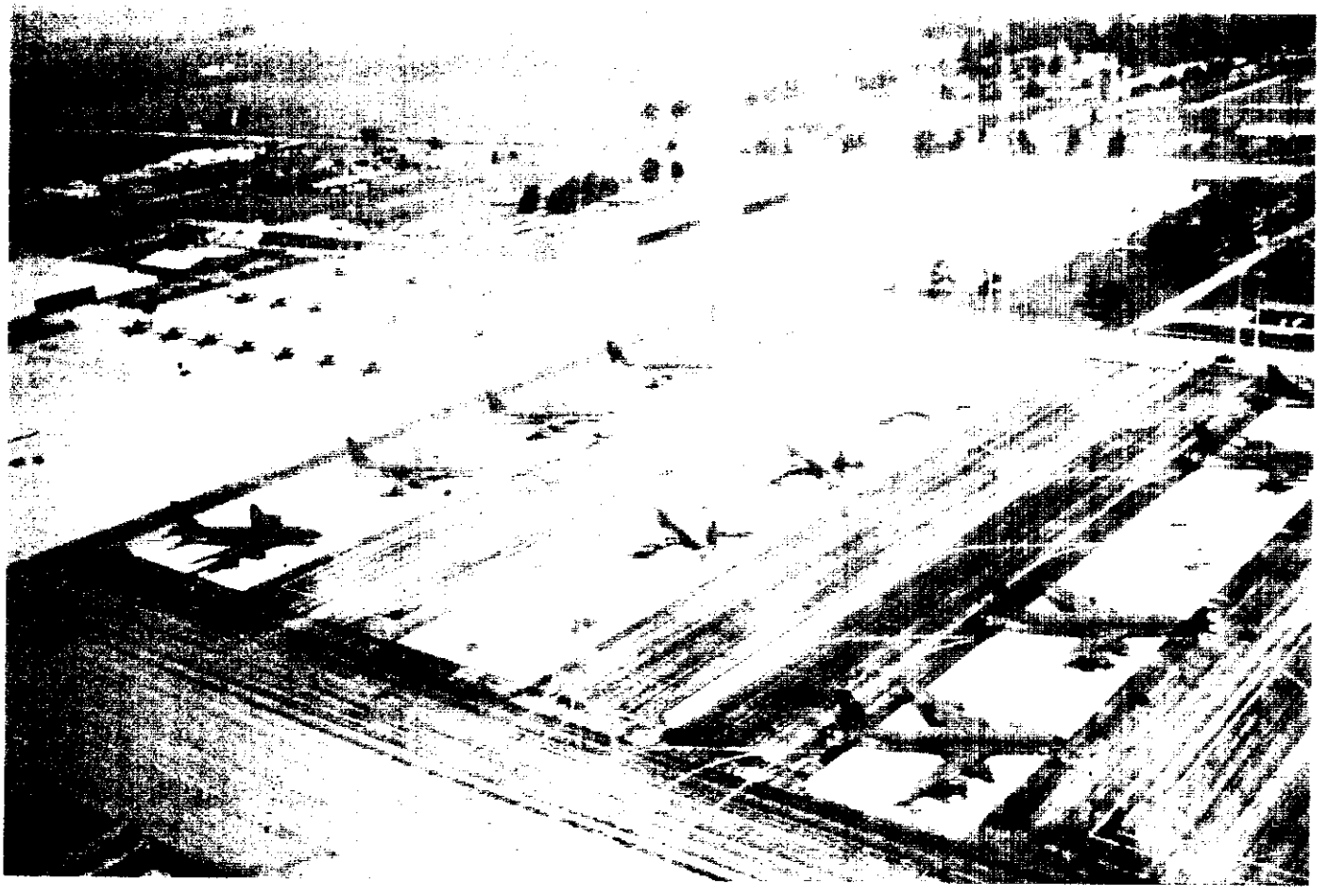


The Evaluation of Air Cargo Feasibility for Grissom Air Force Base

BRIAN E. DAVIS
PLAN 406
Bachelor of Urban Planning and Development

Dedicated to my mother and father who gave me the opportunity to pursue my dreams...

to my brother, who together in love, we have overcome...

to Diane, for your compassion and understanding

with special thanks to:

Dr Francis H. Parker, AICP, for your assistance and support in helping me realize the true meaning of academics

Dr. James A. Segedy, AICP, for your exemplary dedication to the teaching of young minds.

The Evaluation of Air Cargo Feasibility for Grissom Air Force Base

BRIAN E. DAVIS
April 10, 1995

Submitted to Thesis Committee members:
Dr. Francis Parker, AICP, chair
Dr. James A. Segedy, AICP
Dr. Minoo Amini

Thesis Research professors:
Elsie Harper-Anderson
Dr. Thomas W. Schurch

special assistance provided by:

Grissom Redevelopment Authority

United States Department of Defense

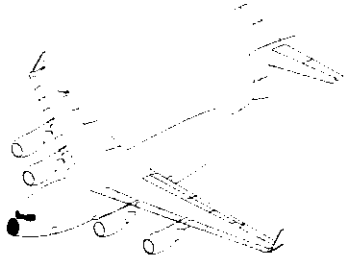
This thesis is to fulfill the requirements of PLAN 406 as part of the requirements for the Bachelor of Urban Planning and Development [BUPD].

Brian E. Davis

Entire document printed on recycled paper

Table of Contents

Chapter 1
The Problem and Its Setting



- Background
- Statement of the Problem
- Hypothesis
- Literary Support

Background

The United States Air Force established Grissom Air Force Base in 1942 as the Bunker Hill Naval Air Station (NAS). The USAF deactivated the Bunker Hill NAS in 1946, making land and facilities available to local businesses and agriculture interests. The USAF reactivated the site in 1954 as the Bunker Hill Air Force Base (AFB) and assigned it to the Tactical Air Command, an arm of the United States Air Force. The USAF later renamed Bunker Hill AFB as the Grissom Air Force Base in honor of the late lieutenant Colonel Virgil Ivan "Gus" Grissom, a native of Indiana and one of America's original seven astronauts.

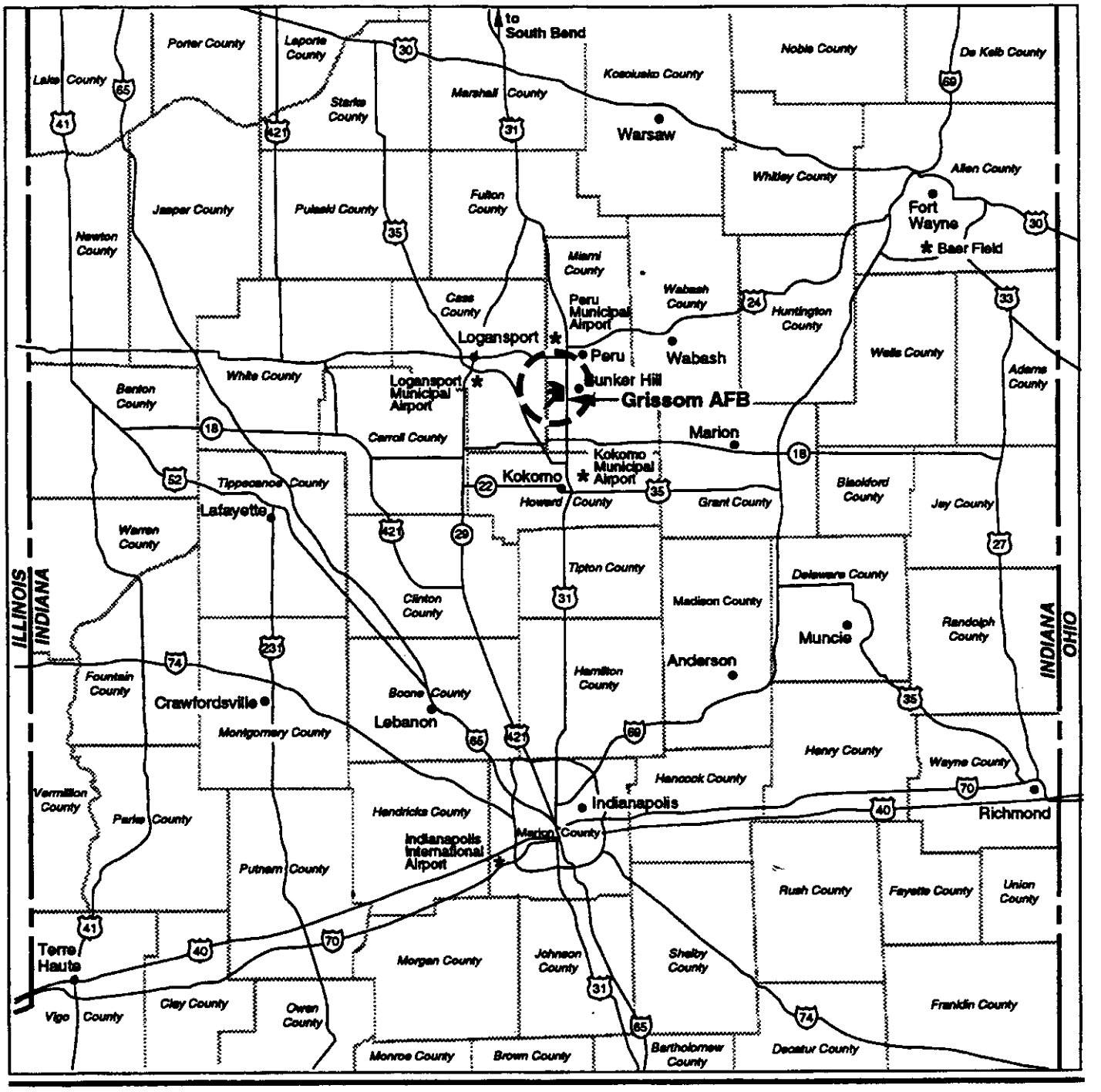
The base is situated on 2,686 acres of land to the immediate west of Bunker Hill and midway between Peru and Kokomo, Indiana along the U.S. 31 corridor (see map on next page). The airfield, including a 12,500-foot runway, bisects the base from southwest to northeast. The base consists of 154 buildings which are as follows:

Use	Total buildings on Base
Aviation	12
Community Service	9
Office	36
Recreational	7
Residential	18
Retail	9
Research and Development	4
Shop and Garage	20
Specialty Uses	7
Warehouse	32
Total	154

Table 1.1

Grissom Air Force Base offers 1,116 military family housing units and can accommodate an additional 1,044 unaccompanied officers and enlisted personnel in base dormitories. Grissom Air Force Base was home to seventeen permanent military units including the following:

- 434th Tactical Fighter Wing, Air Force Reserve
- 931st Air Refueling Group, Air Force Reserve
- 1915th Information Systems Squadron
- Detachment 26, 3rd Weather Wing
- Air Force Office of Special Investigations
- USAF Hospital
- Department of Defense Investigative Service
- Air Force Liaison Office for Civil Air Patrol
- Detachment 8, SAC Management Engineering Team
- American Red Cross
- 214th Field Training Detachment
- 71st TFW/DET-F
- Defense Property Disposal Office
- Resident Auditors Office
- AF Commissary
- 55 SRW
- Indiana Wing - Civil Air Patrol



EXPLANATION

- ★ Major Airports
- (70) Interstate Highway
- (31) U.S. Highway
- (18) State Highway
- County Boundary
- State Boundary

0 5 10 20 Miles

Regional Map

Figure 1.1

Source: United States Air Force

The functions of the base fall into four main categories: (1) air operations, (2) airfield support, (3) administrative, and (4) tenant organizations. The air operations component consisted of 42 KC-135 aircraft assigned to the 305th Air Refueling Wing; 6 EC-135 aircraft assigned to the airborne command post; and two operational squadrons with 18 A-10 aircraft assigned to the 434th Tactical Fighter Wing. The airfield support component consisted of the 12,500 x 200 runway, a 435,800 square yard main parking apron, 378,400 square yards in taxiways, and an aircraft refueling system which served 42 refueling points along the main parking apron. The administrative component consisted of the Combat Support Group and various tenant units which supported airfield operations. The tenant organizations component consisted of the seventeen (17) military tenants previously mentioned. Many of these functions ceased to exist in September, 1994, when Grissom Air Force Base was officially realigned.

The Defense Base Closure and Realignment Commission (DBCRC) is the independent agency charged with the task of recommending base realignment and closure. Since 1988, the Commission's efforts have led to the four waves of closing or realignment of over 120 military installations. Grissom Air Force Base was part of the second wave of realignments recommended by the DBCRC in 1990 (Public Law 101-510, Title XXIX). The DBCRC in presenting its findings to President Bush estimated a closure cost of $24.7 million. The Air Force will save an estimated $48.3 million annually as a result of the realignment.[1]

The Department of Defense completed the realignment of the base in September 1994. The DBCRC decided to retain Air Force Reserve (AFRES) 434th Refueling Wing (ARW) and the U.S. Army Reserves within a military cantonment area. The Air Force intends to dispose of those portions of Grissom Air Force Base which lie outside the military cantonment. Usually, the U.S. General Services Administration administers the disposal of Federal surplus land. However, the DBCRC required the administrator to delegate to the Secretary of Defense the authorities to utilize excess property, dispose of surplus property, and convey airport related property. The Secretary of Defense has since delegated this authority to the respective Service Secretaries (Secretary of the Department of Air Force in the case of Grissom AFB).

The Air Force goal is to dispose of up to 1,270 acres of Grissom AFB property through transfer and/or conveyance to other government agencies or private parties. The recipients of the property will ultimately determine the reuse of the property subject to the terms of transfer.

The Grissom Development Authority was the first group formed to redevelop Grissom AFB. Also, soon after the final announcement of base closure, former Congressman Jim Jontz led the establishment of the Grissom Community Transition Council. In October, 1991, these two groups merged to form the Grissom Community Redevelopment Authority (GCRA). Its membership was expanded to 36 members with representatives from Howard, Cass, and Miami Counties. In response to Bill 293, which establishes a three-member authority, the GCRA disbanded in 1993 and formed the Grissom Redevelopment Authority (GRA). The GRA (in its present form) intends to be the recipients of the Grissom property. Despite the many changes in structure, the GRA's mission has remained the same.

> *The mission of the Grissom Redevelopment Authority is to redevelop Grissom Air Force Base using information, intelligence, and integrity to restore and to enhance the economy of the Miami County and the region.*

---

[1] Defense Base and Realignment Commission *Message from the President of the United States* Washington, D.C. July 10,1991

Since its inception, the GRA has made Grissom AFB the subject of study for reuse options. In December 1993, RKG Associates, Inc. in association with The Pathfinders and Greiner, Inc completed the Grissom AFB Reuse Plan. This plan is divided into three main phases. The first phase provides a resource inventory and assessment. Resources include major buildings, utilities, airside facilities, natural and historic resources, hazardous wastes, government structure, economic base, real estate market, land use analysis, disposal procedure, and organizational options. The second phase focuses on economic development possibilities as well as two reuse options. The subordinate reuse option is the development of a community based aviation complex. This option retains much of the airfield support facilities as well as the areas previously used as housing military personnel. The capital costs for this option are considerably less than the preferred reuse option, despite maintaining higher operational costs over time. The preferred reuse plan focuses on the development of heavy and light industry in the housing areas and aviation support areas not within military cantonment. Though this option requires a significant amount of capital costs, the resulting development yields more positive benefits than the subordinate option.

Later that same year, RKG Associates, Inc in cooperation with HNTB Corporation completed the Transportation Plan for Grissom AFB. RKG analyzes the ability of existing transportation systems to support the preferred reuse option described in the Reuse Plan. Further, RKG presents recommendations for system improvements to meet the change in use.

In July 1994, Cargo Marketing Group (CMG) in association with Aviation Consulting Incorporated completed the Draft of the Air Cargo Hub and Commercial Aviation Potential Feasibility Study. This study is intended to investigate further the potential of air cargo as a viable reuse option. In CMG's estimation the probability of success for an all-cargo reuse is less than 35%. Though the finding appears to be unfavorable, **CMG believes that it is sufficient to warrant additional studies to explore further the air cargo potential at Grissom.**

In September 1994 the United States Air Force published the Final Environmental Impact Statement for Grissom AFB (EIS). This study is perhaps the most comprehensive of all prior studies. Contained therein are three reuse possibilities: a proposed action, a joint use alternative, and a no-action approach. It incorporates the findings from all preceding studies and does not duplicate any of the analyses. Therefore, the proposed action is very similar to the preferred option described in the Reuse Plan. Further, the joint use alternative is very similar to the subordinate option discussed in the Reuse Plan; and though the joint use alternative incorporates the findings from the air cargo feasibility study, the Air Force does not offer any further exploration as the authors of that study had suggested.

The inconclusiveness of the CMG study and the absence of additional analysis in the EIS suggests that the potential for air cargo operations has not been fully determined. The most questionable aspects of the CMG study revolve around the goals of the reuse activity; the methodology used in determining regional economic impact; and the comprehensiveness (or lack thereof) of the variables in the analysis. The CMG study addresses the immediate concern of replacing job loss. The possibility for regional economic growth beyond job replacement is not discussed. Further, the economic analysis is confined to the three county region of Cass, Howard, and Miami counties. The study examines neither the existing nor the potential regional linkages of transactions between aviation and other industries. The study also relies on the subjective judgement that existing air freight carriers, which are located within a 500 mile catchment area, would not locate operations at Grissom because of high costs. Further, the CMG study does not address the potential for new air freight carriers to locate within the region. These deficiencies suggest that the study needs to be reconsidered using a multidimensional approach that accounts for the larger context of regional planning.

Statement of the Problem

In this study, we revisit the potential for establishing an air cargo facility at Grissom Air Force Base. In doing so, we utilize innovative planning and development principles that more fully account for the local as well as regional ramifications. We divide the study into three (3) components. The first component consists of an evaluation of the Air Cargo Hub and Other Commercial Aviation Potential Feasibility Study completed for Grissom Redevelopment Authority (GRA) by the Cargo Marketing Group (CMG). The second component consists of a preferred methodology for reconsidering the feasibility of an air cargo reuse. The third component consists of the application of the preferred methodology to Grissom AFB. All three components revolve around one problem: the "ultimate question of feasibility" of establishing an air cargo facility. This problem can be divided into smaller problems called subproblems. Collectively the subproblems answer the ultimate question of feasibility. The definitions of the subproblems are as follows.

Subproblem 1 - There exists a regional market need for an air cargo facility in the Midwest region. Metropolitan areas within the region of influence, including Chicago-Milwaukee, Indianapolis, St. Louis, Columbus, Cincinnati, Kansas City, Des Moines, Minneapolis, Detroit, and Pittsburgh have a need for an air cargo facility to meet existing and projected air transportation needs. The Chicago metropolitan area is a specific example of an area which is in need of additional airport facilities serving the metropolitan market, as evident in the efforts to plan a third airport facility. Collectively, these markets are in need of a new air cargo facility.

Subproblem 2 - The type of base conversion necessary to establish an air cargo facility represents a feasible alternative. The development of an air cargo facility requires minimal (relative term) capital development costs. Further, operational costs, which had been denounced as too high, can be shared among regional benefactors. Those markets being directly served or realizing the potential of spin-off development would have a direct interest in maintaining air cargo operations at this location.

Subproblem 3 - The air cargo reuse will draw upon and reposition the regional economic base using the military installation as the fulcrum for a major alteration in the region's competitive position. Such reuse will induce secondary development and job growth in the supporting economic sectors of the region.

This research evaluates the CMG study based on its ability to accurately assess the subproblems. The preferred methodology, therefore, is built upon this evaluation. In preparing the preferred methodology, we assimilate literature on suggested approaches and case examples of similar feasibility studies in providing a more complete and accurate feasibility assessment. We then begin the process of applying the preferred method to Grissom AFB.

Hypothesis

The air cargo feasibility study conducted for Grissom AFB did not account for regional economic development factors which, had they been accounted, would have revealed more favorable results. Further, the study did not investigate regional, cooperative approaches to supporting such a facility. Thus, the CMG study did not employ sound planning and development principles which take into account regional resources. The integration of regional economic development analysis would reveal the true feasibility of an air cargo facility which seeks to serve the Midwest region.

Literary Support

Scholars and professionals from a variety of disciplines have been attracted to the issues of planning base redevelopment. Most noticeable in the base reuse literature is the merging of thoughts between planners and economists. From synthesis we conclude that proper military base reuse planning involves local and regional analysis to determine a reuse strategy which yields the greatest ratio of benefits to costs to the local and regional communities. Local analysis involves quantifying the benefits (e.g. direct tax revenue, utility revenue, land sales revenue, lease revenue, etc.) and the costs (e.g. capital costs, support development costs, environmental impact, etc.). Regional analysis involves quantifying the benefits (e.g. spin-off development, and service to regional industry, etc.) and costs (e.g. transportation, user fees, shared development costs, etc.). The most complete reuse strategy is a combination of the local and regional analysis in a usable format. Unquestionably, reuse options have varying degrees of local and regional implications. Therefore, an accurate assessment of feasibility for military base reuse depends upon the accuracy and comprehensiveness of the variables within the regional context. Highly reputable authors from the urban planning and economics professions have published work which reinforce this statement.

Edward Blakely and Subhrajit Guhathakurta presented the position paper *From Military Bases to New Industries and Stronger Regional Economies* before the American Collegiate Schools of Planning Conference in Phoenix, AZ in November, 1994. In this paper, the authors describe the importance of the military base to the regional economic network. Base closure creates an abrupt dislocation of the network of transactions, otherwise referred to as linkages, and can be potentially damaging to the whole regional economy. To counter these potential impacts, base reuse strategy should focus on new industries which utilize similar inputs from the regional economy. Further, the authors recognize a potential for regional economic development by establishing new linkages.

Most noteworthy, Blakely and Guhathakurta assert that planning base reuse has often lacked the larger context of regional planning. With the increase of the rate of base closure, base reuse planning has become uniform in an approach which does not accurately assess regional factors. The authors find it necessary to explore a more comprehensive methodology for base reuse planning. The authors describe this method as a multidimensional approach which attempts to fit established base linkages as well as create new regional economic linkages. The authors assert that this approach can be achieved by studying targeted growth industries which bear a relation to the former base and/or the proposed reuse. The authors believe that the multidimensional approach allows for the transition of defense bases and can lead to an even stronger regional economy.

H. Craig Davis in Regional Economic Impact Analysis and Project Evaluation outlines several quantitative analytical tools that are available in developing a feasibility analysis of reuse options. In 1973 Professor Wassily Leontief of Harvard University developed Input-Output (I-O) economics. A regional I-O model provides a still-life picture of the regional economy. Davis describes one such I-O model which analyzes the economic linkages (backward and forward) between the different sectors of the regional economy. In doing so, we form a matrix which classifies each sector as both a seller and buyer of goods from other sectors. The I-O matrix is useful in showing a snapshot of the transactions (measured by current dollars) being made within the regional economy. Further, the I-O model allows us to predict the effects throughout the economy of the changes in the final demand of any one sector. Davis' Input-Output model is especially useful in quantifying the regional benefits (positive or negative) created by changes in the economy of certain sectors.

Another quantitative tool, which extends the role of I-O model, is a measurement of the secondary benefits. Davis distinguishes secondary benefits from secondary effects. He argues that indirect effects created by a project in region A constructed with foregone expenditures in region B can not generally be considered to be

social benefits. The secondary effects in region A can be assumed to be the same as those foregone in region B unless the linkages in A are characterized by a significantly greater potential for capturing lower cost resources. Thus, the secondary effects of a air cargo hub could be positive benefits if and only if they offset the foregone expenditures in other employment regions within the airport's 500-mile catchment area.

One major departure from the CMG study is the absence of the Chicago metropolitan area as a potential beneficiary of reuse development at Grissom AFB. The CMG study acknowledges that the Chicago metropolitan area is within Grissom's region of influence. Despite this, the CMG study does not introduce the possibility of establishing new linkages to this region. This deficiency could have major impacts when considering the potential volume of interaction which could occur between the Grissom site and the Chicago-area markets. Though the employment levels in the Chicago-area would be essentially unaffected by base closure, the proximate location to Grissom suggests that new linkages for regional transactions could be established. This point is also important because of the recent interest in developing a third regional airport to offset the growth in air traffic at Chicago O'Hare Airport. A study conducted by TAMS Consultants and reported to the General Service Administration in 1993 confirmed that a supplemental airport was needed for the Chicago metropolitan area. For this reason, the analysis of Grissom AFB reuse should account for this potentially new linkage.

J.R. Charnetski in Space Location and Regional Development describes the regional application of a multiple criteria decision making model which is effective in resolving a multi-attribute decision problem. The model effectively aligns a host of attributes into a matrix format. The purpose of the matrix is to provide a computation technique to generate a true expected-value measure for a particular action. Qualitative data, such as social benefits/costs, as they appear do not fit neatly within this model. The model, however, allows one to assign numeric weights to qualitative data for purposes of analysis. The numeric weights, when assigned properly, provide validity to the conclusions of the researcher. The CMG study did not employ this technique; rather, CMG describes the "pros" and the "cons" in a tabular format. Charnetski's model provides an effective means by which qualitative data can be compared with quantitative data in multi-attribute decision-making problems.

Harry Richardson in Regional Economics describes regional accounting as a means to analyze quantitative data that affects entire regions. Regional accounting goes beyond the methods employed in the CMG study, by allowing analysis to take place at several different levels (e.g. state and region). Richardson's method reinforces Davis' theory of regional linkages and supports the identified need to analyze the Grissom AFB reuse proposal from a regional standpoint.

Catherine Hill, Sabina Deitrick, and Ann Makusen in *Converting the Military Industrial Economy* point out that social cost accounting is a key component to assessing the conversion feasibility. Social costs include those publicly owned resources which are employed to restore economic vitality to a converted base's regional economy. Hill, Deitrick, and Makusen stress the need for state conversion legislation. Though there are limited examples of successful state conversion legislation, the important point emerges: the state is one level at which cost and benefit accounting should occur. The CMG study based its accounting methodology within the context of the local community (more specifically, Miami County).

The greatest cost of base closure, environmental remediation, has been fully assumed by the United States Air Force pursuant to P.L. 150-526. Despite the assumed liability, the Grissom Redevelopment Authority may be delayed in redevelopment to allow for environmental cleanup procedures. Barry Steinberg in *The Hidden Costs of Closing Military Bases* points out that "cleanup...precludes the return of that property to productive uses until the restoration is completed." (Steinberg p. 5) Thus, the longer it takes for remediation, the more severe the economic impact. Additionally, reuse alternatives which require a substantial amount of capital

development further delay the return on property. Steinberg's concept of the "cost of time" is an important part of cost accounting and was not considered in the CMG study. A reuse strategy which utilizes existing resources, such as a cargo facility, could substantially reduce the time required for redevelopment and, consequently, reduce the cost of time.

Several reuse plans for related military base closures are case studies which employ a regional approach to assessing feasibility. The *World Trader* exalts the Redevelopment Authority of Pease Air Force Base, New Hampshire, (closed in 1991), for utilizing the base's strategic location in developing an international tradeport. Despite its setting in a mid-sized coast community, Pease International Tradeport utilizes the major north-south, interstate-95 corridor which links the facility with Boston, MA, 50 miles south. Recognizing the necessity for supporting highway transportation, Pease authorities are aiding the construction of a new, major east-west corridor which will serve mid-sized communities throughout New Hampshire. The redevelopment authorities of Pease AFB achieved more than job restoration; the authorities created an entirely new set of regional linkages. Pease resources have enhanced the region by promoting spin-off development. The success of the Pease redevelopment reinforces the need to consider regional linkages (both potential and existing) in base reuse planning.

In the Castle Air Force Base Preliminary Reuse Plan EDAW Inc. outlines as primary goals: (1) to achieve of economic activity that meets or exceeds levels prior to base closure and (2) to assign priority to activities which expand the region's economic base, generating economic multiplier benefits and offering the potential for growth. EDAW recognizes the potential for spin-off development. Though the EDAW study does not recommend an air cargo facility as a viable reuse option, the analysis accounts for more regional variables than the Cargo Marketing Group's study of Grissom AFB. EDAW recognizes the importance of surface transportation in creating the regional linkages necessary in supporting an air cargo hub; and with many of the adjacent highway systems at or above capacity and little room for new development, such a reuse at Castle AFB is unfeasible.

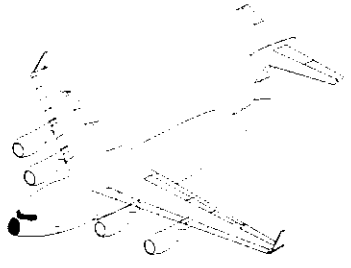
Dennis Whittington in *Joining the Jet Set* describes the successful planning of the North Carolina Global Transpark, to be built adjacent to the Kinston regional jet port. Though this facility is not a base conversion project, the approach of using regional resources in its plan development is noteworthy. The development is larger than Kinston, a small town of 20,000 people, and strategically situated among a collection of mid-sized cities. Developers of the site recognize the potential to create new regional linkages among these communities. In July, 1993, the North Carolina legislature allocated up to $7.5 million to help a dozen counties in the eastern part of the state upgrade their infrastructure in preparation of the development.[1] By targeting such a large area, public policy analysts are well aware of the larger, regional potential for economic development.

In summary, significant literary arguments justify the need for reconsidering a new approach to assessing the feasibility of reusing Grissom AFB as an air cargo hub. The Cargo Marketing Group study is deficient in assessing the broader context of regional planning, and failed offer cost and benefit accounting on a broader, regional level. Focusing solely on the short-run goals of job replacement, CMG does not assess the potential for new regional economic development resulting from the creation of new economic linkages. We must re-evaluation the CMG study by employing quantitative regional impact analysis and drawing upon a larger, more comprehensive set of variables. This comprehensive approach makes the feasibility assessment more accurate and useful to reuse planners and policy administrators.

---

[1] Whittington, Dennis. *Joining the Jet Set*. Planning. September 1993. p. 22.

Chapter 2
Research Bounds and Assumptions



- Research Assumptions
- Methodology for Evaluating the CMG Study
- Methodology for Generating the Proposed Feasibility Study
- Methodology for the Application of the Proposed Feasibility Study
- Major Legal Parameters

Research Assumptions

General Bounds

This study has two objectives: (1) evaluation of the methodology used in generating a feasibility assessment; and (2) the generation and application of a proposed feasibility study. The evaluation component of this research is based on the Air Cargo Hub and Other Commercial Aviation Potential Feasibility Study completed by the Cargo Marketing Group (CMG) for the Grissom Redevelopment Authority . We derive the proposed feasibility study component from a variety of written sources and personal interjections.

The goal of the research is to offer a new methodology for similar feasibility studies in base reuse planning. This research is not intended to supersede previous work completed for the GRA. This study builds upon all secondary data already produced for Grissom AFB. In doing so we consider additional information that otherwise has been excluded in prior studies. This study is intended to benefit base reuse planners by offering new methods and tools inherent to the profession.

We do not analyze administrative decisions regarding base reuse planning at Grissom AFB. Feasibility assessments are a guide and not a prescription for action.

Assumptions

The bounds of our research depends upon important assumptions regarding the definitions of two geographic regions: the catchment area and employment region. The definitions of these regions are important limits in the analysis that follows. The most accurate definitions require a complete market analysis. We may, however, construct a more simplified definition of these areas. We use the following reasoning to establish these assumptions.

Cargo Marketing Group (CMG) in preparing the feasibility assessment define only the catchment area. The catchment area is defined as the geographic region within which an airport can expect to attract traffic originating or terminating locations within the area. In defining the catchment area for Grissom, CMG evaluates an immediate area within 100 radius miles, an intermediate area within 250 radius miles, and a more expansive area within 500 radius miles. CMG offers no definition beyond this explanation.

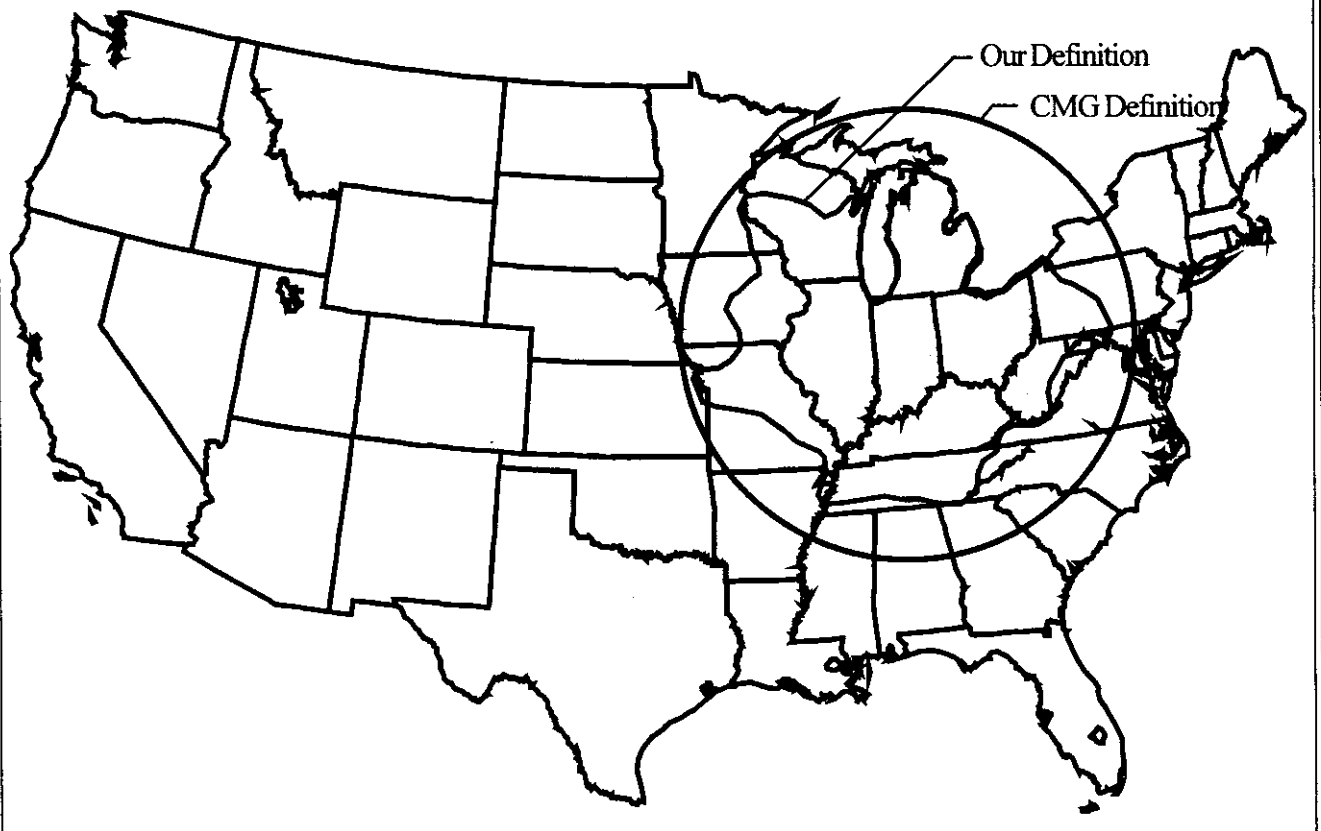
Given that travel time is dictated by the level of service of the transportation system, a circular catchment area seems unrealistic. The determination of this area should be based on several key elements. First, air cargo relies on an industry average of two-day service. We assume that the assembly and distribution functions of air cargo may be afforded equal time. Thus, one day may be designated for the delivery of goods upon arriving at Grissom; and, one day may be designated for the assembly of goods to be exported through Grissom. The ground transportation system, thus, determines the catchment area based on the ability to serve an area within one day.

Secondly, we may calculate a maximum obtainable distance extending from Grissom for one day of ground travel time. This distance is limited by the type and level of service of the roadway, congestion, and maximum allowable hours of operation. Maximum obtainable distance may require a significant amount of calculation. Given the type of analysis that is to follow, a quick method is sufficient in gaining a general understanding. The Institute of Transportation Engineers classifies roadways in the Functional Route Classification. The classifications are based on function, typical percent of street mileage, spacing, land access, minimum roadway spacing, parking restrictions, and speed limit. Trucking may occur only on state or federal designated routes. These routes are classified as either freeway/expressway or primary arterial (in some cases secondary arterial). Aver-

age speed limits in these classifications are 50-60 and 35-45 respectively.[1] For this analysis, we assume that the average speed on interstate classified roadways is 50 Mph. This assumption is based on an average of the speed limits as well as a discount for congestion and stops. For similar reasons, we may assume that the average speed on primary arterial classified roadways is 35 Mph.

Maximum hours of operation is an important limiting factor to the determination of distance. The Interstate Commerce Commission has the authority to investigate and report on the need for Federal regulation of maximum hours of service of employees of all motor carriers. Pursuant to 49 CFR Chapter III §395, a motor carrier shall not operate the vehicle: for more than 10 hours following 8 consecutive hours off duty; or for any period after having been on duty 15 hours following 8 consecutive hours off duty. On duty time includes all time spent at transshipment points, areas of dispatch, inspection time, or driving time. Off duty time includes the time during which the driver is not engaged in performing work responsibilities, such as breaks and sleeper berths (a term meaning the time spent in the sleeper accommodations of the truck).

Comparison of Catchment Areas
for Grissom AFB, Indiana



Source: Atlas GIS® Mapping System

Figure 2.1

[1] Stover, Virgil. Transportation and Land Development. ITE. 1988. pp. 80-87. Figures have been updated to reflect changes in speed limit laws.

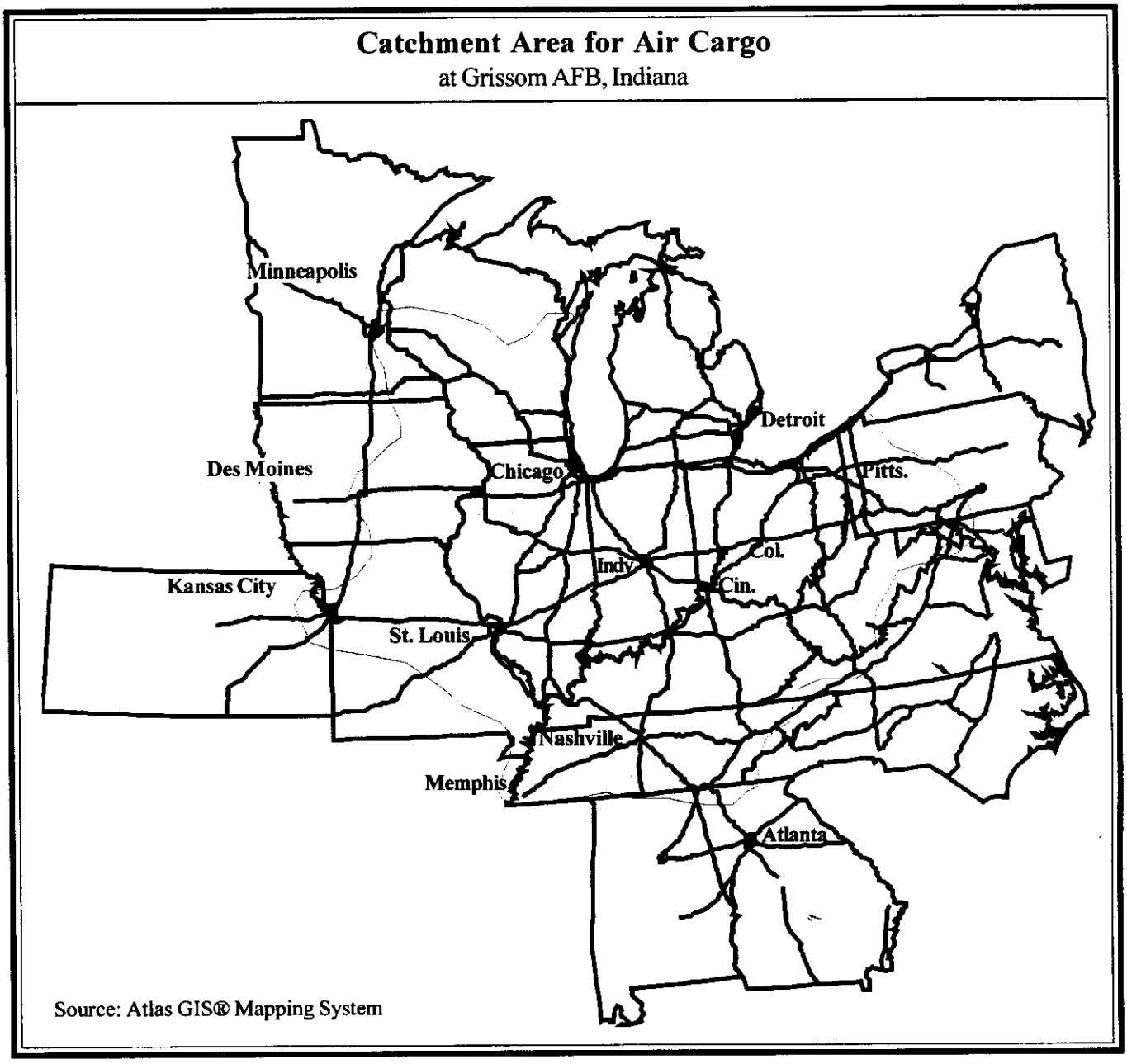


Figure 2.2

Though a driver may operate a vehicle at an average maximum of 14 hours per day, time demands for other functions make such operation impossible. Motor carrier drivers are required to chart on and off duty, driving and non-driving time on a *graph grid*. Examples of such grids show that actual driving time averages 10 hours for a 24-hour period.[1] We may find distance by multiplying the maximum hours of service with the average speed for certain roadways. While maximum hours is constant, the average speed is variable. Distance calculations will be greater for those areas served by interstate transportation corridors. Conversely, distance calculations will be smaller for remote areas. The end result is a catchment area that is more like a web as opposed to a circle. Figure 2.1 illustrates the comparison of this catchment area to that which was defined by CMG.

[1] 49 CFR Chapter III §395.8(k)(2).

The major differences between the two areas is that our definition of the catchment area does not extend as far east as that defined by CMG. Transportation barriers and limited east-west interstate access are the primary reasons for this difference.

Figure 2.2 illustrates a close view of the catchment area as defined for this study. The area includes the major gateways of Kansas City, St. Louis, Chicago, Indianapolis, Columbus, Pittsburgh, Detroit, Nashville, and Cincinnati. The area does not include the "borderline" gateway at Atlanta.

The definition of the catchment area is necessary for the analysis which is to follow. The method used in defining our catchment area is sufficient, yet not exhaustive. A more detailed investigation may be desired; however, doing so might prove to be cost ineffective.

The definition of the employment region is necessary for some of the analysis in this study. CMG did not define the term employment region nor estimate the size and area of such. The employment region is defined as the potential size of the commuting shed for a given industry. The average tolerable commuting time is said to be 45 minutes. We apply this travel time in much the same manner as the catchment area to calculate distance from Grissom. The resulting area is roughly an eight-county region consisting of Miami, Cass, and Howard, Wabash, Grant, Tipton, Carroll, and Fulton counties, as shown in figure 2.3 below. Much of the workforce available to Grissom are located or will locate within this region. The employment region is the area that will be directly impacted by redevelopment at Grissom.

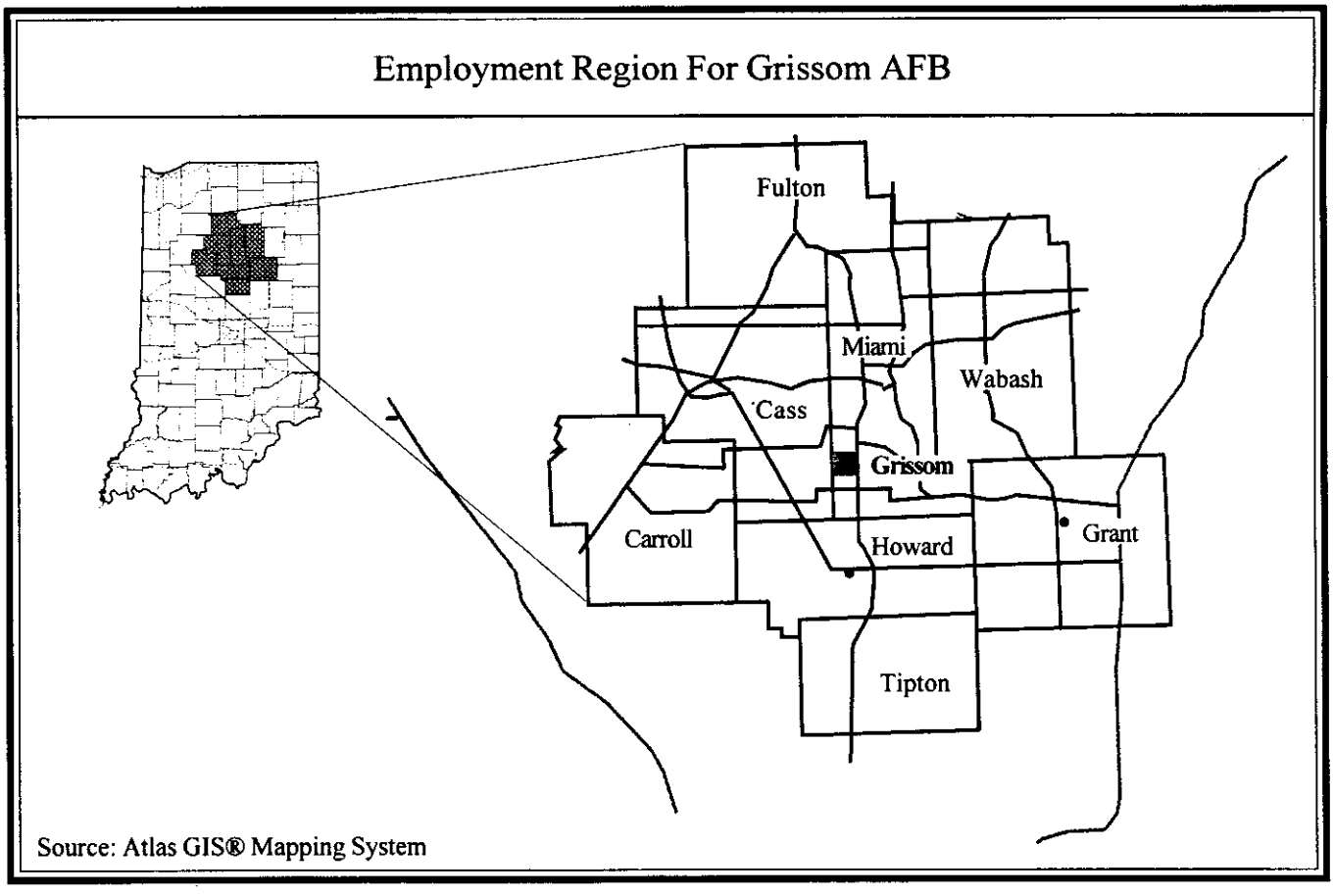


Figure 2.3

The labor supply area is not synonymous with the employment region. Labor supply contains two components. One component consists of the endogenous labor supply; that is, the supply of labor that currently exists within the employment region. The second component is the exogenous supply; that is, the supply of labor that exists outside the employment region. Given the high level of skill associated with aviation, the labor supply for aviation is national (and maybe even international). Grissom can draw from an endogenous labor supply or attract exogenous labor to locate in the employment region. An employment profile of the employment region will give an indication as to the amount of aviation-skilled endogenous labor as well as the need to import exogenous labor.

Methodology for Evaluating the CMG Study Method

This study evaluates both the subfactors and the computation method of the CMG Study. We evaluate the subfactors based on the ability to address the three subproblems. We assess the computation method based on the ability to remain objective in tabulating the subproblem values. Both elements are important in evaluating the accuracy of the feasibility study.

Subfactors

The Cargo Marketing Group study contains subfactors in the form of summary arguments, an airport cargo selection criteria table, and a table of strengths and weaknesses for air cargo at Grissom AFB. We list the subfactors in a table with the subfactor name and the derived location. We then group the subfactors according to its related subproblem.

We describe the function of the subfactors in answering the respective subproblem. We then point out issues which have not been addressed. These issues are pertinent in addressing the subproblem. We provide literary and supporting argument indicating the necessity of these issues.

Calculation Method

The Cargo Marketing Group does not provide a quantitative method for calculating a sum over the range of subfactors. CMG uses a subjective methodology in reaching a conclusion as to the feasibility of air cargo at Grissom AFB. We first criticize the subjective method for its lack of precision and objectivity. We then criticize the conclusions that were generated based on a limited amount of data and regional analysis. In offering this criticism, we describe areas where more objective techniques should have been employed and discuss several documented approaches to producing more accurate results.

The evaluation of the CMG study helps establish the basis for presenting the preferred methodology. We rearrange the subfactors in the CMG study into a tabular format to provide easy comparison with the tables in the preferred methodology. In evaluating both the subfactors and the calculation method, we go beyond simple criticism by offering suggested improvements. We construct the preferred methodology upon these suggested improvements.

Methodology for Generating the Preferred Method

We intend to eliminate biases by generating a quantitative method for facilitating decision-making. We utilizes a list of subfactors that are necessary for addressing the three subproblems and ultimately the feasibility of an air cargo reuse. The computation method for summarizing the set of subfactors also serves to eliminate bias.

Subfactors

The comprehensiveness of the data is crucial to this study. We group related data into subfactors. Each subfactor plays an important role in addressing one of the three subproblems. Several sources provide suggested subfactors for consideration. We obtained related feasibility studies concerning base closure and extracted relevant subfactors. Regional economic literature provides suggested areas or subfactors which should be considered for regional economic development projects such as air cargo development. We extracted locational criteria for airport site selection were extracted from studies completed for the proposed Peotone airport for Chicago. We extracted general locational criteria for airport site selection were extracted from FAA materials. We added perceived relevant subfactors that were not included in any of the aforementioned sources. We list all subfactors in a tabular format.

A two-step review process of the subfactors then followed. First, we consulted with colleagues and the thesis chairman. Revisions were made according to these discussions. We presented a revised list to James Tidd, GRA Deputy Director for his review. Upon the recommendations of Mr. Tidd, we generated a final list of subfactors. The final list of the subfactors represents the data necessary for reevaluating the feasibility of an air cargo reuse. A complete list and detailed explanations are shown in Chapter 5, the Preferred Method.

Calculation Method

As part of developing the preferred method, we establish a calculation method for the subfactors. The calculation method must meet several criteria in order to be acceptable for this study. First, the calculation method must eliminate bias in decision-making. Secondly, the calculation method must account for the significance of the subfactors. Thirdly, we must arrive at an interpretable result.

We chose the Multiple Criteria Decision Analysis (MCDA) model because of its effectiveness in providing a true expected-value measure for a particular action. In the case of this study, the MCDA allows us to compute a set of subfactors in determining an expected measure of feasibility. The MCDA relies on quantitative analysis of assigned data values. The quantitative approach serves to eliminate bias and subjectivity. We convert our responses to the subfactors into data values. The data value range lies on either side of zero, with equal increments on either side. A typical range of data values is -10 (lowest) to 10 (highest). The data value (0) means that the subfactor is indifferent. Level of detail is variable depending upon the user. The more increments, generally, the more detailed is the analysis; however, more increments require more detailed information about the subfactor.

Each subfactor plays a different role in determining the feasibility. Costs, for example, may have a greater significance than certain legal requirements. We account for the variance in significance by assigning weights to the data values. This approach is supported by Charnetski[1]; however, as Charnetski warns, the ordinal ranking of weights can be difficult. The weight of a particular subfactor represents its significance in the model.

---

[1] Chatterji, Manas. Editor. Space Location and Regional Development.

The weights used in reuse studies should not be uniform across all similar studies. Each base reuse effort has its own characteristics. The developers of Peace AFB, for example, were most concerned with state economic development. Had the developers of Pease AFB utilized the MCDA, the weights would reflect the emphasis on state economic development. In this study, we assign weights to the MCDA model by consulting the representatives of the GRA. In doing so we consulted with the representative of those who are affected by the reuse.

The product of the MCDA is in the form of a number (be it positive or negative). The resulting number can be measured against the data value range. A negative result represents a reuse that is unfeasible. Conversely, a positive result represents a reuse that is feasible. The data scale is helpful in displaying the degree to which the reuse is feasible or unfeasible. For example, a result of .1 represents a "feasible" outcome; however, the result lies relatively close to the point of indifference (0).

The following section describes the application of these data in providing a new air cargo feasibility assessment for Grissom AFB.

Methodology for Applying the Preferred Method

Because of time and cost designs, we can not fully respond to all subfactors in the MCDA model. We may, however, respond to those subfactors which bear the most weight in the model. We, therefore, respond to subfactor sets which have relatively high weights. This approach allows us to give an indication of the feasibility without having to conduct a complete analysis. We must bear in mind that the purpose of the application is the testing of the method and not necessarily the actual result of the feasibility study.

Subfactors

Chapter 6, the Application of the Preferred Method, illustrates the priority subfactor sets. Collectively these sets comprise greater than 50% of the total weight of the model. We respond to all subfactors with each priority set. We do not enumerate the responses to these subfactors as in Chapter 5. This approach ensures continuity and helps us understand the relationships among the various subfactors.

Much of the data used for this research are secondary data. Sections which utilizes primary data are the analysis of the pharmaceutical/medical supply industry as a target industry, and the matching of occupational groupings. Another section which *could* use primary data is the Input-Output model. In this situation, we substituted secondary data for primary data due to the significant cost associated with obtaining primary data from all manufacturers within the region of influence. This substitution does not detract from the validity of the Input-Output model. (Davis p. 67) Secondary data includes statistical abstracts, regional economic development models, and supporting studies relevant to the analysis. Primary data includes personal interviews, telephone interviews, and written correspondence.

We derive much of the data relating to costs and revenues from estimates made by HNTB and RKG. These firms were working in tandem on a feasibility study at the time our study was in development.

Calculation Method

The Multiple Criteria Decision Analysis (MCDA) model is the method used in calculating the subfactor list. The MCDA model is established in the Preferred Method chapter of this study. The answers to the subfactors are converted to data values based on a calibrated scale from -10 to 10.

The weights were assigned to the subfactors based on the consensus of the Grissom Redevelopment Authority. The weights represent the significance of one subfactor, in terms of percentage of the total (100%), in answering the ultimate question of feasibility. The process of assigning weights to all subfactors is difficult and sometimes nearly impossible unless we use the following simplified method.

We first asked the GRA to estimate the significance of the three subproblems. We then asked the GRA to estimate the significance of the sets of subfactors within each subproblem. Lastly, the GRA estimated the significance of each subfactor within each set. When the three levels of significance are multiplied for any given subfactor, the product represents the actual significance. This method is easier to administrate and expedites the process of assigning weights.

A more detailed methodology and data sources are provided throughout Chapter 6. Important, though, is the understanding of the general approach that we intend to follow.

Major Legal Parameters

Conveyance of Federal surplus land to a local agency generally falls under the authority of the General Services Administration (GSA). However, upon recommendation of the DBCRC, the GSA has delegated this authority to the Secretary of Defense. The Secretary has delegated this authority to the respective secretaries of the armed services. In surplus property conveyance the Air Force must comply with federal property disposal laws (CFR 101-47). The Air Force has also issued supplemental regulations (as permitted by law) contained in 41 CFR 132. One important provision of the supplemental regulations requires the Air Force to consult with the State Governor and heads of local governments for the purposes of considering any plan for the use of surplus property by the local community.

The Surplus Property Act of 1944 (50 USC, App 1622(g)), authorizes the disposal of surplus real property and related personal property for airport purposes and requires the FAA to certify that the property is necessary, suitable, and desirable for an airport. In making this determination the FAA may refer to the National Plan of Integrated Airport Systems (1994), FAA Strategic Plan (1994), and other studies as may be required by the FAA.

Amendments to the National Defense Authorization Act of 1994 authorizes conveyances of Federal surplus property via Public Benefit Transfer (PBT) to local redevelopment authorities at no or lower than market value price when a public benefit will result. The local recipient is required to utilize the property for the specified use (e.g. public airport); further, the local recipient must comply with FAA mandated planning procedures prior to a PBT. The FAA requires that an airport layout plan be submitted for review. Also, a master plan must be prepared. The FAA has the legal authority to authorize the PBT based on the determination that the airport is "essential, suitable, and desirable". Once property is conveyed via PBT, removing the property from the specified use is arduous and improbable.

Prior to the transfer of any property at Grissom AFB, the Air Force must comply with the provisions of CERCLA §120(h). CERCLA §120(h) requires that, before property can be transferred from federal ownership, the United States must provide notice of specific hazardous substance activities and conditions on the property and, when there have been any such hazardous substance activities, include in the deed a covenant warranting that all remedial action necessary to protect human health and the environment with respect to any hazardous substance remaining on the property has been taken before the date of such transfer.

Provisions of the National Environmental Policy Act of 1969 (NEPA) shall apply to actions of the Department of Defense as described in part (2)(a) of the Defense Base Closure and Realignment Act of 1990. Under this part the Department of Defense shall apply NEPA during the process of property disposal and during the process of relocating functions from a military installation being closed or realigned to another military installation.

Certain activities inherent in the development of an air cargo facility constitute actions that fall under the federal regulatory statutes. Airport development or expansion constitutes a federal action which falls under the authority of the Federal Aviation Administration (FAA). Acts and legislative action regarding the FAA and airline deregulation are important inclusions for the analysis continued in this study.

The Airline Deregulation Act of 1978 declared a policy of intent to encourage secondary airports to service larger metropolitan areas. To this end, the Act intended to eliminate barriers to entry for new air carriers and

expansion of existing carriers at airports not currently being served by the particular airline.[1]

In 1984 the Civil Aeronautics Board Sunset Act helped to complete a full transition of airline deregulation. The House Committee on Public Works and Transportation holds the opinion that the continued success of deregulation of the airline industry depends on the ability to preserve freedom of entry for the airline industry." (United States House of Representatives Subcommittee on Aviation, p.1 Sept. 10, 1985)

The Federal Aviation Administration has determined that four airports, La Guardia, Kennedy, O'Hare, and Washington National be classified as high density. The air traffic control (ATC) system at these airports can not accommodate all the operations that airlines would like to conduct. The FAA, therefore, places limits on hourly operations at these airports by issuing "time slots".

The Civil Aeronautics Board (CAB) under regulated international flight scheduling allows international certificates to be transferred unless they are inconsistent with antitrust principles or would have raised other serious public interest concerns. CAB awards international certificates for new routes pursuant to the policy of making the determination as to the most qualified carrier.

The Airport and Airway Trust Fund, first established in 1970, is supported by a variety of taxes on aviation users, including a 10% tax on domestic airline tickets, and airline fuel taxes. The Trust Fund operates four major programs: The Airport Improvement Program (AIP), which makes funding available to local airport operators for airport development and noise control; the Facilities and Equipment Program (F & E) which purchases equipment for the FAA's air traffic control (ATC), navigation, and aviation communication systems; the Research, Engineering and Development Program (R & D, under the jurisdiction of Committee on Science and Technology), which provides funding for the FAA to conduct Aeronautical research and development; and the Operations and Maintenance Program (O & M) which funds part of the expense of operating and maintaining the FAA's ATC system. Throughout the 1970s and 1980s the Airport Trust Fund had built a surplus, and by 1990, the surplus had reached $7.6 billion.[2] Legislation in 1990 was partly aimed at mobilizing these funds.

Section 2906 of the Defense Base Closure and Realignment Act establishes the "Account" for receiving proceeds from property transfers and distributing such funds for purposes of assisting realignment. Section 2906 of said Act authorizes the Secretary of Defense to utilize the Account for providing economic adjustment assistance to communities located near a realigned military base; community planning assistance; carry out environmental remediation procedures; and provide placement assistance to displaced civilian employees at realigned military.

The 1990 Aviation Safety and Capacity Expansion (ASCE) Act and Aviation Noise and Capacity Act represented landmark legislation regarding restructuring of the FAA. The Public Works committee obtained an agreement with the FAA and the House Appropriations Committee in 1991 to increase AIP funding by $375 million for FY 1991 and additional $100 million increase for FY 1992. The FY1993 showed a continued

The 1990 ASCE Act addresses federal grants for assisting airport development, with explicit grant funding for Air Cargo airports. It states that cargo service airports, which are airports providing air transportation with an aggregate landing weight in excess of one 100,000,000 pounds annually, have a right to specific amounts of

---

[1] United States House of Representatives. Committee on Public Works and Transportation. Subcommittee on Aviation. Sept. 19, 1985. Statement of Randall Malin, Exec. Vice President of Marketing for US Air.

[2] United States House of Representatives. Committee on Public Works and Transportation. Feb 13, 1992. p.VIII.

funding, with the total of all grants not to exceed $50,000,000. The entire amount provided to air cargo airports may not exceed 49.5% of the entire program.[1]

The Aviation Infrastructure Investment Act of 1993 explicitly states an intent to place special emphasis on the appropriate conversion of former military bases to civilian uses. It authorizes that no less than 2.5% of the funds appropriated for FY 1994-96 be used to aid in the development of former military airports to improve capacity of the national air transportation system. The FAA shall designate not more than 16 current or former military bases for participation in a grant program for purposes of distributing these funds.[2]

Pursuant to section 109 of P.L. 103-305 (1994) for new hub airports which anticipate generating equal or greater than .25% of the total enplanements in the United States, the FAA must generate and submit to Congress a report analyzing the anticipated impact of that airport on the geographic region, availability and cost of providing air transportation to rural areas in such region, and fees charge to the air carriers.

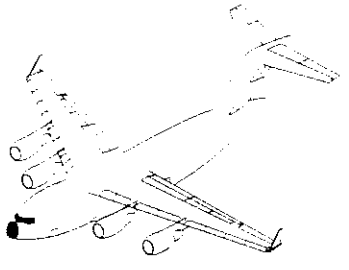
These and other legal parameters are referred to throughout this study. Appendix D contains the Defense Base Closure and Realignment Commission Act of 1990, the primary document by which base closure is dictated.

---

[1] Aviation Infrastructure Act of 1993. § 508(d)(5).

[2] ibid. § 508(f)(1)

Chapter 3
Post-Alignment Assessment



With the realignment of Grissom AFB in September 1994, facilities are located either within or outside a military cantonment area. Physical redevelopment which creates a change in use can only occur in those areas which lie outside of the cantonment area, unless otherwise ordered by the U.S. Air Force. Such facilities, however, may become available at a later date, depending upon future base realignment decisions. In the meantime, facilities within the cantonment area as well as the airfield are maintained according to the standards set by the U.S. Air Force. Facilities which lie outside the cantonment area are to maintained by the recipient of the conveyed property (with the exception of environmental remediation, as discussed later). RKG in Grissom AFB Reuse Plan provides a current assessment of most facilities. We confirmed the assessment upon site inspection of the base facilities.

For the purposes of this study it is necessary to assess the post-realignment conditions of the buildings and structures. Buildings on the base can be grouped into several categories according to use.

Buildings and Structures- Inside the Cantonment Area

The cantonment area contains the majority of the aviation related buildings on the base. The cantonment area contains eight buildings totalling over 240,000 square feet of space. The largest facility is building 592, a hangar containing 68,000 square feet. This hangar once housed the A-10 aircraft stationed at the base. Having been built in 1989, building 592 is considered to be the finest facility located on the base. Much of the remaining space is contained in six hangars which range in size from 27,000 square feet to 31,000 square feet. These structures are considered to be in fair condition and lack several modern conveniences such as air conditioning, automated doors, and floor heating systems.

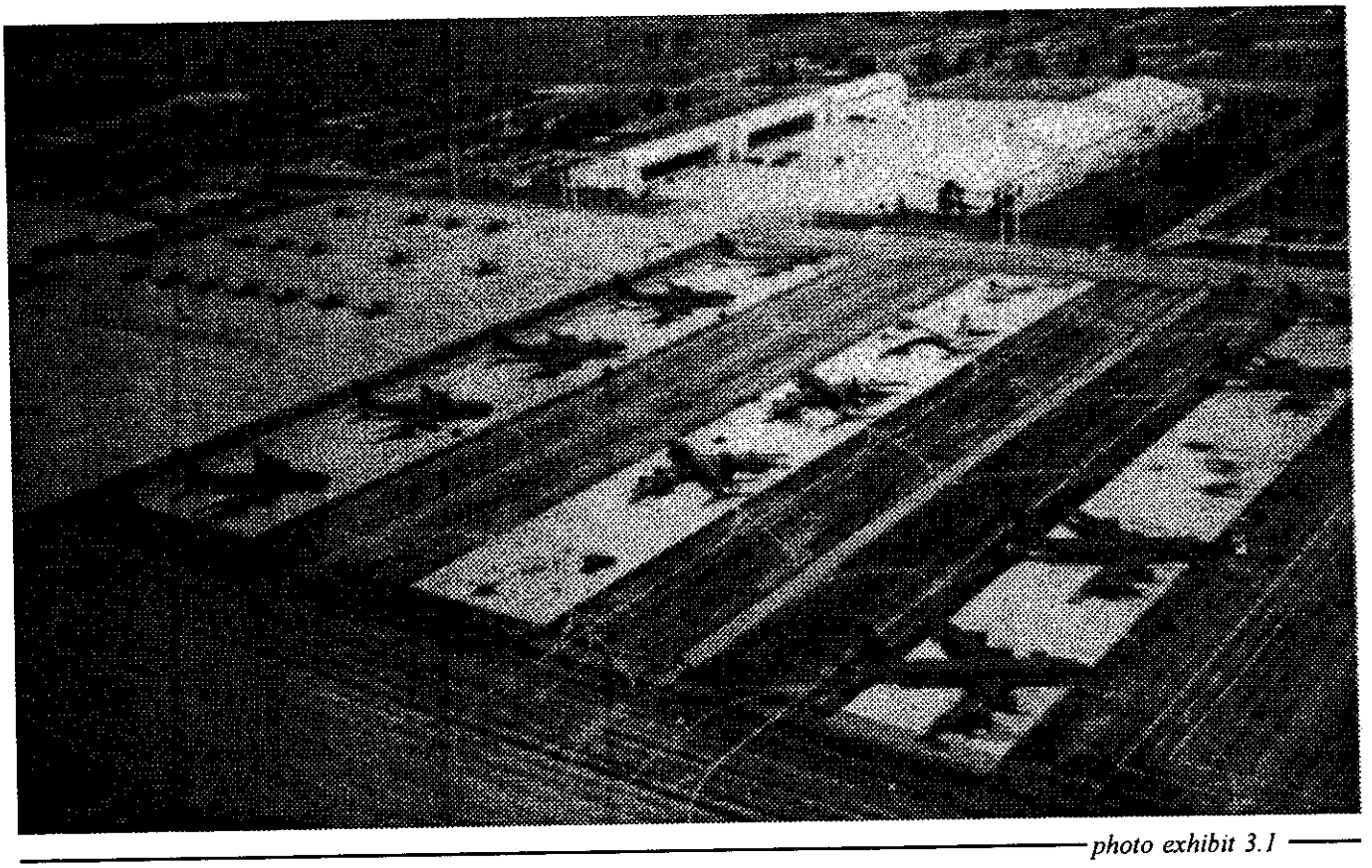


photo exhibit 3.1

Building 592 is shown at far left. The six nose hangars are shown at top center. The main apron space between the two areas is within the cantonment area.

Community service facilities inside the cantonment area are limited. The two facilities located within this area are the Fire Station (bldg. 100) and the Youth Center (bldg. 563). The Fire Station contains three bays for structural firefighting equipment and five bays for crash, fire, and rescue equipment. The Youth Center has the appearance of a gymnasium and contains more than 11,500 square feet. The floor of this facility is said to have several problems.

The cantonment area has 14 office buildings totalling 186,571 square feet. The facilities range in size from 2,700 to 37,000 square feet. The buildings are grouped in an area north of the tanker apron. Building 596 is the largest office building located within the cantonment area totalling 36,985 square feet of space. This building houses the Tactical Fighter Group which has been retained as a result of the realignment decision. The Civil Engineering building (Bldg. 221) has over 30,000 square feet in a two-story structure. It is one of the oldest facilities on base and has seen minor interior renovations through the years.

Office Buildings 430 and 431 are almost identical and contain 8,153 and 8,148 square feet respectively. Both were constructed in 1956 and have varying degrees of quality. Buildings 663, 667,668, and 669 are clustered together in the northwest corner of Warhawk and Hoosier Blvd. Building 667 houses the Wing Headquarters which has been retained as a result of the realignment decision.

The cantonment area has four buildings classified as research and development facilities. The Survival Equipment shop (Bldg. 109) contains 13,200 square feet. Building 509 is a new avionics laboratory, which was constructed in 1989. The interior and heating system of this facility are said to be in excellent condition. The Precision Measurement Lab (Bldg. 429) was built in 1959 and contains almost 30,000 square feet of laboratory and office space.

The cantonment area has no buildings classified as recreational. Grissom, however, has four softball/baseball fields located within the cantonment area.

The cantonment area has seven buildings totalling almost 18,000 square feet of space. Six of the seven buildings are dormitories ranging in size between 25,000 and 26,000 square feet. Both facilities were constructed in the late 1950s and have been assigned to house reserve personnel. The remaining facility in the cantonment area is the National Emergency Airborne Command Post (NEACP) Alert Facility. This facility was constructed in 1986 and is in good condition.

The Club (Bldg. 338) is the only building classified as retail within the cantonment area. The building was constructed in 1956 and totals 17,878 square feet in size. This facility will remain operational.

The cantonment area has 15 buildings which are classified as shop and garage space. The aggregated shop and garage area space is 185,000 square feet. The buildings range in size from 1,500 to 30,000 square feet. The smaller structures are utilized as maintenance shops.

Buildings 593, 453, and 591 are mid-sized shop buildings. The buildings range in size from 7,195 to 12,700 square feet. All three have "drive-in" access for vehicles and small equipment. All three buildings have been constructed during or later than 1987 and have been well maintained. Building 453 has been designed to handle a variety of specialized tasks beyond basic vehicle maintenance.

Buildings 425 and 426 are located adjacent to hangar 200 and are both used as aircraft maintenance shops. Each has just over 19,000 square feet of shop space.

Buildings 420 and 190 are the two remaining garage and shop facilities located in the cantonment area. Both buildings are over 29,000 square feet in size and contain crane lifts and related equipment. Building 190, in particular has eight such cranes, each with lifting capacities of 8,000 to 12,000 pounds. Both the size and flexibility of these buildings make them attractive to any user.

The cantonment area contains three specialty buildings. Specialty buildings include the Steam Plant, wastewater treatment plant, and the old kennel. These facilities may or may not remain functional depending upon the ultimate reuse of the base. At pre-alignment condition these facilities were not operating at capacity. No activity to reduce the capacity of these facilities has taken place.

Warehouse space in the cantonment area totals 239,944 square feet. It is important to note that the warehouse facility classification does not include aircraft storage, regardless of tenure of storage. Seven of the warehouse buildings (Bldgs. 720-726) are located in the munitions storage area. These buildings are shape as igloos with earth berming. There are also six munitions storage buildings (Bldgs. 757 to 765) located in the same general area. Access to these structures is gained via an overhead door. The buildings are made with 12" concrete walls and considered to be explosion proof.

Building 223 is a storage facility for warehousing hazardous materials. The facility was built specifically for the storage of hazardous waste. Inside, the facility has a dry well for containment of chemical spills.

Building 209 is the main Base Supply Warehouse. The facility, constructed in 1956, is 96,000 square feet in size and is the second largest structure on the base. The building has undergone several transformations in recent years. One-third of the space is not being utilized as warehouse. Also, portions of the space are being renovated to accommodate offices for the Reserve unit.

Buildings and Structures - Outside the Cantonment Area

All aviation related structures situated outside the cantonment area are hangars. The largest, Building 200, is more than 129,000 square feet in size. The remaining three hangars are located in close proximity to each other near the northwest end of the runway. The largest of the three hangars is building 11, a 22,391 square foot, four bay hangar. Building 26, which is almost 19,000 square feet in size, is a two bay hangar. Building 33 is a 6,025 square foot hangar. Aside from building space, the area outside the cantonment area has a significant amount of apron space. The line separating the cantonment area bisects the Main Parking Apron leaving three parking rows for civilian use. Further, the entire area known as the Alert Apron on the north east side of the airfield is outside the cantonment area.

The vacant control tower lies along the north side of the airfield midway between buildings 11 and 200. This control tower is not being used and has the potential as a location for a fixed base operator for air cargo operations.

Many of the community service facilities located at Grissom AFB are situated outside the cantonment area. Seven out of nine buildings, totaling 97,415 square feet, are situated outside the cantonment area. The Child Development Center (bldg. 570) has over 7,400 square feet of floor space. This facility has several large playrooms, motor skills areas, and an outdoor play area. The Grissom Community Center (bldg., 575) is located in the same general area. This is an older facility which was once a theater and has since been divided

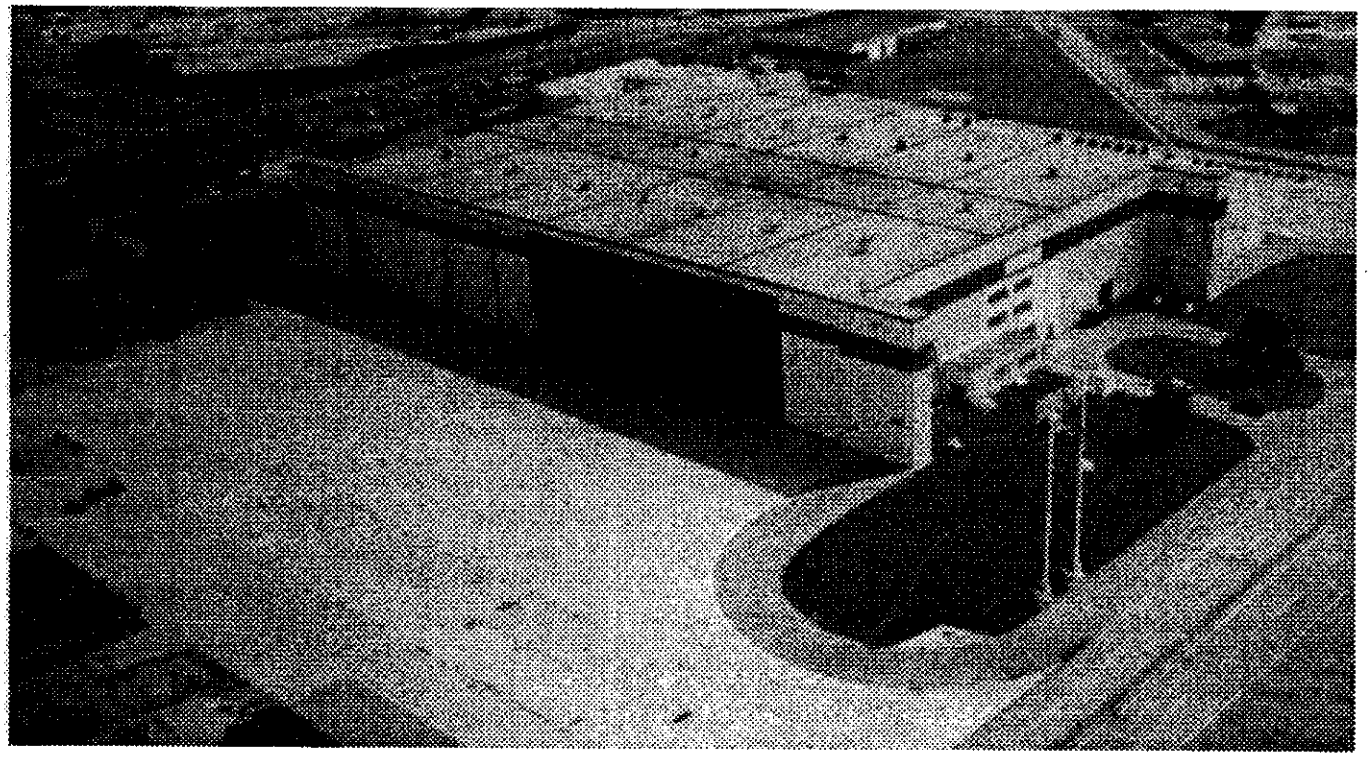


photo exhibit 3.2

Building 200 is the largest hangar on the base and lies outside the cantonment area.

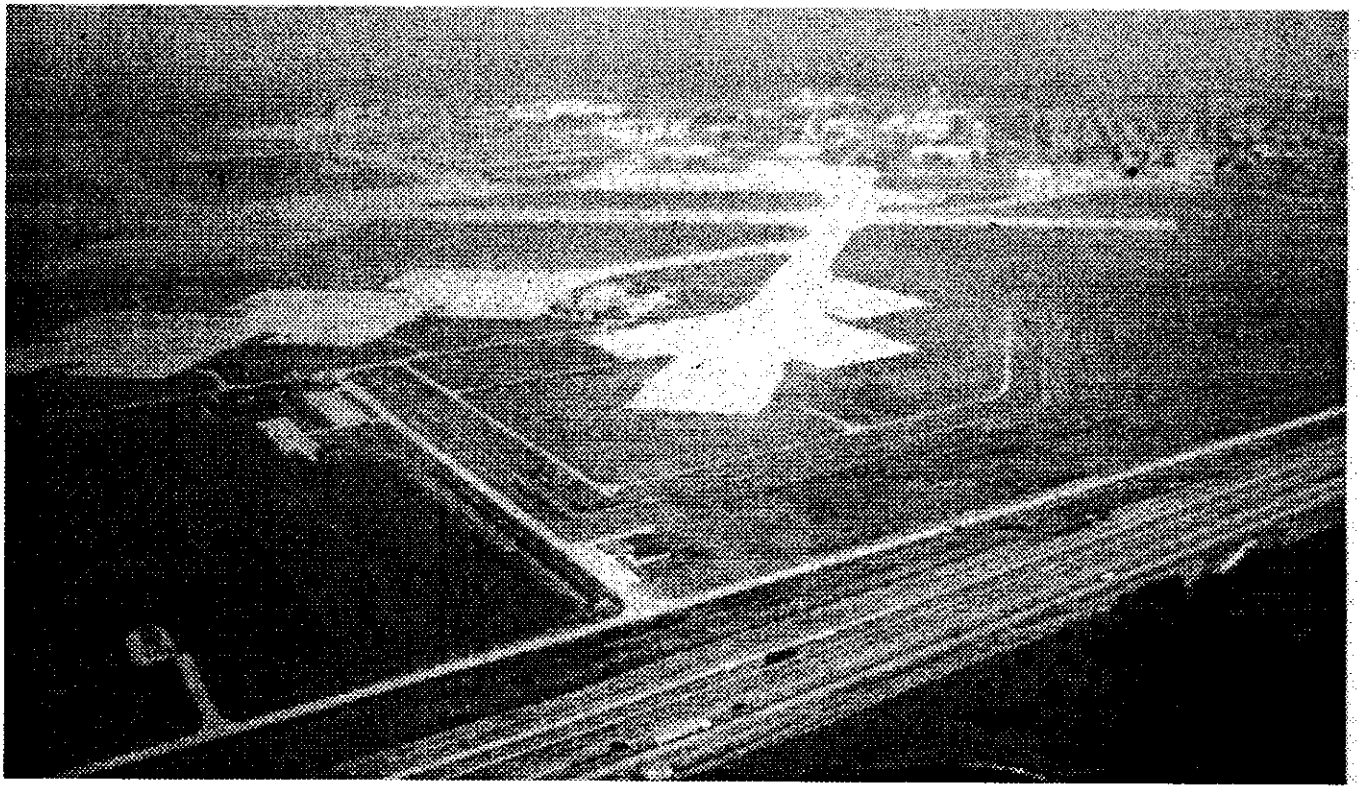


photo exhibit 3.3

The Alert Apron, all of which lies outside the cantonment area, contains 11 aircraft parking spaces

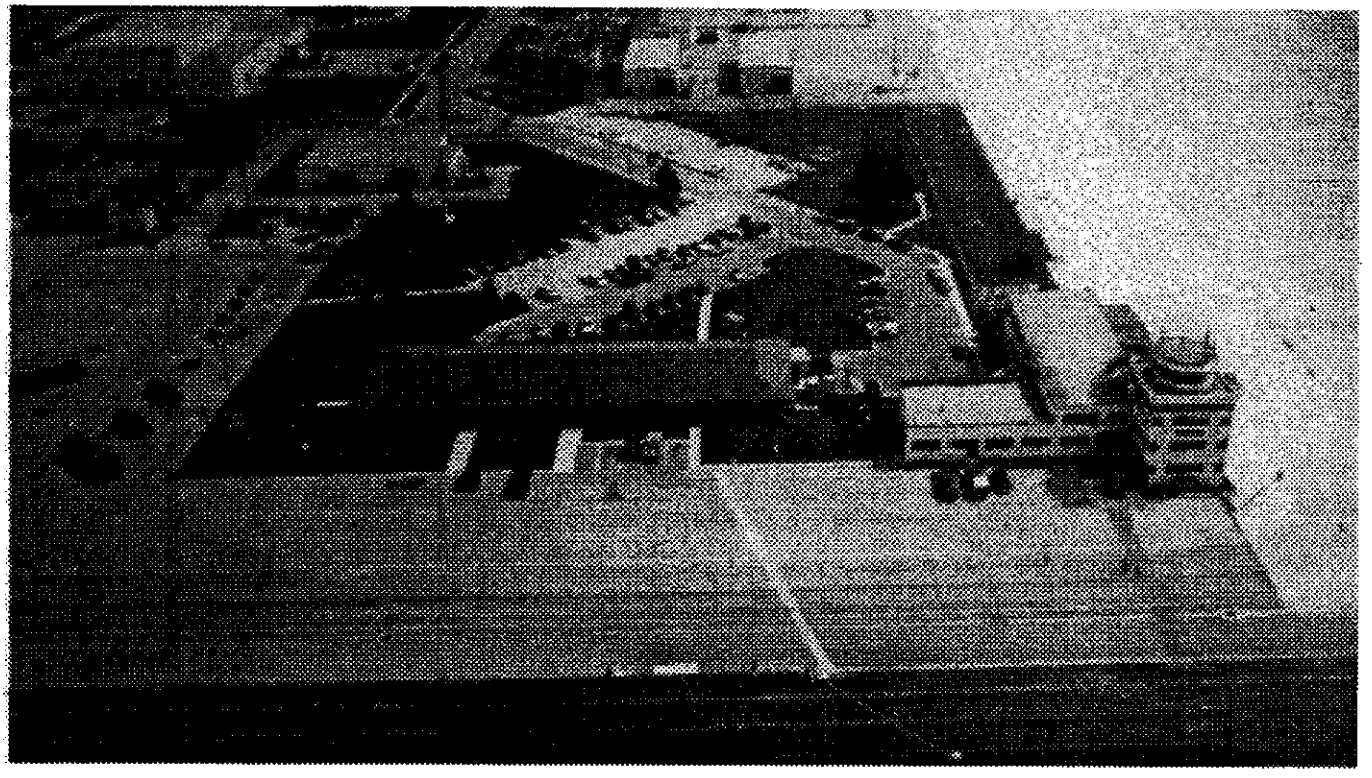


photo exhibit 3.4

The Vacant Tower has reuse potential as a fixed operations center for air cargo

into meeting rooms and offices. The Security Police occupy two small buildings (bldgs. 158 and 410) which total less than 8,000 square feet of floor space. Both buildings were constructed in 1957 and are the oldest of the community service buildings. The Base Library (bldg. 303) and the Base Post Office (bldg. 310) each comprise 21,214 square feet of floor space.

Office space represents the largest number of buildings and the largest quantity of space outside of the cantonment area. The cantonment area contains a total of 259,376 square feet of floor space in 22 separate structures. The Personnel Support Center (bldg. 2) is the largest office space facility with 55,797 square feet of offices. Having been constructed in 1986, the building structure is in excellent condition. The second largest office facility, building 156, is adjacent to the Personnel Support Center. This facility, however, is not in as good condition as building 2. Building 156, built in 1942, has undergone several transformations which have created nonuniform interior spaces.

Buildings 1 and 37 are also located in this same general area. Building 1, containing 13,442 square feet, is presently the home to the Wing Headquarters. Interior renovations to the second floor of this facility have been made to accommodate this use. The first floor, however, is vacant and has not been renovated to the same degree as the second floor. Building 37, containing 24,070 square feet, is a brick office facility built in 1973 and renovated in 1984.

Buildings 300 and 308 are both former dormitory buildings that have been converted to office use. Both buildings are two story structures containing 17,000 square feet of floor space. These buildings suffer from structural and roof problems; reuse of these buildings would require significant renovation. In addition to these larger offices, Grissom AFB also has a variety of smaller offices ranging from 1,200 to 8,800 square feet in size.

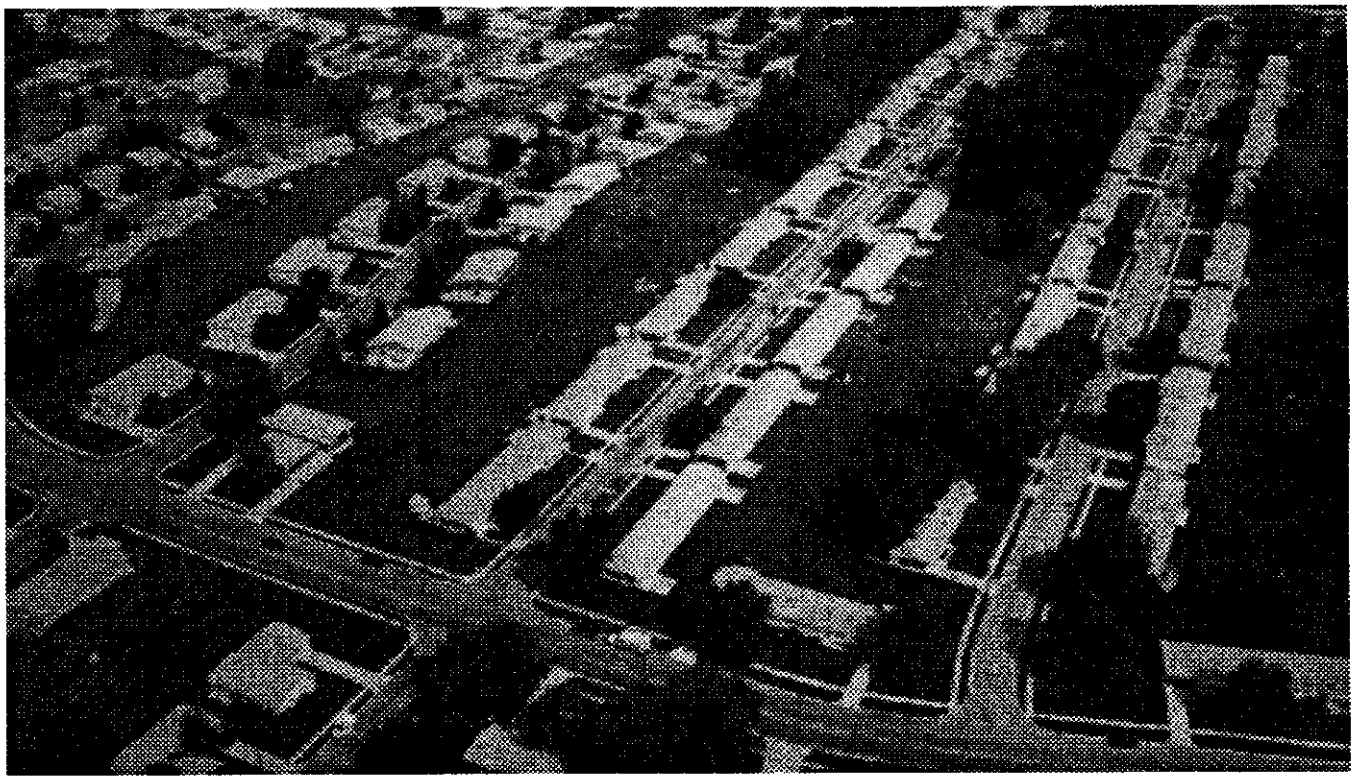


photo exhibit 3.5

Entire neighborhoods have been left vacant as a result of the complete realignment.

Grissom AFB has no buildings outside of the cantonment area classified as research and development. All four of the buildings classified as such lie within the cantonment area.

Recreational facilities on base include a golf course, riding stables, hobby shop, pool, and fitness center. The seven recreational buildings total more than 100,000 square feet. The vast majority of the indoor recreation space is contained in two adjacent buildings joined by a small passageway. These buildings include the pool (bldg. 143) and the Fitness/Bowling Center (bldg. 137). The buildings total more than 80,000 square feet. Both structures are former hangars which have since been converted for the present use. The Hobby Shop (bldg. 145) is the third largest facility with 13,158 square feet of floor space. This facility houses a woodworking shop, frame gallery, and a 14-bay automotive area.

Residential structures at Grissom AFB can be classified as either dormitory or family housing. RKG, in the Reuse Plan, chose to consider each classification separately. Residential space totals more than 210,000 of square feet contained in 11 dormitory structures. Eight of the 11 structures are military dormitories located along a section of land between Lancer and Constellation Streets. The military dormitories, all of which were constructed in 1955, are two story buildings with 17,000 square feet each. The Grissom Inn (bldgs. 550 and 551) represent two additional dormitory buildings. Building 550 is the larger of the two facilities with 26,739 square feet of floor space. This facility contains 10 single rooms, 14 double rooms, and 2 suites. Building 551 contains 14 rooms and 4 suites. These buildings accommodate visiting families and dignitaries. The Alert Crew facility (bldg. 747) represents the remaining dormitory facility. This building is located adjacent to the parking apron, and was previously used to house flight crews and pilots while they were stationed on alert.

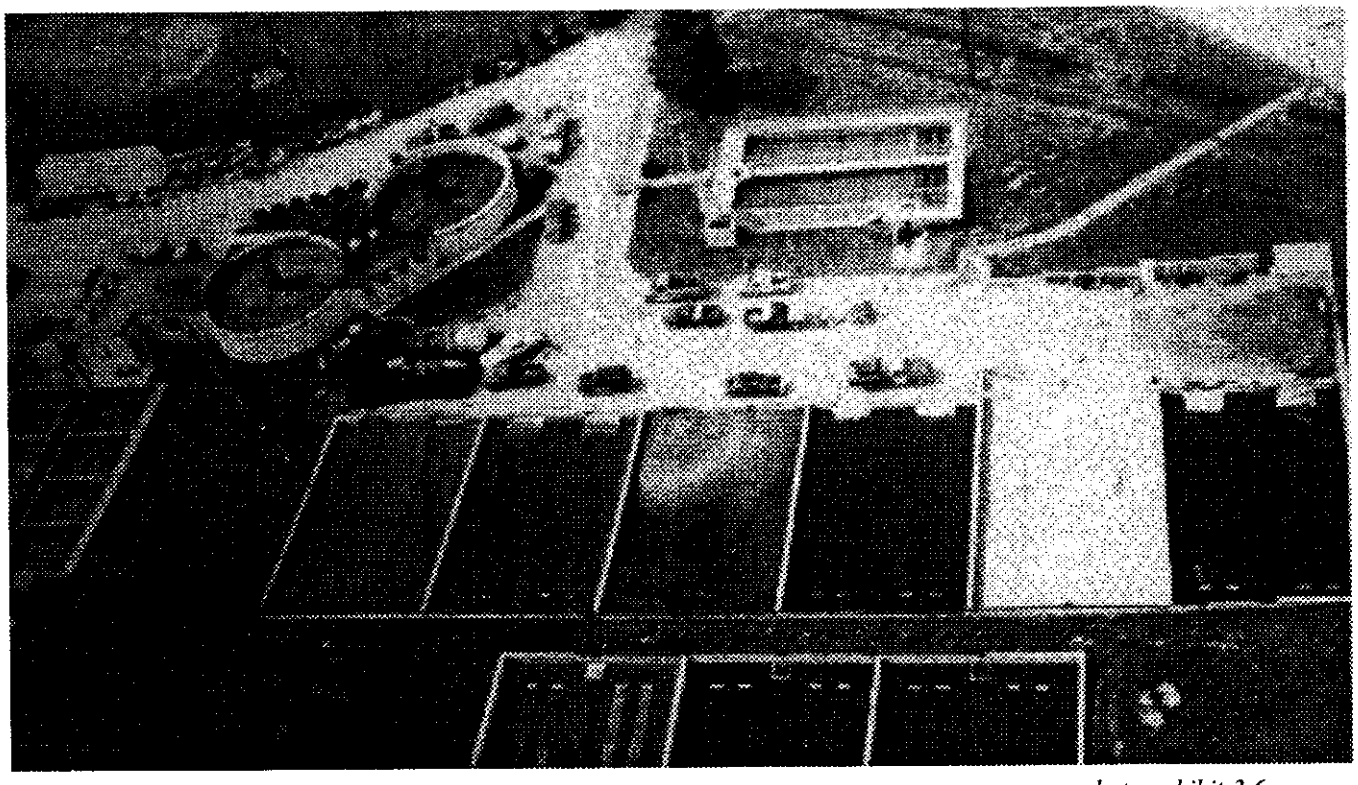


photo exhibit 3.6

The Grissom Waste Water Treatment Plant (WWTP), as shown above, has a sizeable excess capacity.

The family housing area at Grissom AFB contains 1,128 dwelling units, all of which lie outside the cantonment area. The family housing area is located in the northwest area of the base. The family housing area totals 1,417,318 square feet of living space, by far the greatest of any building use outside the cantonment area. The dwelling units are composed of one-, two-, three-, four-, and six-family units. The housing units offer floor plans ranging from 992 square feet for the smallest to 2,270 square feet for the largest (see table 1.4). Many of the units were constructed in the 1950s, while 200 were added in the 1970. Despite housing rehabilitation efforts made in 1986, the majority of the family housing units contain outdated kitchen and bathroom facilities.

Water Facilities

Grissom AFB currently derives its own potable water from seven wells located on base. The water treatment plant, which was constructed in 1942 and upgraded in 1986, pumps groundwater from four of the seven wells. The plant has a treatment capacity of 2.20 MGD. Water storage capacity at the base is 1.1 million gallons consisting of two elevated tanks located on base. As a result of the base realignment, average water demand has decreased to approximately .22 MGD of which .08 is non-potable water used for maintenance and grounds keeping. Thus, the water treatment plant is experiencing an average of 2.04 MGD surplus capacity.

Wastewater Facilities

Domestic sewage at Grissom AFB is treated by the base Wastewater Treatment Plant (WWTP) which was constructed in 1942. Wastewater flows into the WWTP are high relative to water consumption, suggesting an infiltration/inflow problem. As a result of a two-phase Military Construction Program, the WWTP produces a high quality secondary treatment effluent. The current capacity remains at 1.20 MGD with a .30 MGD minimum flow. The effluent from the WWTP is discharged into Pipe Creek. This discharge is authorized under a

National Pollution Discharge Elimination System (NPDES) permit, administered by the Indiana Department of Environmental Management (IDEM).

The base maintains the Industrial Wastewater Treatment Plant (IWWTP) to treat aircraft and maintenance wash water. Effluent from the IWWTP is directed to the WWTP. Eight septic tanks are located on base, two of which are unused. The total capacity is 82,950 gallons. These tanks are utilized by remote facilities not associated with the WWTP or the IWWTP.

Solid Waste

Prior to realignment the family and dormitory housing generated the bulk of the solid waste on base. The pre-alignment disposal rate averaged 1,000 tons/day. This average has decreased significantly since base closure in 1994, though no exact average can be calculated. The solid waste generated on base is hauled to Byers Recycling and Disposal Facility in Logansport and Wabash Landfill in Wabash County. The Byers location has an expected life expectancy of 20 years, while the Wabash facility has an expected life expectancy of 10 years.

Energy - Electric and Natural Gas

Grissom AFB purchases its electricity from PSI Energy. The power is allocated from a base substation with a 7,500 kVA average capacity and 10,450 kVA 4-hour peak capacity. The distribution system consists of overhead 12,000 volt system covering the base and housing areas. As a result of realignment the electric demand dropped from 136 MWH per day in 1990, to 35 MWH per day in 1994.

Natural gas is supplied to Grissom AFB by Northern Indiana Public Service Company (NIPSCO). The system was constructed in 1975 and is considered adequate. The system capacity is 95,000 million therms per day with a peak demand of 20,000 therms per day during the colder winter months. Natural gas is distributed primarily to the residential areas and the base heating plant. The heating plant typically operates with 50% natural gas and provides heating and hot water for the nonresidential parts of the base. As a result of the realignment the demand for natural gas has dropped from 8,500 therms per day in 1990, to 1,900 therms per day in 1994.

Hazardous Waste

Hazardous waste is generated at numerous areas on base; these wastes are collected at 41 accumulation points. Wastes may only be stored at an accumulation point for 90 days prior to final disposal to approved disposal location. Daily generation of hazardous waste will decrease as a result of base realignment. However, past contamination and permanently stored hazardous waste outside the cantonment area must be mitigated prior to base reuse.

IDEM has identified and is currently investigating active points of interest (POI) and potential areas of concern (PAC). 47 POI/PAC have been identified for Grissom AFB. The U.S. Air Force has implemented an Installation Restoration Program (IRP) to identify, characterize, and remediate past environmental contamination contained at POI/PAC sites at Grissom AFB. The IRP is a subset of the Defense Environmental Restoration Program (DERP) which ensures that the Department of Defense has the authority to conduct its own environmental restoration programs. A Base Realignment and Closure Team has been active at Grissom AFB to resolve technical issues and reach consensus on cleanup decisions.

The IRP activities are managed by the Operating Location (OL) at Grissom AFB. The Department of Defense has entered into a Defense State Memorandum of Agreement with IDEM which addresses reimbursement of the State of Indiana for costs associated with providing state services to Grissom AFB.

The IRP process incorporates the terminology of the EPA and additional requirements established under DERP. The IRP is divided into three action stages:

- Preliminary Assessment and Site Inspection
- Remedial Investigation and Feasibility Study
- Remedial Design and Remedial Action

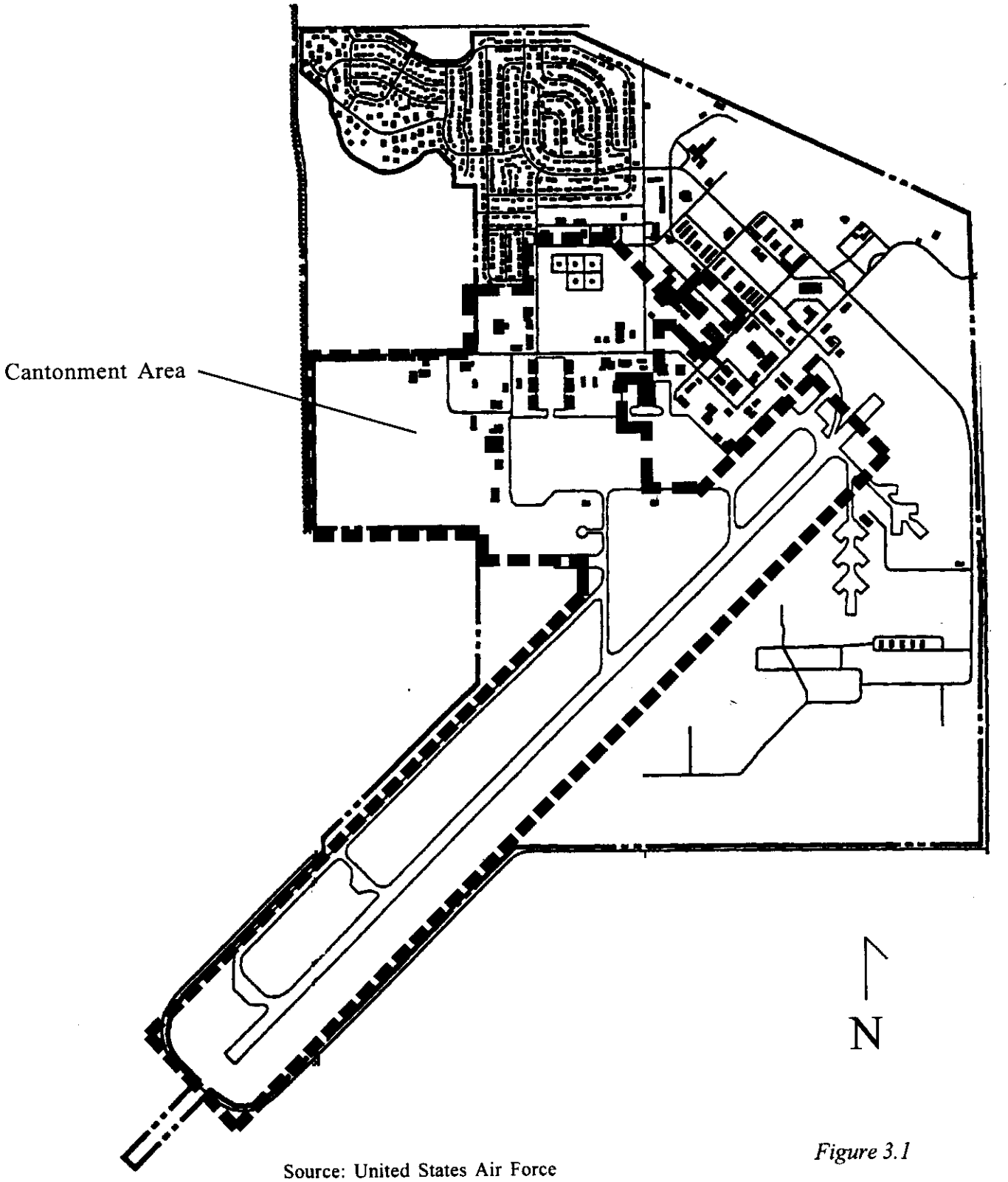
Following the completion of the first two action phases of the IRP the Air Force presents a formal proposal of the remedial action alternatives for public comment. The Air Force is responsible for informing the public of remedial options and making possible a forum for receiving public comment. Upon completion of this step the Air Force presents a formal response to the public and declares a decision regarding remediation. The Air Force then proceeds with the third action phase of the IRP.

The Air Force must complete the IRP process for all POI/PAC sites on Grissom AFB and provide the necessary assurance under CERCLA §120(h) for all properties transferred. The combination of these will delay parcel disposition, conveyance, and may affect reuse.

In order to accelerate the remediation process the contaminated sites have been placed in nine operable units. Each operable unit has been assigned common contamination types and geographic locations. The current schedule for IRP activities is described below.

IRP Stage	**Document Name**	**Commencement Date**
Remedial Investigation	All sites	October 1991
Remedial Design	(9) sites: Fire Protection Training Area (1&2) Landfills (1-3) Waste Oil Storage Pad Low Point Drainage Pad Abandoned Underground Storage Tanks Drum Burial Sites	June 1994
Risk Assessment	Fuel Sludge Weathering Site	June 1994
Remedial Action	(9) sites: Fire Protection Training Area (1&2) Landfills (1-3) Waste Oil Storage Pad Low Point Drainage Pad Abandoned Underground Storage Tanks Drum Burial Sites	October 1994
Remedial Action	Fuel Sludge Weathering Site	April 1995

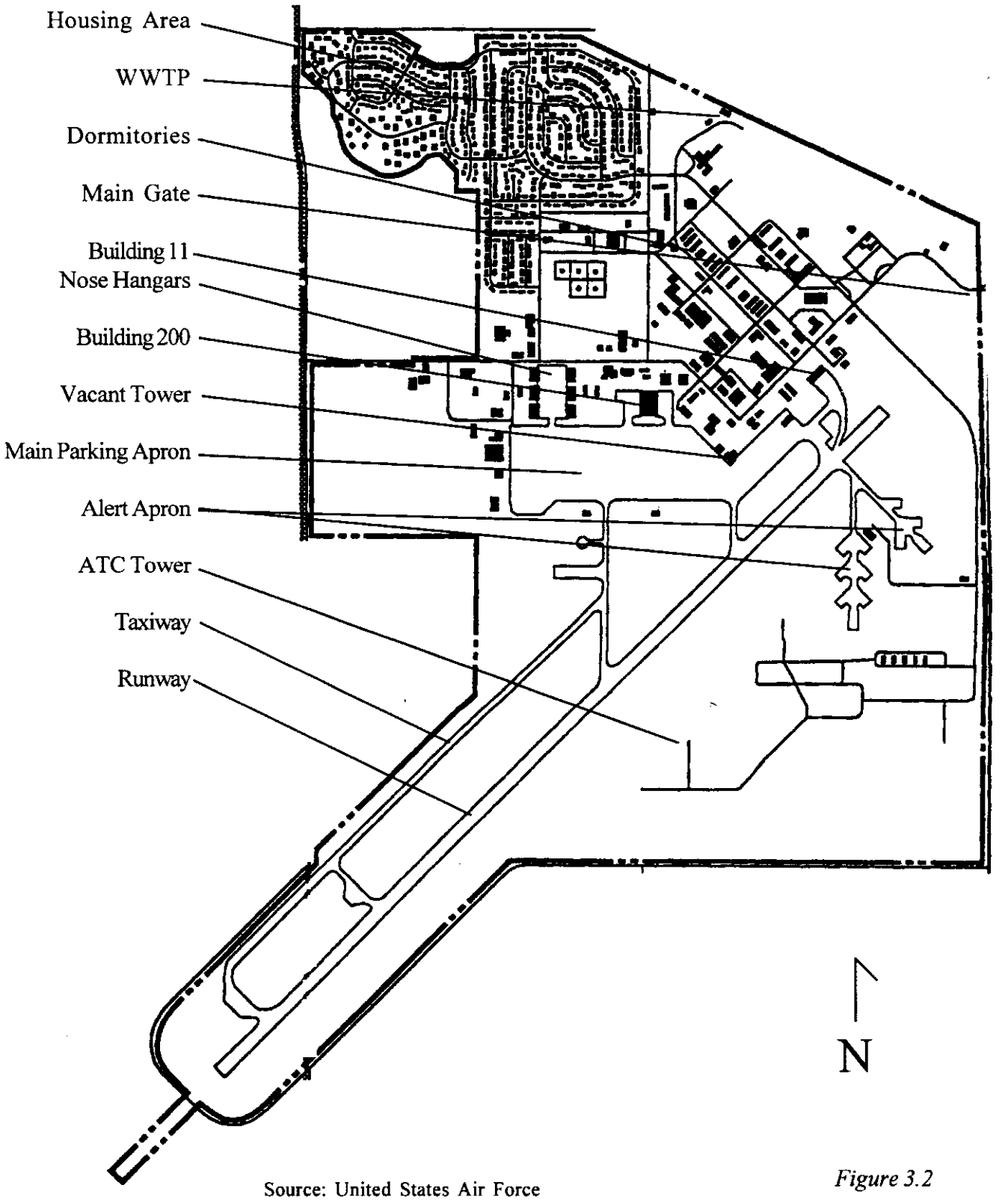
Grissom Air Force Base
Cantonment Area



Source: United States Air Force

Figure 3.1

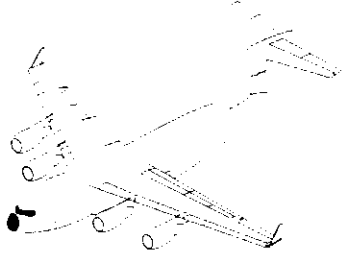
Grissom Air Force Base
Facility Summary



Source: United States Air Force

Figure 3.2

Chapter 4
Evaluation of Cargo Marketing Group (CMG) Study



- Evaluation of Subfactors
- Evaluation of Calculation Method

Evaluation of Subfactors

The Cargo Marketing Group prepared the Air Cargo Hub and Other Aviation Potential Feasibility Study for Grissom Redevelopment Authority to assess the potential for air cargo operations at Grissom AFB. CMG concluded that, at best, the probability for success of air cargo is 35%. Despite this result, CMG makes a suggestion for further research into the feasibility of this reuse. Before pursuing a reassessment of the feasibility of this reuse, we evaluate the effectiveness of the CMG Study.

The CMG Study contains analysis in the form of written accounts, airport selection criteria, and a strengths and weakness table. The CMG Study does not explicitly list the data or subfactors used in forming the conclusions; rather, the CMG data is fragmented and presented during the different types of analysis. For purposes of evaluation, we group all of the data used in the CMG Study into subfactors. Then we assemble these subfactors into groups and associate each group with one of the three subproblems.

Each subfactor has a derived source. Derived sources include the three aforementioned forms of analysis. We describe the data gathered for each subfactor and its importance in the analysis. We then evaluate the effectiveness of each subfactor and the supporting data.

The calculation method used by CMG is questionable. CMG supports the conclusions through three different types of analysis. The written accounts are exclusive of the other two forms of analysis; while the airport selection criteria and the strength and weakness table have significant overlap. This ambiguity weakens CMG's conclusions. Further, CMG's method for making conclusions is purely subjective, despite offering the feasibility conclusion in terms of a statistical probability.

Feasibility studies must be comprehensive, considering all possible data that may affect feasibility. Equally important is the objectivity of such studies in producing accurate results. The CMG Study is deficient on both accounts. The following evaluation supports this claim.

Summary of CMG Subfactors

page 1 of 2

Subproblem #1: Regional Need

Line	Subfactor	Derived Source	Adequacy of Analysis
1.0	**Aviation Demand Forecasts**		
1.1	Traffic Analysis	Written	Incomplete in definition
1.1a	Chicago		Incomplete
1.1b	Cincinnati		Incomplete
1.1c	Detroit		Incomplete
1.1d	Fort Wayne		Incomplete
1.1e	Indianapolis		Incomplete
1.1f	Terre Haute		Incomplete
2.0	**Market Potential**		
2.1	Immediate Area Potential	Strength/Weakness Table	Unnecessary
2.2	Catchment Area Potential	Strength/Weakness Table	Incomplete in definition
2.3	Distance From Major Airport	Strength/Weakness Table	Adequate
2.4	Amount of Competition	Strength/Weakness Table	Adequate
2.5	Forwarder Presence/Support	Strength/Weakness Table	Incomplete in definition
2.6	Industry Growth (domestic)	Written	Adequate
2.7	Industry Growth (international)	Written	Adequate
2.8	Growth of Indiana Air Exports According to Destination	Written	Adequate
2.9	Current Indiana Air Traffic Diversion (international)	Written	Adequate
2.10	Current Indiana Air Traffic Diversion (domestic)	Written	Incomplete
3.0	**Marketability**		
3.1	Adequacy of Ground Transportation	Strength/Weakness Table	Incomplete

Subproblem #2: Feasibility

Line	Subfactor	Derived Source	Adequacy of Analysis
4.0	**Airspace and Traffic Control**		
4.1	Noise or Slot Restrictions	Strength/Weakness Table	Incomplete/unnecessary
4.2	U.S. Customs Clearance	Strength/Weakness Table	Questionable conclusion
5.0	**Airport Facilities**		
5.1	Runway Length	Strength/Weakness Table	Incomplete
5.2	Runway/Taxiway Strength	Strength/Weakness Table	Incomplete
5.3	Aircraft Ramp Space	Strength/Weakness Table	Questionable conclusion
5.4	Approach Aid Category	Airport Selection Criteria	Incomplete
5.5	Airline Service Level Capability	Strength/Weakness Table	Unnecessary
5.6	Facility Capability	Airport Selection Criteria	Incomplete
6.0	**Revenues**		
6.1	Fees (landing, ramp, and facility)	Strength/Weakness Table	Incomplete
6.2	Cargo Facility Fees	Airport Selection Criteria	Incomplete

Table 4.1

Summary of CMG Subfactors

Subproblem #3: Economic Development

Line	Subfactor	Derived Source	Adequacy of Analysis
7.0	**Target Industry**		
7.1	Freight for Selected Indiana Industries	Written	Incomplete
7.2	Value of Air Exports for Selected Indiana Industries	Written	Incomplete
7.3	Growth of Indiana Air Exports According to Industry	Written	Incomplete
7.4	Airline Tariff	Strength/Weakness Table	Incomplete
7.5	Forwarder Tariff	Strength/Weakness Table	Incomplete

Table 4.2

Subproblem #1: Regional Need (table 4.1)

1.0 The first set of subfactors is associated with Aviation Demand Forecasts. The only subfactor within this set is a traffic analysis for selected airports. CMG compares the total freight (in tons) among the major airports in Chicago, Cincinnati, Detroit, Fort Wayne, Indianapolis, and Terre Haute. The selected airports include all Commercial (CM) service airports within Indiana and the three major airports which surround Grissom but lie outside Indiana.

1.1 Traffic analysis and cargo activity at surrounding airports are important data necessary for determining aviation demand forecasts and regional need. The airports included in the CMG analysis, however, are questionable. CMG uses the term "Commercial (CM) service", which according to legislative definition, is a public airport which is determined by the Secretary of the FAA to enplane more than 2,500 passengers annually and receive scheduled passenger service of aircraft. Airports in Indiana which are classified by the Secretary of the FAA as being at least a CM status include Bloomington, Elkhart, Evansville, Fort Wayne, Indianapolis, Kokomo, Lafayette, Muncie, South Bend, and Terre Haute. CMG included only the Indianapolis, Fort Wayne, and Terre Haute airports. If the objective of CMG was to limit the analysis to only the largest airports in Indiana, then only Primary (PR) airports should have been targeted. PR airports are defined as a CM service airport which is determined by the Secretary of the FAA to have more than 10,000 passengers enplaned annually. (NPIAS) PR airports in Indiana include Elkhart, Evansville, Fort Wayne, Indianapolis, Lafayette, South Bend, and Terre Haute. CMG did not analyze airport activity at Elkhart, Evansville, Lafayette, and South Bend; further, CMG did not provide an accurate rationale for those airports selected.

2.0 The second set of subfactors is associated with Market Potential. CMG provides more extensive analysis to this set of subfactors. Market potential is an indicator of regional need and, therefore, is associated with the first subproblem. Subfactors included within this set include immediate and catchment area potential, distance from major airports, competition, industry growth, and the existence of forwarders.

2.1 The first subfactor within this set is the Immediate Area Potential. We extract this subfactor from the strengths/weakness table provided by CMG. CMG states that the immediate area (undefined) can not generate sufficient air traffic. CMG classifies this subfactor as a weakness to the market potential of air cargo at Grissom AFB.

The major shortfall of this analysis is that the "immediate area" is undefined. CMG analyzes the potential traffic generation from the catchment area, which in this case is a range between 100 and 500 miles. This indicates that

the immediate area is some distance less than 100 miles. The question exists as to the need to analyze the air traffic generated from the immediate area. If the catchment area accounts for all traffic generation, then traffic generation in the immediate area has little relevance.

2.2 The second subfactor in this set is Catchment Area Potential. We extract this subfactor from the strengths and weakness table provided by CMG. CMG states that the catchment area may potentially generate sufficient air traffic. CMG classifies this subfactor as a strength to the market potential of air cargo at Grissom AFB.

The main question lies in the demarcation of the catchment area. CMG describes the catchment area as being a range between 100 and 500 miles from Grissom AFB. The author establishes a catchment area for air cargo at Grissom AFB. This catchment area is a 500 mile web. Aside from this disparity, we agree with CMG in that this subfactor is necessary for assessing the market potential for air cargo service at Grissom AFB.

2.3 The third subfactor in this set is Distance from Major Airport. We extract this subfactor from the strengths/weaknesses table provided by CMG. This subfactor is also a locational criterion for airport site selection. CMG states that the nearest major airport is Indianapolis at a distance of 69 miles. Chicago, Detroit, Cleveland, and Cincinnati are major airports within 250 miles of Grissom AFB. CMG states that the Grissom site is at an advantage by having only one major airport within 100 miles. Conversely, the Grissom site is at a disadvantage by having four (4) major airports within 250 miles.

Distance from major airports which offer air cargo service is a necessary subfactor when assessing market potential. Air cargo service at the Grissom site will have to compete for service with other airports within the catchment area. Distance between competitors bears a significant relationship with the market size and potential of a given activity. CMG recognized this relationship and included distance as a criterion.

2.4 Amount of Competition is the fourth subfactor within this set. CMG analyzes this subfactor in the strengths and weaknesses table provided by CMG. This subfactor is also a locational criterion for airport site selection. CMG stated that little competition exists within the state for international service. Alternatively, CMG found greater competition for domestic service. Two integrator hubs offering domestic service, Federal Express and Unites States Postal Service are located at Indianapolis. Burlington (Toledo), DHL (Cincinnati), Emery (Dayton), Airborne (Wilmington), UPS (Louisville), and Roadway Global Air (Terre Haute) are all domestic integrator hubs located within 250 miles of the Grissom site.

Competition is an important criterion for assessing the market potential for air cargo. The question arises as to whether Grissom intends to attract new companies from outside the catchment area to locate at the facility or attract the expansion or relocation of companies operating within the catchment area. CMG argues that diversion or relocation is improbable, yet, offers very little supporting data. CMG argues that companies located outside the catchment area are a more likely candidate to commence operations at Grissom. CMG states, "it is unlikely that any current operators will elect to change locations unless they experience expansion restrictions or a lack of cooperation at their current hubs." (CMG p. 38) The major flaw in this argument is the absence of cost and comparative advantage. The questions raised against CMG suggest that the Competition subfactor should be viewed as a dual-facet subfactor with more regard to comparative advantage.

2.5 CMG analyzes the Forwarder Presence/Support subfactor as part of the strengths and weaknesses table. CMG also lists this subfactor as a locational criterion for airport site selection. CMG states that little forwarder support exists in the area. Indianapolis at a distance of 69 miles is the nearest location which offers

forwarder support of any significance. Forwarders play an intermediary role between the commercial shipper and the air service provider. Forwarders focus on heavy freight with door-to-door deferred service.

Forwarder support is an important criterion for the market potential. Such support, however, will not exists in absence of an air cargo service provider. Therefore, it is logical to assume that no forwarder support exists for Grissom AFB, save Indianapolis. More importantly, we should analyze the potential for future forwarder support at the Grissom site. For this reason, the CMG analysis of forwarder support is incomplete.

2.6 CMG analyzes Industry Growth (domestic) in the written format. CMG observes an average U.S. domestic air cargo growth rate of 5.9% since 1975.[1] Express Carriers are major initiates of this trend and have increased the domestic air cargo market share from 10% in 1975 to 60% in 1992.[2] CMG anticipates future growth in the air cargo industry with a shift in emphasis to the transport of high tech products with a high value per pound.

Domestic air cargo industry growth is an important indicator of potential expansion into new areas and markets. CMG provides sufficient evidence to illustrate growth in this industry in the domestic market. Since a relationship exists between air cargo industry growth and company expansion, the inclusion of this subfactor is necessary.

2.7 CMG analyzes Industry Growth (international) separate from that of domestic. CMG observed that, unlike the U.S. domestic market, scheduled heavy freight is the dominant component of air cargo. Boeing projects a continued long-term growth rate of 6.9% for world air cargo between 1992 and 2010.[3]

International air cargo industry growth is an important indicator of potential expansion. International cargo growth has outpaced domestic cargo growth. Further, fewer airports offer international air cargo service. Grissom has the potential to become a reliever airport for relocated international air cargo operations. CMG provides adequate evidence to illustrate growth in this industry in the international market. Given the opportunities which exist in this industry, the inclusion of this subfactor is necessary.

2.8 CMG analyses the air export growth in Indiana according to the destination. Indiana air exports are defined as goods that are produced in the state of Indiana and shipped to an international location, regardless of the location of the gateway. The level of Indiana air exports has remained relatively unchanged between the years 1989 - 1993. The share of Indiana air exports according to destination, however, has varied considerably. Indiana air exports to Canada, for example, have increased at an average 41.7% growth rate between 1989 - 1993. Alternatively, exports to Africa have dropped at an average 18.6%.[4]

CMG points out two significant conclusions. First, despite a stagnant air export growth, exports to Europe are on a positive growth pattern, a pattern common throughout the U.S. Second, the market for exports to Canada is far stronger than that of any other destination. The analysis of market growth to international destinations is important in assessing market potential. The CMG analysis is sufficient in targeting potential markets for Indiana-produced goods, via air transport.

---

[1] Cargo Marketing Group. p.17.
[2] ibid. p. 19.
[3] ibid. p. 27.
[4] ibid.

2.9 CMG provides analysis of Indiana air exports according to international gateways. The purpose of this analysis to gain an understanding of the amount of air exports currently being diverted to international gateways that are outside the state of Indiana. Nearly 48% of Indiana air exports are diverted to the Chicago O'Hare Airport gateway. Surprisingly, the second largest share of exports is diverted to New York's JFK Airport. Indianapolis, the state's largest international airport is the gateway to only 1.8% of Indiana air exports.[1]

CMG suggests that the diversion is due in part to forwarders who have consolidation points at other gateways, or to airlines which have direct international service or more capacity. The CMG analysis opens the possibility that gateway diversion can be reversed. CMG recognizes this possibility and acknowledges Chicago O'Hare as the primary target. This analysis is necessary in determining the potential for air export diversion.

2.10 While traffic diversion is an important issue for international gateway service, such domestic diversion should be equally important. The domestic market is dominated by the expeditor/express package operators. The potential for diversion, therefore, rests in the potential to attract expeditors and express carriers. CMG does not analyze the potential for the diversion of domestic service because of two noted shortfalls. First, six expeditor service hubs are located within 250 miles of Grissom AFB. Further, the expeditors require Category II or greater landing system. Having made only these two observations, CMG concludes that diversion of such service would be improbable.

The CMG analysis is incomplete for several reasons. First, the GRA asserts that Grissom has a CAT II landing system capacity; and, the Air Force has traditionally operated on at CAT I.[2] Secondly, CMG does not analyze the advantages/disadvantages among these locations as compared to the Grissom site. Finally, CMG does not consider diversion or the relocation of service providers within or outside the 500 mile catchment area. While the analysis of domestic service is pertinent to the feasibility assessment; CMG does not provide sufficient analysis to draw a valid conclusion.

3.0 The third set of subfactors is associated with the marketability of the Grissom site. Marketability is defined as the attractiveness of a site to potential air cargo tenants. Feasibility studies should be geared not only towards those interested in developing the site but also to the potential tenants. CMG analyzes only one subfactor which could be classified under the marketability set.

3.1 CMG provides an assessment of the ground transportation in the strengths and weaknesses table. In doing so, CMG determines that the highway system is a strength for the marketability of the Grissom site. Situated at the crossroads of U.S. 31 and U.S. 24, the Grissom site is easily accessible. Further, current traffic demands are not deleterious to the proposed reuse.

Aside from addressing the adequacy of ground transportation, CMG's analysis of the marketability is grossly incomplete. Air cargo carriers are concerned with far more variables than simply the adequacy of ground transportation. At first glance, the Grissom site appears to offer a myriad of advantages over competitor airports. These advantages may include, but are not limited to, tax and fee rates, lease rates, utility rates, rail access, employment base, and protection services . These potentials must be explored in order to gain an accurate assessment of the marketability of the Grissom site.

---

[1] Cargo Marketing Group. p. 34.

[2] An answer to a question at the February 1, 1995, presentation of HNTB before the Grissom Redevelopment Authority.

Subproblem #2: Feasibility (table 4.1)

4.0 The fourth set of subfactors is associated with airspace and Air Traffic Control (ATC) at the Grissom site. Air space clearance is necessary for any increase, enlargement, or other changes in the nature of flight patterns surrounding Grissom AFB. The role of the ATC system at Grissom will be altered depending upon reuse. The amount of alteration, thus, is important in the assessment of the feasibility of air cargo reuse. CMG analyzes two (2) subfactors within this set.

4.1 CMG analyzes the Noise or Slot restrictions as a subfactor in the strength and weaknesses table. Noise restrictions are contained in the Federal Aviation Regulations (FAR). Noise restrictions are based on maximum allowable decibels (dB), a logarithmic unit that accounts for the large variations in amplitude. The areas most affected by aircraft-generated noise are those which are exposed to dB levels in excess of 65 dB.[1] CMG determined that such a restriction would affect virtually no developed areas surrounding the base. The United States Air Force confirmed this determination in the EIS for Grissom AFB.

Slot restrictions are quite different from noise restrictions and should not be considered in aggregate. Slot restrictions apply only to high density airports, which include: Chicago O'Hare, New York La Guardia, New York JFK, and Washington National. The FAA places limits on hourly operations at these airports by issuing time slots. Such slots would not be required at the Grissom site. While noise restrictions should be considered as a matter of course, the analysis of slot restrictions is unnecessary.

4.2 U.S. Customs Clearance is an important subfactor especially when estimating the potential for international service. CMG analyzes this subfactor in the strengths and weaknesses table. CMG concludes that international clearance could be considerably quicker at the Grissom site. However, CMG notes that the lack of U.S. Customs at the site is a weakness.

For international flights, pilots are required to provide customs notification as part of the routine flight plan.[2] This process requires additional authorization from authorities other than ATC. Approval from such authorities could be considerably quicker for airports with less congestion and more efficient ATC operations. CMG's assessment of international certification is warranted; the conclusion regarding the presence of U.S. Customs, however, is irrelevant. Given the prior use of the Grissom AFB as a military facility precludes the need for U.S. Customs operations. Thus, we would not expect such services to be in existence at this site. A better assessment would focus on the potential to establish U.S. Customs at Grissom.

5.0 The fifth set of subfactors is associated with airport facilities. An assessment of airport facilities can provide an indication of needed improvements. CMG includes six subfactors within this set.

5.1 CMG includes the Runway Length subfactor in the strengths and weaknesses table. CMG determines that the runway length at Grissom (12,500) either meets or exceeds all aircraft standards. Grissom AFB at one point housed an A-10 aircraft, which is one of the military's most demanding aircraft in terms of runway length. CMG concluded that despite this capacity, Grissom AFB's single runway configuration is a weakness. Runway length (and the number of them) are incomplete variables. Runway length should be expanded to consider all of the other dimensions which comprise runway capacity.

---

[1] United States Air Force. Environmental Impact Statement for Grissom Air Force Base. Sept. 1994. p. 3-90.

[2] Federal Aviation Administration. Airman's Informational Manual. 1981. Paragraph 298.

5.2 CMG includes Runway Taxiway Strength as a separate subfactor in the strengths and weakness table. Runway strength bears a strong relation to runway capacity, and therefore, should somehow relate to runway length. Though taxiway strength also relates to capacity, taxiways are more independent from landing capacity and relate more to maneuverability. Thus, CMG should have grouped the analysis according to runway capacity (including length and strength) and taxiway capacity (including strength and other factors). The assessment of these facilities allows for the estimation of capital development needs and costs.

5.3 CMG discusses the aircraft ramp space in the strengths and weaknesses table. CMG finds that a significant amount of ramp space is available for air cargo planes. CMG points to the separation of this space as a weakness. This conclusion lacks detail and specificity. Ramp space is available in locations both adjacent to the cantonment ramp space and separate from such space in the northeast corner of the airfield. Contrary to the assertion by CMG, the separation of ramp space may not be a liability for the Grissom location. Cargo facilities and operations, when located adjacent to each other, may conflict with the normal operations of the 434th. The separations of the uses may actually increase efficiency. Further, the separated ramp space is surrounded by vacant land which may be developed for air cargo. While the inclusion of this subfactor is necessary, the conclusions of CMG are questionable.

5.4 The Approach Aid Category is the fourth subfactor within this set. The Approach Aid is listed in the airport selection criteria for air cargo companies. CMG classifies this subfactor as "I" [important] in the airport selection criteria table. CMG states further that air cargo carriers require, at a minimum, a CAT II landing system. As discussed previously, Grissom AFB is said to be operating at a CAT I classification with CAT II capability.

Approach Aid is a crucially important subfactor in determining the efficiency of an airport facility. Landing systems are considerably more complex for airports which handle larger aircraft. CMG, however, does not provide additional information regarding the specific landing aids which collectively create the CAT II classification. Further, CMG does not consider the potential for upgrading the existing system to meet the demands of air cargo carriers. The FAA is committed to supporting CAT II and/or CAT III landing aid systems at airports serviced by air carriers.[1] Given this argument, the CMG analysis of this subfactor, however warranted, is incomplete.

5.5 The CMG analyzes the Airline Service Capacity subfactor in the strengths and weaknesses table to assess current commercial service being provided at Grissom AFB. The assumption is that current commercial service is an indication of [future] service capacity. CMG does not address the potential for the establishment of air service or the diversion of existing air service at remote airports; rather, CMG concludes that the potential of the Grissom site is weakened by not having commercial aviation already in existence.

Clearly the establishment of air service is more complicated than the simple increase in current activity level. However, given the situation at Grissom, this subfactor is irrelevant; no such service could have been in existence given Grissom's status as a military base up to September 1994.

5.6 Facility Capability is a "catch-all" subfactor that involves several dimensions. CMG uses this subfactor

---

[1] Federal Aviation Administration. FAA Strategic Plan. 1994. p. 73.

in the airport selection criteria table. Facility capacity may include runway capacity, landing systems, ATC, and other such elements. CMG determines that this subfactor is "I" [important] for all-cargo carriers in selecting an airport. This subfactor is not defined and not discussed beyond the airport selection criteria table. The information on this subfactor requires aggregation, thus distorting its multidimensional character. This subfactor is inappropriate in its present form; such an assessment should lie in more than one related subfactor.

6.0 Revenues are crucially important to the determination of the feasibility of the air cargo reuse. CMG includes potential revenues in the strengths and weaknesses table and the airport selection criteria. CMG does not counter the revenue analysis with cost estimates. CMG did not intend to analyze specific costs. Because of this, the revenue analysis lacks the balance that otherwise would be provided through cost and benefit accounting.

6.1 Airport Fees and rents collected by the local airport authority are sources of direct revenue for the operation and maintenance of the airport facility. CMG analyzes such revenues including landing fees, ramp fees, and facility rents. CMG, through the strength/weakness table, assumes that such fees would be competitive relative to other airports.

The CMG analysis is neither detailed nor complete. Competitiveness is clearly a strength; however, no relative competitiveness is discussed. No dollar figures, relative or absolute, are offered in making such a determination. Additionally, the sources of revenue are far more diverse than that provided by CMG. Other source of revenue may include state funding, federal funding, airport taxes, gas tax, and similar property tax revenues. The revenue analysis in the CMG study deserves more attention in these regards.

6.2 Cargo facility fees are the rents charged to the air cargo provider for the use of facilities. These fees may include rent for facilities as well as docking fees. CMG includes this subfactor in the airport selection criteria listing. Such fees are "I" [important] to air cargo companies in making an airport selection. CMG aggregates facility fees with Airport Fees (subfactor 6.1) in the strengths and weaknesses table. Again, CMG concludes that the Grissom site can offer fees that are extremely competitive.

Subproblem #3: Economic Development (table 4.2)

7.0 The seventh set of subfactors is associated with the analysis of a target industry. Target industry analysis is defined at length in subsequent chapters. CMG does not define target industries; rather, the definition is implied based on the type of analysis provided. Target industries are implied as meaning those industries or sectors of the local economy which rely heavily on air cargo as a primary means of transporting goods.

7.1-7.3 Pharmaceuticals/Chemicals and instruments are the major commodities which dominate Indiana air exports with a 51.6% collective share of the dollar value of air traffic.[1] While dollar value is important for computing revenues and ad valorem taxes, airlines and forwarders are primarily concerned with weight. Pharmaceuticals/Chemicals and Instruments account for 26.5% of the weight of Indiana air exports. Machinery is another leading commodity group with a 21.6% share of the weight of Indiana air exports. Either by weight or by value, the Pharmaceuticals/Chemicals and Instruments commodities have the largest share of Indiana air exports. This is due in part to an average $75.00 per pound value.[2] CMG investigates further, the type and growth of air exports for Indiana. CMG finds that growth in these industries have averaged 1% and 6% respectively between the years 1989 and 1993.[3]

---

[1] Cargo Marketing Group. p. 28.
[2] ibid. p. 29.
[3] ibid. p. 33.

Despite the findings, CMG provides no analysis beyond this point. The CMG findings warrant the further exploration of this issue. The pharmaceutical industry could be a "target industry" (explained further in Chapter 5) in that the industry stands to be a primary beneficiary of the redevelopment by having a gateway that is closer and more efficient. Further, the air cargo reuse may be more feasible in the event that an established relationship be built between the air carrier and the major exporters of the region. CMG's analysis is appropriate, yet incomplete in addressing the target industry for this reuse.

7.4 CMG analyzes the Airline Tariff subfactor in both the strengths and weakness table and the airport selection criteria table. The term "airline tariff" used by CMG means the general rate schedule for an airline. CMG acknowledges that the tariffs may be lower at Grissom than those at competitor airports; however, CMG gives no explanation as to why such a situation may exist. An argument is needed to support this proclamation. More important is the need to define the estimated size of the differential in tariffs. The differential has a positive relationship with the comparative advantage of the Grissom site.

7.5 Similar to airline tariffs are those rates which are established by airfreight forwarders. CMG analyzes the Forwarder Tariff subfactor in both the strengths and weakness table and the airport selection criteria table. In this case, however, CMG asserts that such rates would be equal to those at competitor airports. CMG offers no foundation for this argument. Though forwarders typically do not compete at the same level as air carriers, forwarders could conceivably benefit from the same locational cost advantages experienced by air carriers at Grissom. Lower air carrier tariffs *and* lower forwarder tariffs can combine to offer a significantly lower total tariff compared to competitor airports. Thus, the *additive effect* of lower tariffs could magnify the competitive position of Grissom. CMG does not consider this type of effect.

In neither subfactor 7.4 nor 7.5, CMG does not draw a connection between rate differential and the target consumer of air cargo service. The tariff differentials could have profound effects on the primary consumers of air cargo service. Growth in transportation services is based on such "relationships" between consumer and provider.

Evaluation of Calculation Method

We may evaluate the calculation method based on the following criteria. First, the calculation method must eliminate biases and remain objective. Secondly, we must account for the unique significance of each subfactor. Finally, the calculation method must be capable of producing an interpretable result.

The Cargo Marketing Group relies on a combination of written analysis, an airport selection criteria, and a strengths and weaknesses table for presenting subfactors. CMG presents findings and recommendations based on the paramount issues brought out in these analyses. CMG divides the findings into five (5) categories which are as follows: demographic, cargo industry trends, airport operational, domestic cargo service, international cargo service. Key issues are discussed within each category. CMG uses these findings to generate a probability for success, which is in the form of a percentage.

The Cargo Marketing Group conclusions are tainted because of far too little support data. CMG's conclusions, therefore, appear to contain subjective judgement. For example, CMG states the potential for attracting companies is low because of the "appearance" of too much competition. More analysis of competitor airports and air cargo carriers would allow us to better quantify this potential. Further, CMG does not account for the possibility of relocating service from a competitor airport to Grissom. Other such examples exist. In most cases, further analysis would make such conclusions more objective.

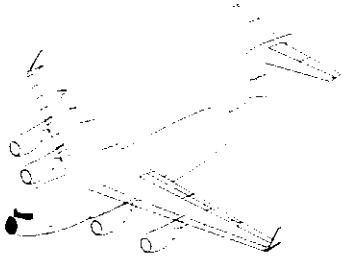
The degree to which each subfactor determines the feasibility is not explicitly stated. We may, however, make some inferences based on the statement of findings and conclusions. Cargo Marketing Group appears to be most concerned with the market potential for both domestic and international air cargo service. More specifically, competition appears to be the key limiting factor to CMG analysis. CMG also places emphasis on the operational components of the existing facility. The lack of hangar space, the landing system Category, and the ramp space are limiting factors. CMG analysis of industry trends is reasonable and provides insight on Europe as a potential market for service at Grissom. Though providing a thorough analysis of the manufacturing labor force growth in Indiana, CMG gives such analysis little regard in presenting the findings and conclusions.

The result of the feasibility study is easy to interpret. CMG states that, at best, international all-cargo has a 20-35% success probability and, at worst, international integrator/express has a 0-10% success probability. The results, however, are not in the same form as the analysis. We found that the analysis was based on three forms: written, an airport criteria table, and a strengths and weaknesses table. Yet the result is displayed as a percentage. The conversion between the written form of the conclusions and the probability for success is not defined. **We, therefore, must question if CMG has accurately depicted the true feasibility.**

Probability statistics is an extremely useful method in conveying information. CMG, however, has misused the probability method to summarize subjective, written arguments.

Based on these criticisms, we must reform the method for generating an accurate feasibility study. Once we have identified a method which meets our criteria, we may apply it in reevaluating the feasibility of reusing Grissom AFB as an air cargo facility.

Chapter 5
Preferred Method



- Subfactor List
- Justification of Subfactors
- Calculation Method

Introduction

This chapter builds upon the evaluation of the methodology contained in the Air Cargo Hub and Other Aviation Potential Feasibility Study completed for Grissom AFB by Cargo Marketing Group. We concluded in the previous chapter that the CMG Study does not account for comprehensive and regional subfactors. The accuracy of that study, therefore, is questionable. This chapter presents a new list of subfactors for assessing the feasibility of an air cargo reuse for any closed Air Force base. The proposed subfactors are more comprehensive, thus, correcting the deficiencies found throughout the CMG Study. We offer justification for including each subfactor.

The proposed list of subfactors has undergone a two-step review process and meets the general approval of the Grissom Redevelopment Authority. We then apply this list of subfactors in reassessing the feasibility of air cargo at Grissom AFB (see Chapter 6).

Table of Subfactors

Subproblem #1: Regional Need

Line	Subfactor	Derived Source
1.0	**Aviation Demand Forecasts**	
1.1	Demand Forecasts for Primary Use Airports	TAMS
1.2	Aviation Demand Forecasts for Joint Use Airports	Personal
2.0	**Market Potential**	
2.1	Air Cargo Industry	CMG
2.2	Distance from major airport	CMG
2.3	Competition	CMG
2.4	Existing Company Relocation	Personal
2.5	New Company Location	Personal
3.0	**Employment Characteristics**	
3.1	Commuting Shed	Personal
3.2	Labor Pool	Personal
3.3	Skill Level/Education	Personal
4.0	**Marketability**	
4.1	Transportation Access-Highway	USAF
4.2	Transportation Access-Rail	USAF
4.3	Utility Charge and Credits	IADC
4.4	Tax Rates and Abatements	IADC
4.5	Protection Services	IADC

Table 5.1

Table of Subfactors

Subproblem #2: Feasibility

Line	Subfactor	Derived Source
5.0	**Airspace and Traffic Control**	
5.1	Aircraft Arrival Delay	TAMS
5.2	Aircraft Departure Delay	TAMS
5.3	Conflicting ATC Uses	Personal
5.4	Change to ATC Systems	USAF
5.5	Movement of Other Air Traffic	USAF
5.6	International Certificates/U.S. Customs	FAA
5.7	Foreign Trade Zone (FTZ)	Pease
6.0	**Legal Requirements and Responsibilities**	
6.1	Recipient Owner Technical Capacity	Fisher
6.2	Technical Capacity of Agencies (other than recipient)	Personal
6.3	FAA Requirements and Standards	Personal
6.3	Noise Requirements	USAF
6.4	EPA General Requirements	USAF
6.5	Hazardous Substance Requirements	USAF
6.6	NEPA Requirements	DBCRC
6.7	CERCLA Requirements	DBCRC
6.8	Conveyance Method	Personal
6.9	Conveyance Requirements	Personal
7.0	**Airport Facilities**	
7.1	Runway Capacity	CMG
7.2	Runway Availability	CMG
7.3	Taxiway Capacity	CMG
7.4	Surface Aircraft Parking Availability	Personal
7.5	Hangar Availability	Personal
7.6	Radar Approach Control Capacity	RKG
7.7	Land Use Compatibility	EDAW
7.8	Internal Circulation	RKG
7.9	Infrastructure Circulation	Personal
7.10	Infrastructure Capacity	USAF
7.10a	Water	USAF
7.10b	Sewerage	USAF
7.10c	Electric	USAF
7.10d	Gas	USAF
7.11	Employee Parking	TAMS
7.12	Truck Parking	Personal
7.13	Public Parking	TAMS
8.0	**Costs**	
8.1	Facility Modification	TAMS
8.2	New Construction	TAMS
8.3	Structure Demolition	TAMS
8.4	Tower Improvements	Personal
8.5	Utility Improvements	TAMS
8.5a	Water	
8.5b	Sewerage	
8.5c	Electric	
8.5d	Gas	

Table 5.2

Table of Subfactors

Subproblem #2: Feasibility (continued)

Line	Subfactor	Derived Source
	Costs (cont.)	
8.6	Utility Demolition	TAMS
8.6a	Water	
8.6b	Sewerage	
8.6c	Electric	
8.6d	Gas	
8.7	Utility Relocation	TAMS
8.7a	Water	
8.7b	Sewerage	
8.7c	Electric	
8.7d	Gas	
8.8	Capital Equipment	Personal
8.9	Environmental Remediation	USAF
8.10	Site Preparation	Personal
8.11	Operational Delay	TAMS
8.12	New Airport Facilities	USAF
8.13	Debt Issued	TAMS
8.14	GARB Interest Rate	TAMS
8.15	Revenue Bond Interest Rate	TAMS
9.0	**Operating costs**	
9.1	Management	Personal
9.2	Maintenance	Personal
9.3	Marketing	Personal
9.4	Administrative	Personal
10.0	**Revenues**	
10.1	FAA Operational Funding	Personal
10.2	AIP Funding Potential	TAMS
10.3	State Funding	Personal
10.4	Local Funding	CMG
10.5	Landing Fees	Leigh Fisher
10.6	Airport Tax	Personal
10.7	Gas Tax	Leigh Fisher
10.8	CEDIT Revenue	HNTB
10.9	COIT Revenue	HNTB
10.10	Property Tax Revenue	Personal
10.11	Sales Tax Revenue	Personal
10.12	Lease Revenue	Leigh Fisher
10.13	Utility Revenue	Personal
10.14a	Water	
10.14b	Sewerage	
10.14c	Electric	
10.14d	Gas	

Table 5.3

Table of Subfactors

Subproblem #3: Economic Development

Line	Subfactor	Derived Source
11.0	**Economic**	
11.1	Matching of Supply Linkages	Blakely
11.2	Absorption of Displaced Labor Force	Blakely
11.3	Job Creation/Retention - local	CMG
11.4	Increased Transactions - as a producer	Chatterji
11.4a	Land Transportation	Chatterji
11.4b	Forwarder/Broker	Chatterji
11.4c	Air Carrier	Chatterji
11.5	Increased transactions - as a consumer	Chatterji
11.5a	Land Transportation	Chatterji
11.5b	Forwarder/Broker	Chatterji
11.5c	Air Carrier	Chatterji
11.6	Job Creation/Retention - regional (indirect)	Personal
11.7	Created Regional Locational Advantages	Blakely
12.0	**Target Industry**	
12.1	New Linkage Potential	Blakely
12.2	Transportation Cost Differential	Personal
12.2a	Gallonage	Personal
12.2b	Time/wages	Personal
12.2c	Depreciation of equipment	Personal
12.3	Tax/fees Differential	Personal
12.4	Routing Capacity	Personal
12.5	Potential Revenue	Personal
12.6	Freight (in dollars)	Personal

Table 5.4

Justification for the Inclusion of Subfactors

We identify 12 categories of subfactors which are necessary in assessing the feasibility of air cargo at a realigned Air Force base. The categories include: Aviation Demand Forecasts, Market Potential, Employment, Marketability, Airspace and Traffic Control, Land Conveyance and Ownership, Airport Facilities, Capital Costs, Operating Costs, Revenues, Economic Development, and Economic Development to Target Industries. Numerous subfactors comprise each category. We group the categories according to the three subproblems. Justifications for each of the subfactors in tables 5.1 thru 5.4 are as follows.

Subproblem #1: Regional Need (table 5.1)

1.0 The first set of subfactors is associated with the existing demand for aviation services at target airports. The target airports included in this analysis include Primary (PR) airports which lie within the defined catchment area of the base (refer to Chapter 2). A PR airport is defined as a commercial service airport which is determined by the Secretary to have more than 10,000 enplanements annually. The PR classification is the most limiting classification for airports. Subfactor 1.1 includes all PR airports within the base's catchment area. Target airports also included in the analysis are joint use aviation airports.

1.1 The Aviation Demand for PR Airports subfactor is multidimensional. First, we identify all PR airports within the catchment area for the base, as defined in Chapter 2. Second, we analyze the airports based on level of air carrier service (e.g. total annual enplanements). TAMS Consultants recognize the need to analyze annual enplanements for possible competing airports. Annual enplanement figures can help gauge the level of service at certain airports and provide indications for potential deferment of service. Thirdly, we extract aviation demand forecasts from FAA documents for these airports. Demand increases are another such indicator for potential new development. We should not consider air cargo enplanement data independent of total enplanement data; rather, we should present air cargo operations data as a percentage of total operations. Increases in the percentage of air cargo operations can show growth relative to other forms of aviation.

1.2 The Aviation Demand for Joint Use Airports subfactor is similar to Subfactor 1.1. Joint Use aviation facilities are closer to perfect substitutes in terms of facility character. Eighteen (18) Joint Use airports are currently in operation across the United States. Because of the aforementioned reasons the inclusion of this subfactor is necessary to establish a basis for analyzing regional need.

2.0 The second set of subfactors is associated with the market potential for air cargo development at the base. The subfactors of industry growth, competition, and complement air cargo operations are included in this set.

2.1 Air Cargo Industry Growth is a market potential subfactor derived from the CMG feasibility study. Growth in a particular industry may indicate a potential for future expansion. Statistics discussed in the CMG study shed some light on the air cargo industry growth. Despite the relatively high cost to export via air carrier, the air cargo industry has outpaced all other forms of cargo transport. Since a relationship exists between industry growth and company expansion, the inclusion of this subfactor is necessary.

2.2 Distance from Major Airports is a necessary subfactor when assessing market potential. The air cargo facility will compete for air cargo service with all other airports within the catchment area. Those airports considered within subfactor 1.1 are used for the computation of this subfactor. The market potential for air cargo service at the air cargo facility will depend on not only the level or excess capacity at other major airports but also the distance from those airports.

2.3 Competition is the most common subfactor used in market analysis. The air cargo facility is no exception. The air cargo facility will compete with all other PR airports serving the catchment area. CMG states that the amount of competition in the area, as defined by CMG, creates a weakness for the reuse potential. The analysis, however, is incomplete in that CMG does not consider the potential for transferring air cargo service from competitor airports. Competition is also dependent upon the level of service type of air traffic generated at the air cargo facility.

2.4 Existing Company Relocation is a market potential subfactor that is necessary for inclusion in this study. Existing Company Location means the potential for an existing company within the catchment area to transfer part or all of its air service to the air cargo facility. Companies located at competing airports within the catchment area are not assumed to be fixed. Air cargo companies with hubs at competing airports may find advantages to transferring part or all of its operations to the air cargo facility. Depending upon the level of air and land traffic congestion, the air cargo facility has the potential to serve as a reliever airport to airports within the catchment area. Further, the site may also be cost effective for company relocation. For these reasons, the inclusion of this subfactor is necessary.

2.5 New Company Location is a market potential subfactor associated with the development of new service providers to a given market area. New Company Location means the potential for an existing company outside the catchment area to locate services at the air cargo facility.

3.0 Employment Characteristics is an important subfactor in determining the market potential of a particular industry. Given the level of training necessary for flight operations and air traffic control, Air cargo companies draw on a national pool of applicants. However, the base site may appear advantageous because of the displaced labor force resulting from the realignment. For these reasons, the inclusion of this subfactor is necessary.

3.1 The Commuting Shed is an important subfactor when generating a profile of a particular area. The commuting shed means the area defined by the maximum possible, land-based commuting time to a place of employment. The generally accepted maximum tolerable commuting time is 45 minutes. This time can be mapped over an area surrounding the air cargo facility (similar to that shown figure 2-3). All persons living within the commuting shed are potential employees of an air cargo facility and will not require a change in residence. Given the relationship between the employment potential and those within the commuting shed, this subfactor is necessary in determining regional need. This subfactor is also useful in employment projections discussed later.

3.2 The Labor Pool is a subfactor which has no size constraint. The labor pool for a company is defined by the type of activity, level of skill, and location. The labor pool is not limited to the commuting shed. Airport operation is a highly specialized industry. Conceivably, the labor pool for air cargo is national.

3.3 Skill Level and Education is an important regional need subfactor. RKG in the Reuse Plan describes the immediate need to retrain and reemploy the displaced workforce from the realignment. In order for air cargo to generate more benefit to the local economy, the skill level of the commuting shed must be adequate or the opportunity for retraining must exist. For these reasons, the inclusion of this subfactor is necessary.

4.0 The third set of subfactors is associated with the marketability for air cargo development at the base site. Marketability subfactors include access, utility rates, and other such subfactors which influence the attractiveness of a particular site.

4.1-4.2 Transportation Access is perhaps the most important determinant of the marketability of land. Transportation Access is a subfactor included in most all base reuse planning studies. The U.S. Air Force is credited as the derived source for this subfactor because of the level of specificity found in the EIS documents for base realignments. Bonnie Fisher identifies transportation as one of the nine key issues to military base redevelopment. Military bases, by their nature, are transportation hubs and base developers should capitalize upon this transportation opportunity.[1] Christopher Chadbourne and Associates in the Bangor International Airport Land Development Strategy labelled transportation access as one of the four A's in marketing airport facilities.[2] Transportation access includes vehicle access by highway or local road and rail access. Transportation access should not be viewed as a constant; rather, access can be variable in that facility development works in tandem with transportation development. For these reasons, the inclusion of this subfactor is necessary.

4.3 Lease Rates is perhaps the most important subfactor when assessing the marketability of the realigned base. Closed military base facilities have the potential for a tremendous comparative advantage relative to lease rates at comparable airport facilities. The lease rates at competitor hubs are fashioned on the operational cost of providing the facility as well as the capital debt and interest on the construction of the facility. Alternatively, the lease rate at the realigned military base is missing a major facet, the capital and interest cost. Given that the existing base facilities are sufficient to provide some level of air cargo activities, the lease rates need only be fashioned on the operational cost. The end result is a lease rate on facilities that is lower than comparable civilian airports. This advantage increases the attractiveness of the base facility.

4.4 Utility Charges and Credits is an important subfactor when assessing the marketability of a particular base. Utilities offering low rates or economic development credits can significantly reduce the operational cost for an industry, thus making certain areas more economically feasible. System capacity is equally important in marketability; but to avoid redundancy, system capacity is discussed only within the Airport Facilities set of subfactors. Competition for serving the base reuse is expected. This competition will generate lower rates and possible credits for activities generating economic development for the area. For these reasons, this subfactor is necessary for the analysis contained herein.

4.5 Tax Rates and Tax Credits can improve the marketability of land. The Indiana Development Council recommends the inclusion of this subfactor when generating a profile of a development site. Economic developers generally include this information as a matter of course, as most companies require a complete listing of rates and possible abatements. For these reasons, the inclusion of this subfactor is necessary.

4.6 Protection Services is a subfactor recommended by the Indiana Area Development Council. Protection Services include fire, police, and ambulance service from all available sources. Many realigned bases contain on-base police station, fire station, and a community health facility. The capacity of these services are generally high relative to the their current use after realignment. Air cargo industries, as with most industries, require a high level of protection service; therefore, the inclusion of this subfactor is important in illustrating the marketability of the base site to air cargo industries.

---

[1] Fisher, Bonnie. *Seizing the Opportunity In Military Base Closures.* Urban Land. August 1993. p. 14.

[2] Christopher Chadbourne and Associates. Bangor International Airport Land Development Strategy. p. 13. Originally Dow AFB in Bangor, Maine. Officially realigned in 1968.

Costs, both capital and operating, are necessary subfactors in assessing the marketability of sites on base. These subfactors and the arguments for their inclusion are discussed under other sets of subfactors.

Subproblem #2: Feasibility (tables 5.2 and 5.3)

5.0 The first set of subfactors is associated with the airspace and Air Traffic Control (ATC) system at the base. Air space clearance is necessary for any increase, enlargement or other changes in the nature of flight patterns surrounding the base. The role of the ATC system will increase with an increase in enplanements. This set of subfactors is associated with quantifying the effects that an increase in enplanements would have on the airspace and the ATC system.

5.1-5.2 Aircraft Arrival Delay and Aircraft Departure Delay are subfactors derived from TAMS Consultants. TAMS uses the estimated flight delays for the proposed airport development as a measure of efficiency. This subfactor is applicable to the air cargo facility in that flight delays can be estimated for the proposed air cargo reuse. The estimated delay times can be compared to flight delays at Primary (PR) airports. Aircraft delays cause cost burdens on air service providers; thus, differences in delay times among airports can create comparative advantage.

5.3 Conflicting Air Traffic Control Uses is especially important in the case of joint use aviation with both the military and air cargo service. The development of air cargo operations will require an agreement with the U.S. Air Force. The agreement must provide assurance that air cargo operations will not adversely impact military maneuvers. This subfactor is important in recognizing the certain concessions which must be made to allow both uses to exist.

5.4-5.5 Changes to the Air Traffic Control System and Movement of Other Air Traffic are subfactors derived from the U.S. Air Force. The Air Force includes these subfactors in Environmental Impact Statements prepared for Castle AFB, Grissom AFB, Eaker AFB, England AFB, and others. The Air Force recognizes the potential effect that amending the existing Air Traffic System at a particular location has on the FAA's strategic goals. As a federal agency, the Air Force is well-qualified to enter into the analysis a discussion of national objectives. Since the FAA has authority over aviation uses, the inclusion of this subfactor is prudent to this study.

5.6 International Certification is a necessary subfactor to consider if international air carrier operations are to be enplaned at the Grissom site. International air cargo operations with a terminal point in the United States shall use only those airports defined by the FAA as an International Airport. To receive the designation as an International Airport, the Commissioner of Customs must designate the airport as such for customs purposes.[1] U.S. Customs regulates all international aviation by requiring landing permission and regulating import merchandise. For these reasons, this subfactor is crucial in determining the potential for international service at the air cargo facility.

5.7 Foreign Trade Zones is an important subfactor to consider if Grissom is to offer international air service. Foreign Trade Zones (FTZ) are secure areas inside the United States where merchandise is taken and, for U.S. Customs purposes, are not considered within the U.S. While import merchandise is within the zone, it can be stored, tested cleaned, sampled, relabeled, repacked, and displayed, repaired, and otherwise manipulated.

---

[1] United States. Department of Transportation. Federal Aviation Administration. Airman's Information Manual. 1981. p. S-22.

Merchandise is not assessed a duty until it is brought out of the zone and enters the United States. FTZs create a potential for increased revenue to the shipping company. Actual tariffs are usually lower on final products than on the sum of the parts. Also, FTZs allow goods to be stockpiled pending better market conditions or until import quotas permit release.[1] The air cargo facility could take advantage of an FTZ classification if international service is offered. For these reasons, we must include this subfactor in the analysis.

6.0 The set of subfactors associated with land conveyance and ownership is important in considering the feasibility of an air cargo reuse at the base. The recipient of the surplus base property must be in a position to accept the burdens of redevelopment, maintenance, and planning. Legal constraints on conveyance methods can play a significant role in the cost and procedure for land conveyance. Beyond this, the FAA, EPA, and other federal agencies have regulations which may affect the operation of air cargo at this location.

6.1 Bonnie Fisher in *Seizing the Opportunity In Military Base Closures* extols the need for a strong, local agency to handle airport management. The management of former military property is best suited for public organizations with an emphasis on economic development.[2] Public organizations must have the technical capacity to not only mange the daily activities at the facility but also work towards redevelopment. Westover Air Force Base in Springfield Massachusetts and Pease Air Force Base in New Hampshire are two such examples where a public, nonprofit agency was able to assume full ownership and work effectively towards redevelopment. Technical capacity is an important subfactor that is often times overlooked by consulting base reuse planners, primarily because the agency being assessed is the agency which hired the consultant. For these reasons, the inclusion of this subfactor is necessary.

6.2 Technical Capacity for agencies other than the recipient is another important subfactor in assessing redevelopment responsibilities. Agencies falling under this subfactor include but are not limited to city and county governments, local or area planning commission, area economic development corporations, nonprofit development corporations, regional economic development associations, state department of commerce, state department of transportation, federal economic adjustment commission, and federal aviation administration. Technical capacity is more of an issue at the local level. Areas of relatively low population may find an insufficient amount of local technical capacity to cope with base realignment and reuse. In such cases, the role of the state in aiding redevelopment is increased. The technical capacity subfactor is a partial determinant of need for assistance.

6.3 The FAA Requirements and Standards for air cargo play an important role in determining the amount of improvements necessary and, ultimately, the feasibility of the reuse. The FAA sets standards for piloting procedures, runways, taxiways, navigational equipment (NAVAIDS), flight patterns, noise, air space control, and more. This subfactor includes only those standards which may affect operations and facilities at the particular base. This subfactor is necessary in developing substantiation for capital cost improvements.

6.4 EPA General Requirements is a subfactor which covers major EPA regulations not associated with NEPA, CERCLA, or hazardous waste. This subfactor includes requirements such as soils, water quality, wetlands. The subfactor is derived from the U.S. Air Force in EIS documents for Grissom AFB, Eaker AFB, England AFB, and Castle AFB. EPA requirements may affect the timing of redevelopment and, ultimately, the

---

[1] New Hampshire State Port Authority. The World Trader. 1994.

[2] Fisher, Bonnie. *Seizing the Opportunity In Military Base Closures*. Urban Land. August 1993. p. 14.

cost. Further, an analysis of these requirements is necessary to determine possible effects to the operations of the reuse.

6.5 We itemize the three (3) subfactors from the list of EPA requirements. Hazardous Wastes is one such subfactor which is derived from USAF EIS documents for Grissom AFB, Eaker AFB, England AFB, and Castle AFB. Hazardous wastes, primarily in the form of gasoline and cleaning solvents, require IRP remediation. Though the United States assumes all environmental liability with base realignments, the time required for remediation can affect redevelopment.

6.6 The National Environmental Policy Act of 1969 (NEPA) is an important subfactor to consider. The Defense Base Closure and Realignment Act of 1990 makes explicit the applicability of NEPA.[1] NEPA establishes a national policy to protect the environment and ensure that federal agencies consider the effects of actions in their decision making. The Council on Environmental Quality (CEQ) implements NEPA requirements and provides implementation assistance to the USAF in preparation of EIS statements. The U.S. Air Force pays reasonable regard to this requirement in EIS documents issued for all base closures and realignments. NEPA requirements affect not only base disposal and reuse but also all new or expansion development. For this and other reasons, NEPA is an important subfactor in assessing feasibility.

6.7 The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) is an important subfactor to consider aside from general EPA regulations. CERCLA places additional demands on the state IRP process. CERCLA requires that the United States include in the deed of transfer a covenant warranting that all remedial action necessary to protect human health and the environment has been taken prior to transfer; and the United States will take all remedial action found to be necessary after the date of transfer. CERCLA eliminates all burdens of remediation expenditures. However, CERCLA in combination with other such regulations will delay redevelopment, thus affecting the cost component of the feasibility subproblem. For this reason, the CERCLA subfactor is necessary in assessing feasibility.

6.8 The Conveyance Method subfactor has immense importance to many other subfactors in the analysis. The General Services Administration (GSA) provides for several methods for the disposal of realigned military facilities. Public Benefit Transfer (PBT) allows federal surplus land be granted to a public entity for a specified purpose at little or no cost. The cost savings of PBT can be significant. However, PBT limits flexibility is use. Another option is Negotiated Sale (NS) which creates an offering price at or near fair market value. Several other, less widely used methods are afforded to public, nonprofit, and private entities. In any case, the conveyance method will affect cost, reuse, revenue, and other factors important in the determination of feasibility.

6.9 The Conveyance Requirements subfactor is associated with subfactor 6.8. The GSA establishes different requirements depending upon the conveyance method. Generally, the conveyance methods which generate offers below market value have more requirements. Each requirement adds a cost burden to the recipient property owner. The requirement may also affect the recipient's ability to provide technical administration. This subfactor, therefore, is equally important to subfactor 6.8.

7.0 An assessment of airport facilities, as they presently exist, is important in establishing a basis developing cost and revenue feasibility analysis. The following subfactors are necessary components to an airport assessment.

---

[1] Defense Base Closure and Realignment Commission. 1993 Report to the President. 1993. p. A-8. Also codified as 10 USC 2687 §2905(c).

7.1 Runway Capacity is a subfactor derived from the CMG Study. CMG does not assess the runway capacity for Grissom AFB; rather, CMG classifies the subfactor as "extremely important" in the airport site selection criteria for air cargo companies. The inclusion of this subfactor is necessary in developing the feasibility assessment.

7.2 Runway Availability is another such subfactor derived from the CMG study. CMG classifies the subfactor as "somewhat important" in the airport site selection criteria. We understand that scheduled air service to the airport shall not interfere with military operations; therefore, the inclusion of this subfactor is necessary in determining the capacity for development.

7.3 Taxiway Capacity is another subfactor derived from the CMG study. CMG classifies the subfactor as "extremely important" in the airport site selection criteria. CMG also finds that the existence of a taxiway system can be an asset to the air cargo facility. As RKG points out, however, certain taxiway modifications may be necessary should the base expand to include air cargo operations. The inclusion of this subfactor is necessary for the assessment and further analysis contained herein.

7.4 Surface Aircraft Parking Availability is a subfactor which is necessary for determining aircraft capacity and apron expansion. Parking areas lying outside the cantonment area are a tremendous asset for the air cargo facility. However, the boundary for the cantonment area may separate available parking areas or restrict access thereto. Reuse of parking areas in such situations will require additional taxiways. For these reasons, aircraft parking availability is a necessary subfactor in assessing the airport facilities.

7.5 Hangar Availability is an important subfactor in assessing airport facilities. The availability and condition of hangars left outside the cantonment area will aid in determining the site's marketability to air cargo companies and the level of capital improvements necessary to achieve adequate marketability. For these reasons, we include this subfactor in the analysis.

7.6 Radar Approach Control Capacity is a multidimensional subfactor that is necessary in assessing the airport equipment. RKG includes this subfactor in the Reuse Plan. RKG provides the most complete assessment of tower facilities and, therefore, is considered to be the primary derived source for this subfactor. The U.S. Air Force in the EIS documents also include an assessment of radar and tower facilities. Radar Approach Control includes airport lighting and navigational aids (NAVAIDS). The Air Traffic Control Tower has a potential for reuse or joint use as a fixed operations control area for air cargo.

7.7 Land Use Compatibility is a subfactor derived from EDAW, which approached this subject in Planning Civilian Reuse of Former Military Bases, prepared for the President's Economic Adjustment Committee. EDAW states that adjacent land uses, zoning, and recent development proposals in the vicinity of the base are critical data to obtain as they may affect land use compatibility on base. Michael Beyard states that first, and foremost, a realigned military base must be "reverse engineered"; for example, new lot lines and building sites must be plotted.[1] This reverse engineering is a prerequisite to land use controls.

---

[1] Beyard, Michael D. *When the military Leaves Town.* Urban Land. June 1987. p.7.

7.8 Internal Circulation is a subfactor derived from RKG Associates. As a supplement to the Reuse Plan, RKG prepared the Transportation Plan in association with HNTB Corporation. In that plan, RKG provides a basic assessment of base facilities. RKG points out the potential impact on existing transportation routes by restricting access to the cantonment area. Changes to the existing routes may be considerably smaller in situations in which a cantonment area does not exist. The RKG study is adequate in its appraisal and reinforces the importance of this subfactor.

7.9 Infrastructure Circulation is a subfactor that is necessary in addressing military base reuse. Under Federal ownership, Air Force bases do not contain easements and individual land parcels. The President's Economic Adjustment Committee to the Department of Defense notes that on-base utility lines were almost always installed from point A to point B. Many of the utility lines run underneath buildings built later.[1] Land conveyance to a public or private recipient will necessitate the mapping of easements and land parcels. Crucially important is the assessment of infrastructure for purposes of designating easements. Easements and infrastructure circulation should be compatible with current engineering standards.

7.10 Infrastructure Capacity is a subfactor included in most all base reuse planning documents. This subfactor includes water, sewerage, electric, and gas systems on the base. The U.S. Air Force is credited as the derived source because of the level of specificity found in the EIS documents for base realignments. Capacity of these systems serve as a primary gauge for the amount of potential redevelopment.

7.11 - 7.13 Employee Parking, Truck Parking, and Public Parking are important subfactors that are often excluded from analysis. TAMS Consultants includes employee and public parking as subfactors in assessing potential sites for a new airport development. RKG briefly discusses truck mobility in the Transportation Plan. These subfactors are important in assessing the marketability of certain sites. Further, they may provide information as to the need for capital improvements. For these reasons, the we include these subfactors.

8.0 This set of subfactors is associated with capital costs. CMG did not intend to analyze costs. This study includes costs and revenues as a substantial component in determining the feasibility of physical base conversion. Capital costs are being considered by HNTB in preparing the Joint Use/Aviation Feasibility Study for Grissom AFB. Leigh Fisher discusses the implementation of a Capital Improvements Program for prioritizing capital cost expenditures in the Financial Operation of a Portion of Mather AFB as Mather Airport. Capital costs are categorized within 14 subfactors. Capital costs are necessary but not exhaustive in determining the feasibility of air cargo.

8.1 Facility Modification is a subfactor derived from HNTB draft materials of the Joint Use/Aviation Feasibility Study. Facility modification consists of that which is necessary to support the reuse and that which is necessary to support an expansion of the proposed reuse. Facility expansion is dependent upon a myriad of related subfactors. Primary, however, are the goals of the airport authority in terms desired level of air cargo service.

8.2 New Construction is another subfactor derived from HNTB. TAMS Consultants also includes new construction in the airport site selection methodology. New construction includes all new buildings and structures which are required to support the air cargo use of facilities. HNTB states that the construction of new

---

[1] Office of the Secretary of Defense. Office of Economic Adjustment. President's Economic Adjustment Committee. Planning Civilian Reuse of Former Military Bases. 1978. p.15.

facilities is a function of a warehouse utilization rate. The utilization rate is a relationship between enplaned cargo tons and warehouse size. The utilization ratio is deficient in that it does not account for the size of the cargo. Despite this, a relationship between the characteristics of the enplaned cargo and the size requirement for warehouse facilities *does* exist.

8.3 Structure Demolition is a subfactor used by TAMS Consultants. TAMS discusses the demolition of civilian structures for purposes of constructing new, public facilities. RKG in the Reuse Plan for Grissom AFB discusses structure demolition to make way for alternative uses. The air cargo reuse usually necessitates less structure demolition than most other reuse alternatives. Obsolescent buildings, however, may require demolition to allow for the efficient operation of air cargo. Structure demolition may also be warranted in situations in which rehabilitation costs are prohibitive.

8.4 Tower Improvements is a subfactor that is necessary in assessing the feasibility of military base conversion. In situations in which a realigned Air Force base retains air operations, the base reuse planner must assess the cost to convert the air control tower to accommodate joint use. In situations in which the base retains no air operations, the base reuse planner must assess the cost of complete conversion of the air control tower.

8.5 Utility Improvements is a subfactor included in most base reuse planning documents. Utility improvements may be necessary to improve efficiency; additionally, system improvements may be necessary to provide service to new facilities. Utility upgrade improvements may be needed to increase capacity for current facilities. Utility system improvements will affect other subfactors such as cost, revenue, marketability, and airport facilities. For these reasons, an assessment of utility improvements is necessary.

8.6 Utility Demolition is a subfactor that is typically associated with utility improvements. The USAF in preparing EIS reports for realigned bases does not make recommendations for utility demolition without recommending replacement. In the process of either relocation or reconstruction, however, utility demolition may be desired. TAMS Consultants recognize this point and includes this subfactor in the airport selection methodology. Utility demolition may also be part of the reverse engineering process discussed herein. For these reasons, this subfactor is important in assessing capital costs.

8.7 Utility Relocation is a subfactor that is uniquely important to reusing military bases. Utility relocation means a new segment replaces a closed segment of a given utility. This subfactor affects the engineering of new property parcels, dedication of easements, and system quality. These effects can be calculated in other subfactors.

8.8 Capital Equipment is a necessary subfactor in determining cost feasibility. Capital equipment includes protection service vehicles, air tower control equipment, and general airfield support equipment. RKG includes this subfactor in the Grissom Air Force Base Reuse Plan. A minimum investment in capital equipment is necessary to support the air cargo use. Additional investments in capital equipment may improve an airport's level of service, a component of the site selection criteria for air cargo operators.[1] The Office of Economic Adjustment (OEA) may identify and retain support equipment as personal property.[2] This property may be

---

[1] Cargo Marketing Group. Air Cargo Hub and Other Commercial Aviation Potential Feasibility Study for Grissom Air Force Base. July 1994. pp. 40-41.

[2] Department of Defense. Directive 5410.12.

conveyed to the airport authority using the same terms as the surplus property. The conveyance of this equipment via PBT or any method generating a less than market price can represent a significant cost savings for the airport authority.

8.9 Environmental Remediation is a multidimensional subfactor that is not only a cost, but also an advantage for the airport authority. The Legal Requirements and Responsibilities subfactor set elaborates on the environmental issues. This subfactor is an assessment of the cost associated with these issues. Though the direct cost of environmental remediation is born by the Department of Defense, the opportunity cost associated with the IRP process may be quite high.

David Steinberg in *The Hidden Costs of Closing Military Bases* discusses an additional component to the issue of opportunity cost. CERCLA's Superfund is not available to the Department of Defense for environmental remediation at closed military bases. In its place, the DBRCA established the Defense Environmental Restoration Account. The funding limitations of this account inhibit the Department of Defense's ability to correct all environmental problem sites. The Department of Defense uses a priority model that essentially deals with the worst cases first.[1] The "worst case first" model leaves lower priority sites unattended for a period of time. The deferral of remediation at lower priority sites adversely affects the opportunity cost of redevelopment.

The direct cost associated with environmental remediation need not a part of the cost accounting for the airport authority. This cost savings is an advantage for the authority. The airport authority stands the most to gain in a situation in which the identified sites are classified as high priority and require high remediation costs.

8.10 New Airport Facilities is a subfactor that accounts for all road and airfield surface improvement costs. This subfactor includes parking, taxiway, and runway improvement costs. Runway improvements are usually associated with the down-sizing of the runway in efforts to reduce maintenance costs. Taxiway improvements are more prevalent in joint use situations in which mobility has been limited by the imposition of the cantonment area. Parking and loading areas for trucks are other necessary improvements. Portions of these improvements are necessary to support *any* joint use aviation. Later development will necessitate additional improvements.

8.11 Site Preparation is an important cost component that must be considered separate from new airport facilities. The Site Preparation subfactor includes improvements such as landscaping, wetland restoration, and natural drainage. The USAF identifies and designates wetland lakes and natural drainage areas for bases in the EIS documents for realigned bases. Facility expansion , new construction, and new airport facilities may necessitate additional site preparation. For this reason, the Site Preparation subfactor is necessary in assessing capital costs.

8.12 Debt Issued is an important subfactor in considering the cost liability of redevelopment. The type and amount of debt will play a significant role in the amount and rate of redevelopment. Several debt services are available to airport authorities in the development or redevelopment of airport facilities. TAMS Consultants extract the two (2) most common types used for airport improvements and consider the associated interest rates

---

[1] Steinberg, Barry P. *The Hidden Costs of Closing Military Bases*. PM. May 1991. Steinberg also discusses the inordinate cost to the Federal government. By offering property at lower than market rates, while assuring environmental responsibility, the Federal Government is taking a tremendous loss on investment in military property.

as separate cost subfactors. Because of anticipated use in the redevelopment of the base, these interest rates are considered in subfactors 8.13 and 8.14 respectively, and separate of this subfactor. The Debt Issue subfactor includes, collectively, all other forms of debt service and the duration of such debt.

8.13 The General Airport Revenue Bond (GARB) Interest Rate is an important subfactor to consider because of its potential use in the redevelopment of the base. Due to 1982 changes in Federal Law, revenue generated by air cargo facility can be diverted to finance the interest on these debts.[1]

8.14 The Revenue Bond (RB) Interest Rate for bonds issued by the airport authority is an important subfactor to consider because of its potential use in the redevelopment of the base. Bonds which are backed by multiple sources stand to gain a better rating, thus lowering interest rate cost.

9.0 This set of subfactors is associated with operational costs. CMG did not intend to analyze costs. Cost and revenues comprise a significant portion of the feasibility analysis in this study. HNTB is considering operational costs in preparing the Joint Use/Aviation Feasibility Study. Studies indicate that operational costs for civilian operated realigned military bases are significantly lower than military operated bases.[2] Operational costs are categorized within four (4) subfactors. Operational costs are necessary in determining the long-term feasibility of air cargo.

9.1 Personnel Costs is an operational cost subfactor which includes the wages, benefits, and payroll taxes for airport staff personnel. In situations in which Air Force operations are retained, a standard Base Caretaker Agreement between the airport authority and the U.S. Air Force will establish some of the direct and indirect payroll cost as well as staffing requirements. HNTB establishes a core personnel requirement for airport operations which includes the following job classifications: airport manager, assistant airport manager, secretary, operations supervisor, maintenance supervisor, and airport maintenance personnel. The U.S. Air Force provides personnel to operate control tower operations for military aircraft. The FAA typically provides personnel for civilian operations. Additional personnel costs will increase with future airport development.

9.2 Maintenance Cost is an important component of operating cost. Maintenance must be provided to roadways (e.g. snow removal), public spaces (e.g. mowing and landscaping), and airport facilities. Maintenance costs are variable and may be adjusted to meet budget demands. Maintenance does, however, affect longevity of buildings, marketing of the site, and overall appearance.

9.3 Marketing Cost is another variable operating cost subfactor. The airport authority will experience higher marketing costs during the earlier years of redevelopment. As the facility moves through redevelopment, marketing costs will be reduced to a constant level. Marketing costs include promotional materials, banquets, and a host of other expenses. The airport authority should not overlook the power of good marketing. The airport authority should tap the resources of the local utility providers, the county, and other entities with a direct interest in the redevelopment of the base.

9.4 Utility Cost is an operational cost subfactor which includes the cost of providing utilities to public facilities retained by the airport authority. The bulk of the utility charges are usually contained in the heating or cooling of aircraft hangars. Aircraft maintenance hangars may demand high electrical demands for equipment.

---

[1] United States House of Representatives. Aviation Infrastructure Investment Act of 1993. P.L. 103-240. p. 14.

[2] Office of the Secretary of Defense. Office of Economic Adjustment. President's Economic Adjustment Committee. Planning Civilian Reuse of Former Military Bases. 1978. p.16. Based on a study completed by Booz, Allen & Hamilton, Inc. *Boon or Burden? The Cost of Operating Former Bases.* 1978.

For these reasons, the airport authority should require tenants to assume the cost of utilities. This provision usually necessitates the installation of individual meters for facilities, a cost which should be absorbed by utility provider. Other utility charges may include airport lighting, emergency power backup, and power to administrative and service facilities.

9.5 Administrative Costs include all operational costs not include in the aforementioned subfactors. These costs include accounting and managerial support, legal fees, insurance, inspection, and related expenses. Again these costs will be higher in the earlier years of redevelopment. Insurance costs may be the only cost to remain constant relative to inflation. The airport authority must assume these costs as a matter of course.

10.0 This set of subfactors is associated with revenues. CMG includes revenues generated from tariffs and landing fees but not lease revenue. Revenue is defined as all money receipts to the airport authority for purposes of operating and investing in airport facilities. This study includes numerous potential revenue sources. Revenues are categorized within 13 subfactors. Revenues are necessary but not exhaustive in determining the feasibility of air cargo.

10.1 FAA Operational Funding is an important subfactor for revenue calculation. The FAA does not explicitly subsidize airports which are cost ineffective. Several funding options do exist which have as a result the reduction in operation and maintenance costs. The Airport and Airway Trust Fund may finance operations and maintenance of air navigation facilities. This trust fund may also finance equipment research and development initiatives.[1] The FAA may have an interest in maintaining air control operations at the base. The FAA is committed to providing technical assistance to airport authorities, and will provide leadership to accomplish same. The programs established in recent legislation as well as FAA strategic goals have the effect of lowering operational costs to the airport operator.

10.2 The Airport Improvement Program (AIP) is a potential source for federal revenue to fund capital expenditures. To be eligible for these funds, several conditions must be met. Air cargo service airports which provide an aggregate landing weight in excess of 100,000,000 pounds annually have the right to a specific amount of funding with the total not to exceed $50,000,000 (refer to page 2-10). The FAA must consider funding, among other factors, for new hub airports which anticipate the generation of equal or greater than .25% of total enplanements in the United States. A third source, discretionary funds, may be made available for airport development. The FAA prefers capital investment above operational subsidies. Additionally, the FAA has shown a preference towards capital improvements at joint use airports. These factors suggest that an assessment of the potential to receive such funds is warranted.

10.3 State Funding for capital expenditures are generally limited and dwindling in supply. The state Department of Commerce (DOC) and the state Department of Transportation (DOT) serve as the primary sources for potential state financing. DOCs may offer assistance to export companies to promote the global export of state produced goods. Facility and infrastructure grants may be available for capital development projects. Further, some states offer similar airport development funds to finance new construction or expansion of public airport facilities. All of these programs are potential financing sources for capital improvements to the air cargo facility. The airport authority must pursue state participation in order to move towards financial feasibility.

---

[1] United States. House Ways and Means Committee. Explanation of Committee Amendment to H.R. 4691. p. 4.