 'the ability of both the existing and potential receiving communities infrastructure to support forces, missions, and personnel.' The study does not identify other suitable attributes to measure this aspect of the quality of life measure of merit."

Reply. ESSC accepts the sponsor's rationale for retaining "Places Rated Almanac Rating" as an attribute. The report has been changed to reflect the retention of this attribute. The Places Rated Almanac Rating was not used by the Major Training Areas, Ocean Terminal Ports, and Ammunition Ports installation categories during BRAC 91. In reinserting this attribute ESSC did not add it to the three categories where it did not previously exist. ESSC's recommendation to delete the "Community Economics" attribute has not been changed in the report. ESSC continues to recommend that this attribute be deleted. This attribute measures a community's cost of living. However, since the Places Rated Almanac Rating includes cost of living as one of the factors it considers, it is redundant to include cost of living in a second attribute (note: Community Economics was used as an attribute by only three installation categories in BRAC 91: Depots, Production Installations, and Commodity Oriented Installations).

• *Comment.* "Finding/Recommendation #6. Agree with the recommended use of two standardized attributes across all categories - construction investment and deployment network."

Reply. No change is necessary in the report.

6. INSTALLATION DATA.

• *Comment.* "Agree with the three recommendations."

Reply. No change is necessary in the report

7. INSTALLATION RATING PROCESS.

• *Comment.* "Agree with the recommendation to retain D-PAD as the software program to assess the military value of Army installations during BRAC 93."

Reply. No change is necessary in the report.

8. FINAL COMMENT.

- *Comment.* "The Total Army Basing Study (TABS) group reserves the right to accept, reject or modify any of the recommendations in the report."

Reply. No change is necessary in the report. ESSC's analysis and recommendations in no way constrain or supersede the prerogatives of the TABS group as they work to develop the Army's submission for BRAC 93.

LAST PAGE OF ANNEX F

Engineer Strategic Studies Center	A REVIEW OF THE ARMY'S BRAC INSTALLATION ASSESSMENT METHODOLOGY	STUDY QIST CETEC-ES-R-92-5

PRINCIPAL FINDINGS:

- **Measures of Merit.** Mission essentiality and mission suitability are the highest priority measures of merit. Mission essentiality deserves the greater weight of the two because it measures those attributes deemed as the most important for accomplishing the installation's primary mission.

- **Installations & Categories.** The industrial category, commodity subcategory contains three functional activities within one subcategory -- Inventory Control Points, Proving Grounds, and R & D Centers. These three functional activities are best evaluated in separate subcategories.

- **Attributes.** ESSC found the need for new or substantially revised attributes. These new attributes address weaknesses in the set of attributes used for Army BRAC 91 and add to the Army's effort of measuring an installation's military value. These candidate attributes are -- mobilization and environmental carrying capacity.

- **Installation Data.** Various versions or editions of installation data are used during the Army BRAC process. This leads to data discrepancies, endless verification loops, and inaccuracies. The Army's BRAC process makes little consideration of the significant number of Army leased space holdings throughout the fifty states. These holdings should be considered and reconciled within the Army BRAC process.

- **Installation Rating Process.** A thorough review of decision analysis theories leads to the conclusion that the most appropriate decision analysis techniques are those in the category of Multiple Attribute Decision making, Compensatory Methods. Based on operational considerations, the specific software program in the preferred category is D-PAD.

SCOPE OF THE STUDY: This study examines the validity and effectiveness of the measures of merit, installation categories, attributes, installation data, and installation rating process used by the Army in BRAC 91.

STUDY OBJECTIVE: This study will assist the Base Realignment and Closure Office (BRACO) as it reviews the process used by the Army during the BRAC 91 round of base realignment and closure deliberations. The objective is to refine the process prior to the commencement of the next study group (BRAC 93) in October 1992.

BASIC APPROACH:

- **Stage One: Study Request and Scope.** The ESSC BRAC team met with members of the Army BRAC Office on 15 January 1992 to begin the study, further define the objectives of the study, discuss BRAC issues, and scope out various study problems.

- **Stage Two: Research and Data Collection.** After the 15 January 1992 study coordination meeting, ESSC gathered BRAC documents written and published by a wide array

of Federal, DOD, and Army organizations. ESSC also conducted phone conversations, video-teleconferences, on-site interviews, and issue workshops with a wide range of BRAC subject matter experts. These interviews allowed ESSC not only to collect baseline information and confirm basic BRAC issues, but also to identify other areas where BRAC methodology improvements could be made.

- **Stage Three: Assessment and Evaluation.** ESSC finalized its initial research and data collection phase with a preliminary BRAC issues assessment. This preliminary assessment focused on determining the key BRAC issues for further evaluation. ESSC returned to the Army BRAC Office on 30 March 1992 to provide them with a project update. The objective of this update was to obtain their approval of the key BRAC issues ESSC identified for further analysis.

- **Stage Four: Analysis and Synthesis.** The ESSC study team focused its attention on the key BRAC issues identified and approved by the study sponsor in stage three. Further in-depth research was conducted which provided the basis for analysis of each of the five issue areas.

- **Stage Five: Presentation.** The final stage of the study process was to provide a consolidated report containing our findings.

REASONS FOR PERFORMING THE STUDY: There are ongoing efforts to close or realign unneeded military bases as part of wide-ranging efforts to balance the U.S. budget, trim DOD, and reduce the operating costs of U.S. military forces. The most recent statutory effort by Congress to accomplish this task was the passage of *Public Law 101-510 (Defense Base Closure and Realignment Act of 1990)*. This law is an effort to ensure a timely, independent, and fair process for closing and realigning U.S. military installations. This statute requires the Secretary of Defense to submit a list of proposed military base closures and realignments to an independent Base Closure and Realignment Commission. This commission met in 1991 and will meet again in 1993 and 1995. The Army's 1991 submission received high marks for the clarity and logic of its methodology. However, the Army wishes to be proactive in improving its methodology to provide even better analysis for the upcoming 1993 submission.

STUDY SPONSOR: Department of the Army, Office of the Chief of Staff, Base Realignment and Closure Office, ATTN: DACS-DMB, Washington, DC 20310-0200

PERFORMING ORGANIZATION AND PRINCIPAL AUTHORS: The U.S. Army Corps of Engineers, Engineer Strategic Study Center performed the study. Mr. Stephen C. Reynolds was the Projector Director, Mr. Richard L. Taylor was the Project Team Leader and principal author, and Mr. Stephan E. Ryeczek was the Project Analyst and coauthor.

DTIC ACCESSION NUMBER: Pending

COMMENTS AND SUGGESTIONS MAY BE SENT TO: Commander, U.S. Army Corps of Engineers, Engineer Strategic Study Center, ATTN: CETEC-ES, Casey Building #2594, Fort Belvoir, VA 22060-5583

START AND COMPLETION DATES: Start Date: January 1992
Completion Date: July 1992

Engineer Strategic Studies Center	A REVIEW OF THE ARMY'S BRAC INSTALLATION ASSESSMENT METHODOLOGY	STUDY QIST CETEC-ES-R-92-5

PRINCIPAL FINDINGS:

- **Measures of Merit.** Mission essentiality and mission suitability are the highest priority measures of merit. Mission essentiality deserves the greater weight of the two because it measures those attributes deemed as the most important for accomplishing the installation's primary mission.

- **Installations & Categories.** The industrial category, commodity subcategory contains three functional activities within one subcategory -- Inventory Control Points, Proving Grounds, and R & D Centers. These three functional activities are best evaluated in separate subcategories.

- **Attributes.** ESSC found the need for new or substantially revised attributes. These new attributes address weaknesses in the set of attributes used for Army BRAC 91 and add to the Army's effort of measuring an installation's military value. These candidate attributes are -- mobilization and environmental carrying capacity.

- **Installation Data.** Various versions or editions of installation data are used during the Army BRAC process. This leads to data discrepancies, endless verification loops, and inaccuracies. The Army's BRAC process makes little consideration of the significant number of Army leased space holdings throughout the fifty states. These holdings should be considered and reconciled within the Army BRAC process.

- **Installation Rating Process.** A thorough review of decision analysis theories leads to the conclusion that the most appropriate decision analysis techniques are those in the category of Multiple Attribute Decision making, Compensatory Methods. Based on operational considerations, the specific software program in the preferred category is D-PAD.

SCOPE OF THE STUDY: This study examines the validity and effectiveness of the measures of merit, installation categories, attributes, installation data, and installation rating process used by the Army in BRAC 91.

STUDY OBJECTIVE: This study will assist the Base Realignment and Closure Office (BRACO) as it reviews the process used by the Army during the BRAC 91 round of base realignment and closure deliberations. The objective is to refine the process prior to the commencement of the next study group (BRAC 93) in October 1992.

BASIC APPROACH:

- **Stage One: Study Request and Scope.** The ESSC BRAC team met with members of the Army BRAC Office on 15 January 1992 to begin the study, further define the objectives of the study, discuss BRAC issues, and scope out various study problems.

- **Stage Two: Research and Data Collection.** After the 15 January 1992 study coordination meeting, ESSC gathered BRAC documents written and published by a wide array

of Federal, DOD, and Army organizations. ESSC also conducted phone conversations, video-teleconferences, on-site interviews, and issue workshops with a wide range of BRAC subject matter experts. These interviews allowed ESSC not only to collect baseline information and confirm basic BRAC issues, but also to identify other areas where BRAC methodology improvements could be made.

- **Stage Three: Assessment and Evaluation.** ESSC finalized its initial research and data collection phase with a preliminary BRAC issues assessment. This preliminary assessment focused on determining the key BRAC issues for further evaluation. ESSC returned to the Army BRAC Office on 30 March 1992 to provide them with a project update. The objective of this update was to obtain their approval of the key BRAC issues ESSC identified for further analysis.

- **Stage Four: Analysis and Synthesis.** The ESSC study team focused its attention on the key BRAC issues identified and approved by the study sponsor in stage three. Further in-depth research was conducted which provided the basis for analysis of each of the five issue areas.

- **Stage Five: Presentation.** The final stage of the study process was to provide a consolidated report containing our findings.

REASONS FOR PERFORMING THE STUDY: There are ongoing efforts to close or realign unneeded military bases as part of wide-ranging efforts to balance the U.S. budget, trim DOD, and reduce the operating costs of U.S. military forces. The most recent statutory effort by Congress to accomplish this task was the passage of *Public Law 101-510 (Defense Base Closure and Realignment Act of 1990)*. This law is an effort to ensure a timely, independent, and fair process for closing and realigning U.S. military installations. This statute requires the Secretary of Defense to submit a list of proposed military base closures and realignments to an independent Base Closure and Realignment Commission. This commission met in 1991 and will meet again in 1993 and 1995. The Army's 1991 submission received high marks for the clarity and logic of its methodology. However, the Army wishes to be proactive in improving its methodology to provide even better analysis for the upcoming 1993 submission.

STUDY SPONSOR: Department of the Army, Office of the Chief of Staff, Base Realignment and Closure Office, ATTN: DACS-DMB, Washington, DC 20310-0200

PERFORMING ORGANIZATION AND PRINCIPAL AUTHORS: The U.S. Army Corps of Engineers, Engineer Strategic Study Center performed the study. Mr. Stephen C. Reynolds was the Projector Director, Mr. Richard L. Taylor was the Project Team Leader and principal author, and Mr. Stephan E. Ryeczek was the Project Analyst and coauthor.

DTIC ACCESSION NUMBER: Pending

COMMENTS AND SUGGESTIONS MAY BE SENT TO: Commander, U.S. Army Corps of Engineers, Engineer Strategic Study Center, ATTN: CETEC-ES, Casey Building #2594, Fort Belvoir, VA 22060-5583

START AND COMPLETION DATES: Start Date: January 1992
Completion Date: July 1992

Engineer Strategic Studies Center	A REVIEW OF THE ARMY'S BRAC INSTALLATION ASSESSMENT METHODOLOGY	STUDY QIST CETEC-ES-R-92-5

PRINCIPAL FINDINGS:

- **Measures of Merit.** Mission essentiality and mission suitability are the highest priority measures of merit. Mission essentiality deserves the greater weight of the two because it measures those attributes deemed as the most important for accomplishing the installation's primary mission.

- **Installations & Categories.** The industrial category, commodity subcategory contains three functional activities within one subcategory -- Inventory Control Points, Proving Grounds, and R & D Centers. These three functional activities are best evaluated in separate subcategories.

- **Attributes.** ESSC found the need for new or substantially revised attributes. These new attributes address weaknesses in the set of attributes used for Army BRAC 91 and add to the Army's effort of measuring an installation's military value. These candidate attributes are -- mobilization and environmental carrying capacity.

- **Installation Data.** Various versions or editions of installation data are used during the Army BRAC process. This leads to data discrepancies, endless verification loops, and inaccuracies. The Army's BRAC process makes little consideration of the significant number of Army leased space holdings throughout the fifty states. These holdings should be considered and reconciled within the Army BRAC process.

- **Installation Rating Process.** A thorough review of decision analysis theories leads to the conclusion that the most appropriate decision analysis techniques are those in the category of Multiple Attribute Decision making, Compensatory Methods. Based on operational considerations, the specific software program in the preferred category is D-PAD.

SCOPE OF THE STUDY: This study examines the validity and effectiveness of the measures of merit, installation categories, attributes, installation data, and installation rating process used by the Army in BRAC 91.

STUDY OBJECTIVE: This study will assist the Base Realignment and Closure Office (BRACO) as it reviews the process used by the Army during the BRAC 91 round of base realignment and closure deliberations. The objective is to refine the process prior to the commencement of the next study group (BRAC 93) in October 1992.

BASIC APPROACH:

- **Stage One: Study Request and Scope.** The ESSC BRAC team met with members of the Army BRAC Office on 15 January 1992 to begin the study, further define the objectives of the study, discuss BRAC issues, and scope out various study problems.

- **Stage Two: Research and Data Collection.** After the 15 January 1992 study coordination meeting, ESSC gathered BRAC documents written and published by a wide array

of Federal, DOD, and Army organizations. ESSC also conducted phone conversations, video-teleconferences, on-site interviews, and issue workshops with a wide range of BRAC subject matter experts. These interviews allowed ESSC not only to collect baseline information and confirm basic BRAC issues, but also to identify other areas where BRAC methodology improvements could be made.

- **Stage Three: Assessment and Evaluation.** ESSC finalized its initial research and data collection phase with a preliminary BRAC issues assessment. This preliminary assessment focused on determining the key BRAC issues for further evaluation. ESSC returned to the Army BRAC Office on 30 March 1992 to provide them with a project update. The objective of this update was to obtain their approval of the key BRAC issues ESSC identified for further analysis.

- **Stage Four: Analysis and Synthesis.** The ESSC study team focused its attention on the key BRAC issues identified and approved by the study sponsor in stage three. Further in-depth research was conducted which provided the basis for analysis of each of the five issue areas.

- **Stage Five: Presentation.** The final stage of the study process was to provide a consolidated report containing our findings.

REASONS FOR PERFORMING THE STUDY: There are ongoing efforts to close or realign unneeded military bases as part of wide-ranging efforts to balance the U.S. budget, trim DOD, and reduce the operating costs of U.S. military forces. The most recent statutory effort by Congress to accomplish this task was the passage of *Public Law 101-510 (Defense Base Closure and Realignment Act of 1990)*. This law is an effort to ensure a timely, independent, and fair process for closing and realigning U.S. military installations. This statute requires the Secretary of Defense to submit a list of proposed military base closures and realignments to an independent Base Closure and Realignment Commission. This commission met in 1991 and will meet again in 1993 and 1995. The Army's 1991 submission received high marks for the clarity and logic of its methodology. However, the Army wishes to be proactive in improving its methodology to provide even better analysis for the upcoming 1993 submission.

STUDY SPONSOR: Department of the Army, Office of the Chief of Staff, Base Realignment and Closure Office, ATTN: DACS-DMB, Washington, DC 20310-0200

PERFORMING ORGANIZATION AND PRINCIPAL AUTHORS: The U.S. Army Corps of Engineers, Engineer Strategic Study Center performed the study. Mr. Stephen C. Reynolds was the Projector Director, Mr. Richard L. Taylor was the Project Team Leader and principal author, and Mr. Stephan E. Ryeczek was the Project Analyst and coauthor.

DTIC ACCESSION NUMBER: Pending

COMMENTS AND SUGGESTIONS MAY BE SENT TO: Commander, U.S. Army Corps of Engineers, Engineer Strategic Study Center, ATTN: CETEC-ES, Casey Building #2594, Fort Belvoir, VA 22060-5583

START AND COMPLETION DATES: Start Date: January 1992
Completion Date: July 1992

Engineer Strategic Studies Center	A REVIEW OF THE ARMY'S BRAC INSTALLATION ASSESSMENT METHODOLOGY	STUDY DIST CETEC-ES-R-92-5

PRINCIPAL FINDINGS:

- **Measures of Merit.** Mission essentiality and mission suitability are the highest priority measures of merit. Mission essentiality deserves the greater weight of the two because it measures those attributes deemed as the most important for accomplishing the installation's primary mission.

- **Installations & Categories.** The industrial category, commodity subcategory contains three functional activities within one subcategory -- Inventory Control Points, Proving Grounds, and R & D Centers. These three functional activities are best evaluated in separate subcategories.

- **Attributes.** ESSC found the need for new or substantially revised attributes. These new attributes address weaknesses in the set of attributes used for Army BRAC 91 and add to the Army's effort of measuring an installation's military value. These candidate attributes are -- mobilization and environmental carrying capacity.

- **Installation Data.** Various versions or editions of installation data are used during the Army BRAC process. This leads to data discrepancies, endless verification loops, and inaccuracies. The Army's BRAC process makes little consideration of the significant number of Army leased space holdings throughout the fifty states. These holdings should be considered and reconciled within the Army BRAC process.

- **Installation Rating Process.** A thorough review of decision analysis theories leads to the conclusion that the most appropriate decision analysis techniques are those in the category of Multiple Attribute Decision making, Compensatory Methods. Based on operational considerations, the specific software program in the preferred category is D-PAD.

SCOPE OF THE STUDY: This study examines the validity and effectiveness of the measures of merit, installation categories, attributes, installation data, and installation rating process used by the Army in BRAC 91.

STUDY OBJECTIVE: This study will assist the Base Realignment and Closure Office (BRACO) as it reviews the process used by the Army during the BRAC 91 round of base realignment and closure deliberations. The objective is to refine the process prior to the commencement of the next study group (BRAC 93) in October 1992.

BASIC APPROACH:

- **Stage One: Study Request and Scope.** The ESSC BRAC team met with members of the Army BRAC Office on 15 January 1992 to begin the study, further define the objectives of the study, discuss BRAC issues, and scope out various study problems.

- **Stage Two: Research and Data Collection.** After the 15 January 1992 study coordination meeting, ESSC gathered BRAC documents written and published by a wide array

of Federal, DOD, and Army organizations. ESSC also conducted phone conversations, video-teleconferences, on-site interviews, and issue workshops with a wide range of BRAC subject matter experts. These interviews allowed ESSC not only to collect baseline information and confirm basic BRAC issues, but also to identify other areas where BRAC methodology improvements could be made.

- **Stage Three: Assessment and Evaluation.** ESSC finalized its initial research and data collection phase with a preliminary BRAC issues assessment. This preliminary assessment focused on determining the key BRAC issues for further evaluation. ESSC returned to the Army BRAC Office on 30 March 1992 to provide them with a project update. The objective of this update was to obtain their approval of the key BRAC issues ESSC identified for further analysis.

- **Stage Four: Analysis and Synthesis.** The ESSC study team focused its attention on the key BRAC issues identified and approved by the study sponsor in stage three. Further in-depth research was conducted which provided the basis for analysis of each of the five issue areas.

- **Stage Five: Presentation.** The final stage of the study process was to provide a consolidated report containing our findings.

REASONS FOR PERFORMING THE STUDY: There are ongoing efforts to close or realign unneeded military bases as part of wide-ranging efforts to balance the U.S. budget, trim DOD, and reduce the operating costs of U.S. military forces. The most recent statutory effort by Congress to accomplish this task was the passage of *Public Law 101-510 (Defense Base Closure and Realignment Act of 1990)*. This law is an effort to ensure a timely, independent, and fair process for closing and realigning U.S. military installations. This statute requires the Secretary of Defense to submit a list of proposed military base closures and realignments to an independent Base Closure and Realignment Commission. This commission met in 1991 and will meet again in 1993 and 1995. The Army's 1991 submission received high marks for the clarity and logic of its methodology. However, the Army wishes to be proactive in improving its methodology to provide even better analysis for the upcoming 1993 submission.

STUDY SPONSOR: Department of the Army, Office of the Chief of Staff, Base Realignment and Closure Office, ATTN: DACS-DMB, Washington, DC 20310-0200

PERFORMING ORGANIZATION AND PRINCIPAL AUTHORS: The U.S. Army Corps of Engineers, Engineer Strategic Study Center performed the study. Mr. Stephen C. Reynolds was the Projector Director, Mr. Richard L. Taylor was the Project Team Leader and principal author, and Mr. Stephan E. Ryeczek was the Project Analyst and coauthor.

DTIC ACCESSION NUMBER: Pending

COMMENTS AND SUGGESTIONS MAY BE SENT TO: Commander, U.S. Army Corps of Engineers, Engineer Strategic Study Center, ATTN: CETEC-ES, Casey Building #2594, Fort Belvoir, VA 22060-5583

START AND COMPLETION DATES: Start Date: January 1992
Completion Date: July 1992

Engineer Strategic Studies Center	A REVIEW OF THE ARMY'S BRAC INSTALLATION ASSESSMENT METHODOLOGY	STUDY GIST CETEC-ES-R-92-5

PRINCIPAL FINDINGS:

- **Measures of Merit.** Mission essentiality and mission suitability are the highest priority measures of merit. Mission essentiality deserves the greater weight of the two because it measures those attributes deemed as the most important for accomplishing the installation's primary mission.

- **Installations & Categories.** The industrial category, commodity subcategory contains three functional activities within one subcategory -- Inventory Control Points, Proving Grounds, and R & D Centers. These three functional activities are best evaluated in separate subcategories.

- **Attributes.** ESSC found the need for new or substantially revised attributes. These new attributes address weaknesses in the set of attributes used for Army BRAC 91 and add to the Army's effort of measuring an installation's military value. These candidate attributes are -- mobilization and environmental carrying capacity.

- **Installation Data.** Various versions or editions of installation data are used during the Army BRAC process. This leads to data discrepancies, endless verification loops, and inaccuracies. The Army's BRAC process makes little consideration of the significant number of Army leased space holdings throughout the fifty states. These holdings should be considered and reconciled within the Army BRAC process.

- **Installation Rating Process.** A thorough review of decision analysis theories leads to the conclusion that the most appropriate decision analysis techniques are those in the category of Multiple Attribute Decision making, Compensatory Methods. Based on operational considerations, the specific software program in the preferred category is D-PAD.

SCOPE OF THE STUDY: This study examines the validity and effectiveness of the measures of merit, installation categories, attributes, installation data, and installation rating process used by the Army in BRAC 91.

STUDY OBJECTIVE: This study will assist the Base Realignment and Closure Office (BRACO) as it reviews the process used by the Army during the BRAC 91 round of base realignment and closure deliberations. The objective is to refine the process prior to the commencement of the next study group (BRAC 93) in October 1992.

BASIC APPROACH:

- **Stage One: Study Request and Scope.** The ESSC BRAC team met with members of the Army BRAC Office on 15 January 1992 to begin the study, further define the objectives of the study, discuss BRAC issues, and scope out various study problems.

- **Stage Two: Research and Data Collection.** After the 15 January 1992 study coordination meeting, ESSC gathered BRAC documents written and published by a wide array

of Federal, DOD, and Army organizations. ESSC also conducted phone conversations, video-teleconferences, on-site interviews, and issue workshops with a wide range of BRAC subject matter experts. These interviews allowed ESSC not only to collect baseline information and confirm basic BRAC issues, but also to identify other areas where BRAC methodology improvements could be made.

- **Stage Three: Assessment and Evaluation.** ESSC finalized its initial research and data collection phase with a preliminary BRAC issues assessment. This preliminary assessment focused on determining the key BRAC issues for further evaluation. ESSC returned to the Army BRAC Office on 30 March 1992 to provide them with a project update. The objective of this update was to obtain their approval of the key BRAC issues ESSC identified for further analysis.

- **Stage Four: Analysis and Synthesis.** The ESSC study team focused its attention on the key BRAC issues identified and approved by the study sponsor in stage three. Further in-depth research was conducted which provided the basis for analysis of each of the five issue areas.

- **Stage Five: Presentation.** The final stage of the study process was to provide a consolidated report containing our findings.

REASONS FOR PERFORMING THE STUDY: There are ongoing efforts to close or realign unneeded military bases as part of wide-ranging efforts to balance the U.S. budget, trim DOD, and reduce the operating costs of U.S. military forces. The most recent statutory effort by Congress to accomplish this task was the passage of *Public Law 101-510 (Defense Base Closure and Realignment Act of 1990)*. This law is an effort to ensure a timely, independent, and fair process for closing and realigning U.S. military installations. This statute requires the Secretary of Defense to submit a list of proposed military base closures and realignments to an independent Base Closure and Realignment Commission. This commission met in 1991 and will meet again in 1993 and 1995. The Army's 1991 submission received high marks for the clarity and logic of its methodology. However, the Army wishes to be proactive in improving its methodology to provide even better analysis for the upcoming 1993 submission.

STUDY SPONSOR: Department of the Army, Office of the Chief of Staff, Base Realignment and Closure Office, ATTN: DACS-DMB, Washington, DC 20310-0200

PERFORMING ORGANIZATION AND PRINCIPAL AUTHORS: The U.S. Army Corps of Engineers, Engineer Strategic Study Center performed the study. Mr. Stephen C. Reynolds was the Projector Director, Mr. Richard L. Taylor was the Project Team Leader and principal author, and Mr. Stephan E. Ryeczek was the Project Analyst and coauthor.

DTIC ACCESSION NUMBER: Pending

COMMENTS AND SUGGESTIONS MAY BE SENT TO: Commander, U.S. Army Corps of Engineers, Engineer Strategic Study Center, ATTN: CETEC-ES, Casey Building #2594, Fort Belvoir, VA 22060-5583

START AND COMPLETION DATES: Start Date: January 1992
Completion Date: July 1992

Engineer Strategic Studies Center	A REVIEW OF THE ARMY'S BRAC INSTALLATION ASSESSMENT METHODOLOGY	STUDY QIST CETEC-ES-R-92-5

PRINCIPAL FINDINGS:

- **Measures of Merit.** Mission essentiality and mission suitability are the highest priority measures of merit. Mission essentiality deserves the greater weight of the two because it measures those attributes deemed as the most important for accomplishing the installation's primary mission.

- **Installations & Categories.** The industrial category, commodity subcategory contains three functional activities within one subcategory -- Inventory Control Points, Proving Grounds, and R & D Centers. These three functional activities are best evaluated in separate subcategories.

- **Attributes.** ESSC found the need for new or substantially revised attributes. These new attributes address weaknesses in the set of attributes used for Army BRAC 91 and add to the Army's effort of measuring an installation's military value. These candidate attributes are -- mobilization and environmental carrying capacity.

- **Installation Data.** Various versions or editions of installation data are used during the Army BRAC process. This leads to data discrepancies, endless verification loops, and inaccuracies. The Army's BRAC process makes little consideration of the significant number of Army leased space holdings throughout the fifty states. These holdings should be considered and reconciled within the Army BRAC process.

- **Installation Rating Process.** A thorough review of decision analysis theories leads to the conclusion that the most appropriate decision analysis techniques are those in the category of Multiple Attribute Decision making, Compensatory Methods. Based on operational considerations, the specific software program in the preferred category is D-PAD.

SCOPE OF THE STUDY: This study examines the validity and effectiveness of the measures of merit, installation categories, attributes, installation data, and installation rating process used by the Army in BRAC 91.

STUDY OBJECTIVE: This study will assist the Base Realignment and Closure Office (BRACO) as it reviews the process used by the Army during the BRAC 91 round of base realignment and closure deliberations. The objective is to refine the process prior to the commencement of the next study group (BRAC 93) in October 1992.

BASIC APPROACH:

- **Stage One: Study Request and Scope.** The ESSC BRAC team met with members of the Army BRAC Office on 15 January 1992 to begin the study, further define the objectives of the study, discuss BRAC issues, and scope out various study problems.

- **Stage Two: Research and Data Collection.** After the 15 January 1992 study coordination meeting, ESSC gathered BRAC documents written and published by a wide array

of Federal, DOD, and Army organizations. ESSC also conducted phone conversations, video-teleconferences, on-site interviews, and issue workshops with a wide range of BRAC subject matter experts. These interviews allowed ESSC not only to collect baseline information and confirm basic BRAC issues, but also to identify other areas where BRAC methodology improvements could be made.

- **Stage Three: Assessment and Evaluation.** ESSC finalized its initial research and data collection phase with a preliminary BRAC issues assessment. This preliminary assessment focused on determining the key BRAC issues for further evaluation. ESSC returned to the Army BRAC Office on 30 March 1992 to provide them with a project update. The objective of this update was to obtain their approval of the key BRAC issues ESSC identified for further analysis.

- **Stage Four: Analysis and Synthesis.** The ESSC study team focused its attention on the key BRAC issues identified and approved by the study sponsor in stage three. Further in-depth research was conducted which provided the basis for analysis of each of the five issue areas.

- **Stage Five: Presentation.** The final stage of the study process was to provide a consolidated report containing our findings.

REASONS FOR PERFORMING THE STUDY: There are ongoing efforts to close or realign unneeded military bases as part of wide-ranging efforts to balance the U.S. budget, trim DOD, and reduce the operating costs of U.S. military forces. The most recent statutory effort by Congress to accomplish this task was the passage of *Public Law 101-510 (Defense Base Closure and Realignment Act of 1990)*. This law is an effort to ensure a timely, independent, and fair process for closing and realigning U.S. military installations. This statute requires the Secretary of Defense to submit a list of proposed military base closures and realignments to an independent Base Closure and Realignment Commission. This commission met in 1991 and will meet again in 1993 and 1995. The Army's 1991 submission received high marks for the clarity and logic of its methodology. However, the Army wishes to be proactive in improving its methodology to provide even better analysis for the upcoming 1993 submission.

STUDY SPONSOR: Department of the Army, Office of the Chief of Staff, Base Realignment and Closure Office, ATTN: DACS-DMB, Washington, DC 20310-0200

PERFORMING ORGANIZATION AND PRINCIPAL AUTHORS: The U.S. Army Corps of Engineers, Engineer Strategic Study Center performed the study. Mr. Stephen C. Reynolds was the Projector Director, Mr. Richard L. Taylor was the Project Team Leader and principal author, and Mr. Stephan E. Ryeczek was the Project Analyst and coauthor.

DTIC ACCESSION NUMBER: Pending

COMMENTS AND SUGGESTIONS MAY BE SENT TO: Commander, U.S. Army Corps of Engineers, Engineer Strategic Study Center, ATTN: CETEC-ES, Casey Building #2594, Fort Belvoir, VA 22060-5583

START AND COMPLETION DATES: Start Date: January 1992
Completion Date: July 1992

Engineer Strategic Studies Center	A REVIEW OF THE ARMY'S BRAC INSTALLATION ASSESSMENT METHODOLOGY	STUDY DIST CETEC-ES-R-92-5

PRINCIPAL FINDINGS:

- **Measures of Merit.** Mission essentiality and mission suitability are the highest priority measures of merit. Mission essentiality deserves the greater weight of the two because it measures those attributes deemed as the most important for accomplishing the installation's primary mission.

- **Installations & Categories.** The industrial category, commodity subcategory contains three functional activities within one subcategory -- Inventory Control Points, Proving Grounds, and R & D Centers. These three functional activities are best evaluated in separate subcategories.

- **Attributes.** ESSC found the need for new or substantially revised attributes. These new attributes address weaknesses in the set of attributes used for Army BRAC 91 and add to the Army's effort of measuring an installation's military value. These candidate attributes are -- mobilization and environmental carrying capacity.

- **Installation Data.** Various versions or editions of installation data are used during the Army BRAC process. This leads to data discrepancies, endless verification loops, and inaccuracies. The Army's BRAC process makes little consideration of the significant number of Army leased space holdings throughout the fifty states. These holdings should be considered and reconciled within the Army BRAC process.

- **Installation Rating Process.** A thorough review of decision analysis theories leads to the conclusion that the most appropriate decision analysis techniques are those in the category of Multiple Attribute Decision making, Compensatory Methods. Based on operational considerations, the specific software program in the preferred category is D-PAD.

SCOPE OF THE STUDY. This study examines the validity and effectiveness of the measures of merit, installation categories, attributes, installation data, and installation rating process used by the Army in BRAC 91.

STUDY OBJECTIVE: This study will assist the Base Realignment and Closure Office (BRACO) as it reviews the process used by the Army during the BRAC 91 round of base realignment and closure deliberations. The objective is to refine the process prior to the commencement of the next study group (BRAC 93) in October 1992.

BASIC APPROACH:

- **Stage One: Study Request and Scope.** The ESSC BRAC team met with members of the Army BRAC Office on 15 January 1992 to begin the study, further define the objectives of the study, discuss BRAC issues, and scope out various study problems.

- **Stage Two: Research and Data Collection.** After the 15 January 1992 study coordination meeting, ESSC gathered BRAC documents written and published by a wide array

of Federal, DOD, and Army organizations. ESSC also conducted phone conversations, video-teleconferences, on-site interviews, and issue workshops with a wide range of BRAC subject matter experts. These interviews allowed ESSC not only to collect baseline information and confirm basic BRAC issues, but also to identify other areas where BRAC methodology improvements could be made.

- **Stage Three: Assessment and Evaluation.** ESSC finalized its initial research and data collection phase with a preliminary BRAC issues assessment. This preliminary assessment focused on determining the key BRAC issues for further evaluation. ESSC returned to the Army BRAC Office on 30 March 1992 to provide them with a project update. The objective of this update was to obtain their approval of the key BRAC issues ESSC identified for further analysis.

- **Stage Four: Analysis and Synthesis.** The ESSC study team focused its attention on the key BRAC issues identified and approved by the study sponsor in stage three. Further in-depth research was conducted which provided the basis for analysis of each of the five issue areas.

- **Stage Five: Presentation.** The final stage of the study process was to provide a consolidated report containing our findings

REASONS FOR PERFORMING THE STUDY: There are ongoing efforts to close or realign unneeded military bases as part of wide-ranging efforts to balance the U.S. budget, trim DOD, and reduce the operating costs of U.S. military forces. The most recent statutory effort by Congress to accomplish this task was the passage of *Public Law 101-510 (Defense Base Closure and Realignment Act of 1990)*. This law is an effort to ensure a timely, independent, and fair process for closing and realigning U.S. military installations. This statute requires the Secretary of Defense to submit a list of proposed military base closures and realignments to an independent Base Closure and Realignment Commission. This commission met in 1991 and will meet again in 1993 and 1995. The Army's 1991 submission received high marks for the clarity and logic of its methodology. However, the Army wishes to be proactive in improving its methodology to provide even better analysis for the upcoming 1993 submission.

STUDY SPONSOR: Department of the Army, Office of the Chief of Staff, Base Realignment and Closure Office. ATTN: DACS-DMB, Washington, DC 20310-0200

PERFORMING ORGANIZATION AND PRINCIPAL AUTHORS: The U.S. Army Corps of Engineers, Engineer Strategic Study Center performed the study. Mr. Stephen C. Reynolds was the Projector Director, Mr. Richard L. Taylor was the Project Team Leader and principal author, and Mr. Stephan E. Ryeczek was the Project Analyst and coauthor.

DTIC ACCESSION NUMBER: Pending

COMMENTS AND SUGGESTIONS MAY BE SENT TO: Commander, U.S. Army Corps of Engineers, Engineer Strategic Study Center, ATTN: CETEC-ES, Casey Building #2594, Fort Belvoir, VA 22060-5583

START AND COMPLETION DATES: Start Date: January 1992
Completion Date: July 1992

Engineer Strategic Studies Center	A REVIEW OF THE ARMY'S BRAC INSTALLATION ASSESSMENT METHODOLOGY	STUDY QIST CETEC-ES-R-92-5

PRINCIPAL FINDINGS:

- **Measures of Merit.** Mission essentiality and mission suitability are the highest priority measures of merit. Mission essentiality deserves the greater weight of the two because it measures those attributes deemed as the most important for accomplishing the installation's primary mission.

- **Installations & Categories.** The industrial category, commodity subcategory contains three functional activities within one subcategory -- Inventory Control Points, Proving Grounds, and R & D Centers. These three functional activities are best evaluated in separate subcategories.

- **Attributes.** ESSC found the need for new or substantially revised attributes. These new attributes address weaknesses in the set of attributes used for Army BRAC 91 and add to the Army's effort of measuring an installation's military value. These candidate attributes are -- mobilization and environmental carrying capacity.

- **Installation Data.** Various versions or editions of installation data are used during the Army BRAC process. This leads to data discrepancies, endless verification loops, and inaccuracies. The Army's BRAC process makes little consideration of the significant number of Army leased space holdings throughout the fifty states. These holdings should be considered and reconciled within the Army BRAC process.

- **Installation Rating Process.** A thorough review of decision analysis theories leads to the conclusion that the most appropriate decision analysis techniques are those in the category of Multiple Attribute Decision making, Compensatory Methods. Based on operational considerations, the specific software program in the preferred category is D-PAD.

SCOPE OF THE STUDY: This study examines the validity and effectiveness of the measures of merit, installation categories, attributes, installation data, and installation rating process used by the Army in BRAC 91.

STUDY OBJECTIVE: This study will assist the Base Realignment and Closure Office (BRACO) as it reviews the process used by the Army during the BRAC 91 round of base realignment and closure deliberations. The objective is to refine the process prior to the commencement of the next study group (BRAC 93) in October 1992.

BASIC APPROACH:

- **Stage One: Study Request and Scope.** The ESSC BRAC team met with members of the Army BRAC Office on 15 January 1992 to begin the study, further define the objectives of the study, discuss BRAC issues, and scope out various study problems.

- **Stage Two: Research and Data Collection.** After the 15 January 1992 study coordination meeting, ESSC gathered BRAC documents written and published by a wide array

of Federal, DOD, and Army organizations. ESSC also conducted phone conversations, video-teleconferences, on-site interviews, and issue workshops with a wide range of BRAC subject matter experts. These interviews allowed ESSC not only to collect baseline information and confirm basic BRAC issues, but also to identify other areas where BRAC methodology improvements could be made.

- **Stage Three: Assessment and Evaluation.** ESSC finalized its initial research and data collection phase with a preliminary BRAC issues assessment. This preliminary assessment focused on determining the key BRAC issues for further evaluation. ESSC returned to the Army BRAC Office on 30 March 1992 to provide them with a project update. The objective of this update was to obtain their approval of the key BRAC issues ESSC identified for further analysis.

- **Stage Four: Analysis and Synthesis.** The ESSC study team focused its attention on the key BRAC issues identified and approved by the study sponsor in stage three. Further in-depth research was conducted which provided the basis for analysis of each of the five issue areas.

- **Stage Five: Presentation.** The final stage of the study process was to provide a consolidated report containing our findings.

REASONS FOR PERFORMING THE STUDY: There are ongoing efforts to close or realign unneeded military bases as part of wide-ranging efforts to balance the U.S. budget, trim DOD, and reduce the operating costs of U.S. military forces. The most recent statutory effort by Congress to accomplish this task was the passage of *Public Law 101-510 (Defense Base Closure and Realignment Act of 1990)*. This law is an effort to ensure a timely, independent, and fair process for closing and realigning U.S. military installations. This statute requires the Secretary of Defense to submit a list of proposed military base closures and realignments to an independent Base Closure and Realignment Commission. This commission met in 1991 and will meet again in 1993 and 1995. The Army's 1991 submission received high marks for the clarity and logic of its methodology. However, the Army wishes to be proactive in improving its methodology to provide even better analysis for the upcoming 1993 submission.

STUDY SPONSOR: Department of the Army, Office of the Chief of Staff, Base Realignment and Closure Office, ATTN: DACS-DMB, Washington, DC 20310-0200

PERFORMING ORGANIZATION AND PRINCIPAL AUTHORS: The U.S. Army Corps of Engineers, Engineer Strategic Study Center performed the study. Mr. Stephen C. Reynolds was the Projector Director, Mr. Richard L. Taylor was the Project Team Leader and principal author, and Mr. Stephan E. Ryeczek was the Project Analyst and coauthor.

DTIC ACCESSION NUMBER: Pending

COMMENTS AND SUGGESTIONS MAY BE SENT TO: Commander, U.S. Army Corps of Engineers, Engineer Strategic Study Center, ATTN: CETEC-ES, Casey Building #2594, Fort Belvoir, VA 22060-5583

START AND COMPLETION DATES: Start Date: January 1992
Completion Date: July 1992

Engineer Strategic Studies Center	A REVIEW OF THE ARMY'S BRAC INSTALLATION ASSESSMENT METHODOLOGY	STUDY GIST CETEC-ES-R-92-5

PRINCIPAL FINDINGS:

- **Measures of Merit.** Mission essentiality and mission suitability are the highest priority measures of merit. Mission essentiality deserves the greater weight of the two because it measures those attributes deemed as the most important for accomplishing the installation's primary mission.

- **Installations & Categories.** The industrial category, commodity subcategory contains three functional activities within one subcategory -- Inventory Control Points, Proving Grounds, and R & D Centers. These three functional activities are best evaluated in separate subcategories.

- **Attributes.** ESSC found the need for new or substantially revised attributes. These new attributes address weaknesses in the set of attributes used for Army BRAC 91 and add to the Army's effort of measuring an installation's military value. These candidate attributes are -- mobilization and environmental carrying capacity.

- **Installation Data.** Various versions or editions of installation data are used during the Army BRAC process. This leads to data discrepancies, endless verification loops, and inaccuracies. The Army's BRAC process makes little consideration of the significant number of Army leased space holdings throughout the fifty states. These holdings should be considered and reconciled within the Army BRAC process.

- **Installation Rating Process.** A thorough review of decision analysis theories leads to the conclusion that the most appropriate decision analysis techniques are those in the category of Multiple Attribute Decision making, Compensatory Methods. Based on operational considerations, the specific software program in the preferred category is D-PAD.

SCOPE OF THE STUDY: This study examines the validity and effectiveness of the measures of merit, installation categories, attributes, installation data, and installation rating process used by the Army in BRAC 91.

STUDY OBJECTIVE: This study will assist the Base Realignment and Closure Office (BRACO) as it reviews the process used by the Army during the BRAC 91 round of base realignment and closure deliberations. The objective is to refine the process prior to the commencement of the next study group (BRAC 93) in October 1992.

BASIC APPROACH:

- **Stage One: Study Request and Scope.** The ESSC BRAC team met with members of the Army BRAC Office on 15 January 1992 to begin the study, further define the objectives of the study, discuss BRAC issues, and scope out various study problems.

- **Stage Two: Research and Data Collection.** After the 15 January 1992 study coordination meeting, ESSC gathered BRAC documents written and published by a wide array

of Federal, DOD, and Army organizations. ESSC also conducted phone conversations, video-teleconferences, on-site interviews, and issue workshops with a wide range of BRAC subject matter experts. These interviews allowed ESSC not only to collect baseline information and confirm basic BRAC issues, but also to identify other areas where BRAC methodology improvements could be made.

- **Stage Three: Assessment and Evaluation.** ESSC finalized its initial research and data collection phase with a preliminary BRAC issues assessment. This preliminary assessment focused on determining the key BRAC issues for further evaluation. ESSC returned to the Army BRAC Office on 30 March 1992 to provide them with a project update. The objective of this update was to obtain their approval of the key BRAC issues ESSC identified for further analysis.

- **Stage Four: Analysis and Synthesis.** The ESSC study team focused its attention on the key BRAC issues identified and approved by the study sponsor in stage three. Further in-depth research was conducted which provided the basis for analysis of each of the five issue areas.

- **Stage Five: Presentation.** The final stage of the study process was to provide a consolidated report containing our findings.

REASONS FOR PERFORMING THE STUDY: There are ongoing efforts to close or realign unneeded military bases as part of wide-ranging efforts to balance the U.S. budget, trim DOD, and reduce the operating costs of U.S. military forces. The most recent statutory effort by Congress to accomplish this task was the passage of *Public Law 101-510 (Defense Base Closure and Realignment Act of 1990)*. This law is an effort to ensure a timely, independent, and fair process for closing and realigning U.S. military installations. This statute requires the Secretary of Defense to submit a list of proposed military base closures and realignments to an independent Base Closure and Realignment Commission. This commission met in 1991 and will meet again in 1993 and 1995. The Army's 1991 submission received high marks for the clarity and logic of its methodology. However, the Army wishes to be proactive in improving its methodology to provide even better analysis for the upcoming 1993 submission.

STUDY SPONSOR: Department of the Army, Office of the Chief of Staff, Base Realignment and Closure Office, ATTN: DACS-DMB, Washington, DC 20310-0200

PERFORMING ORGANIZATION AND PRINCIPAL AUTHORS: The U.S. Army Corps of Engineers, Engineer Strategic Study Center performed the study. Mr. Stephen C. Reynolds was the Projector Director, Mr. Richard L. Taylor was the Project Team Leader and principal author, and Mr. Stephan E. Ryeczek was the Project Analyst and coauthor.

DTIC ACCESSION NUMBER: Pending

COMMENTS AND SUGGESTIONS MAY BE SENT TO: Commander, U.S. Army Corps of Engineers, Engineer Strategic Study Center, ATTN: CETEC-ES, Casey Building #2594, Fort Belvoir, VA 22060-5583

START AND COMPLETION DATES: Start Date: January 1992
Completion Date: July 1992

Engineer Strategic Studies Center	A REVIEW OF THE ARMY'S BRAC INSTALLATION ASSESSMENT METHODOLOGY	STUDY GIST CETEC-ES-R-92-5

PRINCIPAL FINDINGS:

- **Measures of Merit.** Mission essentiality and mission suitability are the highest priority measures of merit. Mission essentiality deserves the greater weight of the two because it measures those attributes deemed as the most important for accomplishing the installation's primary mission.

- **Installations & Categories.** The industrial category, commodity subcategory contains three functional activities within one subcategory -- Inventory Control Points, Proving Grounds, and R & D Centers. These three functional activities are best evaluated in separate subcategories.

- **Attributes.** ESSC found the need for new or substantially revised attributes. These new attributes address weaknesses in the set of attributes used for Army BRAC 91 and add to the Army's effort of measuring an installation's military value. These candidate attributes are -- mobilization and environmental carrying capacity.

- **Installation Data.** Various versions or editions of installation data are used during the Army BRAC process. This leads to data discrepancies, endless verification loops, and inaccuracies. The Army's BRAC process makes little consideration of the significant number of Army leased space holdings throughout the fifty states. These holdings should be considered and reconciled within the Army BRAC process.

- **Installation Rating Process.** A thorough review of decision analysis theories leads to the conclusion that the most appropriate decision analysis techniques are those in the category of Multiple Attribute Decision making, Compensatory Methods. Based on operational considerations, the specific software program in the preferred category is D-PAD.

SCOPE OF THE STUDY: This study examines the validity and effectiveness of the measures of merit, installation categories, attributes, installation data, and installation rating process used by the Army in BRAC 91.

STUDY OBJECTIVE: This study will assist the Base Realignment and Closure Office (BRACO) as it reviews the process used by the Army during the BRAC 91 round of base realignment and closure deliberations. The objective is to refine the process prior to the commencement of the next study group (BRAC 93) in October 1992.

BASIC APPROACH:

- **Stage One: Study Request and Scope.** The ESSC BRAC team met with members of the Army BRAC Office on 15 January 1992 to begin the study, further define the objectives of the study, discuss BRAC issues, and scope out various study problems.

- **Stage Two: Research and Data Collection.** After the 15 January 1992 study coordination meeting, ESSC gathered BRAC documents written and published by a wide array

of Federal, DOD, and Army organizations. ESSC also conducted phone conversations, video-teleconferences, on-site interviews, and issue workshops with a wide range of BRAC subject matter experts. These interviews allowed ESSC not only to collect baseline information and confirm basic BRAC issues, but also to identify other areas where BRAC methodology improvements could be made.

- **Stage Three: Assessment and Evaluation.** ESSC finalized its initial research and data collection phase with a preliminary BRAC issues assessment. This preliminary assessment focused on determining the key BRAC issues for further evaluation. ESSC returned to the Army BRAC Office on 30 March 1992 to provide them with a project update. The objective of this update was to obtain their approval of the key BRAC issues ESSC identified for further analysis.

- **Stage Four: Analysis and Synthesis.** The ESSC study team focused its attention on the key BRAC issues identified and approved by the study sponsor in stage three. Further in-depth research was conducted which provided the basis for analysis of each of the five issue areas.

- **Stage Five: Presentation.** The final stage of the study process was to provide a consolidated report containing our findings.

REASONS FOR PERFORMING THE STUDY: There are ongoing efforts to close or realign unneeded military bases as part of wide-ranging efforts to balance the U.S. budget, trim DOD, and reduce the operating costs of U.S. military forces. The most recent statutory effort by Congress to accomplish this task was the passage of *Public Law 101-510 (Defense Base Closure and Realignment Act of 1990)*. This law is an effort to ensure a timely, independent, and fair process for closing and realigning U.S. military installations. This statute requires the Secretary of Defense to submit a list of proposed military base closures and realignments to an independent Base Closure and Realignment Commission. This commission met in 1991 and will meet again in 1993 and 1995. The Army's 1991 submission received high marks for the clarity and logic of its methodology. However, the Army wishes to be proactive in improving its methodology to provide even better analysis for the upcoming 1993 submission.

STUDY SPONSOR: Department of the Army, Office of the Chief of Staff, Base Realignment and Closure Office, ATTN: DACS-DMB, Washington, DC 20310-0200

PERFORMING ORGANIZATION AND PRINCIPAL AUTHORS: The U.S. Army Corps of Engineers, Engineer Strategic Study Center performed the study. Mr. Stephen C. Reynolds was the Projector Director, Mr. Richard L. Taylor was the Project Team Leader and principal author, and Mr. Stephan E. Ryeczek was the Project Analyst and coauthor.

DTIC ACCESSION NUMBER: Pending

COMMENTS AND SUGGESTIONS MAY BE SENT TO: Commander, U.S. Army Corps of Engineers, Engineer Strategic Study Center, ATTN: CETEC-ES, Casey Building #2594, Fort Belvoir, VA 22060-5583

START AND COMPLETION DATES: Start Date: January 1992
Completion Date: July 1992