Final Environmental Assessment and Finding of No Significant Impact

For the

Proposed Expansion of Air Cargo Facilities

MAA-AE-94-003

BWI
BALTIMORE / WASHINGTON
INTERNATIONAL AIRPORT

Prepared for the

Federal Aviation Administration Eastern Region

Prepared by

Maryland Department of Transportation
Maryland Aviation Administration
Office of Planning and Engineering

JUNE 1998

U.S. Department
of Transportation
Federal Aviation
Administration

Eastern Region

Fitzgerald Federal Building
John F. Kennedy
International Airport
Jamaica, New York 11430

Mr. Lynn S. Bezilla, Director
Division of Planning
Maryland Aviation Administration
P.O. Box 8766
BWI Airport, Maryland 21240-0766

JUN 15 1998

Dear Mr. Bezilla:

Enclosed is a copy of the recently approved Finding of No Significant Impact (FONSI) for the proposed expansion of the Air Cargo Facilities at the Baltimore-Washington International Airport (BWI), Baltimore, Maryland. Also enclosed is a copy of the Environmental Assessment Report Signature Page, signed by the Responsible FAA Official. This Federal environmental approval is a determination by the approving official that the requirements imposed by applicable environmental statutes and regulations have been satisfied by a FONSI. It does not constitute a commitment of Federal funding of eligible items for this project. That decision remains with the FAA, Washington Airports District Office, Mr. Terry Page, Manager.

In compliance with CEQ regulations Section 1506.6, we request that your office make the enclosed documents (FONSI and EA w/Signature Page) available to any reviewing agency which had substantive comments, and to the affected public, and announce such availability through appropriate media in the area. The announcement shall indicate the availability of the document for examination and note the appropriate location of general public access where the document may be found (i.e., the airport, your office, local libraries, public buildings, etc.). Reference Order 5050.4A, Paragraphs 65, 66 & 98.

Your attention is directed to the seven (7) mitigation measures which were made a condition of approval of the FONSI. Since the Environmental Assessment Report is incorporated as part of the FONSI, it should, likewise, be reviewed for any other stated mitigation measures which have now become part of the Federal environmental approval.

The process of making these environmental determinations is that of a partnership between yourself, as airport sponsor, and the other contributing parties, both public and private. We thank you for your effort and cooperation.

Sincerely,

for Robert B. Mendez
Manager, Airports Division

Enclosures

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
FINDING OF NO SIGNIFICANT IMPACT

Location

Baltimore Washington International Airport
Baltimore, Maryland

Proposed Federal Action

Airport Layout Plan approval and financial participation in the expansion of an air cargo facility at the Baltimore Washington International Airport (BWI).

Purpose and Need

Air cargo facilities and services are an integral part of development at BWI. The existing BWI cargo complex occupies approximately 65 acres with 355,000 square feet of cargo warehouse/office space. The 1995 Air Cargo Complex Evaluation recommended that cargo development for all-cargo operators should occur in the area south of the existing Runway 10/28. This study also recommended that the existing cargo complex should be dedicated to cargo operations that need to be located near the passenger terminal.

Forecasts of cargo activity indicate that by the year 2015, BWI will process approximately 327,000 tons of cargo. The existing cargo facilities at BWI are capable of handling approximately 200,000 tons of cargo per year. In order to accommodate the additional demand for air cargo, approximately 220,000 square feet of additional cargo facilities are needed. Due the limited land area in the vicinity of the existing cargo facility, the additional facilities can best be developed in an area removed from the current cargo warehouse and offices.

Discussion

The attached Environmental Assessment (EA) addresses the effect of the proposed project on the human and natural environment, and is made part of this finding. Exhibit II-7 of the EA depicts the proposed development and its relationship to the surrounding area.

The following Impact Analysis presentation outlines the highlights of the more thorough analysis contained in the EA.

Impact Analysis

Noise

Air cargo and passenger (air carrier, commuter and general aviation) activity at the airport is anticipated to increase in the future regardless if the proposed action is implemented. However, the expansion of the cargo facilities will not have an effect on passenger operations, but will result in a greater increase in air cargo operations.

Table IV-5 of the EA shows that there would be no change in passenger activity between the No-Build and Build Scenarios in any of the future key years. However, air cargo is expected to increase by three (3) operations per day in 1999 with the implementation of the proposed action. In the year 2015, two growth scenarios were developed: expected growth and high growth. Under the expected growth scenarios, air cargo operations will increase by 5 operations per day, while daily cargo operations will increase by 11 under the high growth scenario.

DNL noise values were calculated using the year 2015 expected growth and high growth scenarios in comparison to the 2015 no-build scenario. The greatest change in noise exposure is a DNL 0.5 dBA increase from the use of the high growth scenario.

The proposed action will not require any property or easement acquisition since construction will be accomplished entirely on airport property. The proposed action will cause impacts to wetlands and forested areas on the airport. Impacts to these areas will require off-airport mitigation. It is not anticipated that this mitigation will have an adverse impact on the compatibility of land uses surrounding the airport.

Therefore, it can be concluded that there would be no adverse noise impacts or non-compatible land uses as a result of the proposed action.

Social Impacts

The proposed action will be constructed entirely on airport property, therefore, there will be no disruption or division of established or planned communities or transportation patterns. Vehicle traffic volumes will increase on the roadways immediately surrounding the airport. However, these roadways have sufficient capacity to accommodate this increase in vehicle traffic.

Air Quality

The MAA has developed an air quality plan for BWI to help ensure that activity is consistent with the SIP. The Air Quality Planning Division of the Maryland Department of the Environment (MDE) has reviewed the Plan and found it to be consistent with their SIP. In addition, the forecasted level of activity contained in this EA is lower than the activity level included as part of the BWI Air Quality Plan. Therefore, since the BWI Air Quality Plan was found to conform with the SIP, a similar conclusion can be made to this EA.

Water Quality

Erosion control is essential in the design and construction of the proposed action. The development of the proposed action will include the preparation, approval and implementation of Erosion and Sediment Control and Stormwater Management Plans in accordance with applicable regulations. All plans for the proposed action shall be reviewed and approved by the local authorities for compliance with all applicable water quality regulation prior to construction. This is included in this Finding as a mitigation measure.

Additional stormwater runoff will be realized from the addition of approximately 50 acres of impervious surfaces. This increased runoff would be discharged into a new stormwater management infiltration basin designed to handle the increased flow in the entire drainage basin. Additional stormwater management facilities would include the installation of infiltration trenches, and where feasible, these facilities would be equipped with devices to reduce the peak flow of stormwater runoff. The construction of infiltration basins and grassed areas to control the discharge of stormwater may be required. A Section 401 Water Quality Certification will be required prior to construction. The Airport currently has a National Pollutant Discharge Elimination System (NPDES) and no revisions are expected to be needed as a result of this proposed action. The need to obtain these permits is included in this Finding as a mitigation measure.

Historic, Architectural, Archaeological and Cultural Resources

Design changes to one of the original alternatives were carried out based on input from the Maryland Historical Trust (MHT) in order to establish the preferred alternative. Based on these design changes, a Phase I and Phase II archaeological survey was conducted in the area of the proposed action. This survey identified five archaeological

sites. Of these five sites, only one was determined to be eligible for listing in the National Register of Historic Places. A June 1997 letter from the MHT confirmed the status of this site and further stated that the air cargo facility would have no effect on the archaeological site. A fence will be placed around this archaeological site and will remain in place during and after construction. This is contained in this Finding as a mitigating measure. Therefore, it can be concluded that there would be no significant adverse impact as a result of this action.

Biotic Communities and Endangered and Threatened Species

The proposed action will impact approximately 105 acres of forest and 115 acres of mowed grassland on and adjacent to the project area. There are no endangered or threatened species located in the project area that would be adversely affect by the removal of potential habitat. There are sufficient wooded areas surrounding the airport where and wildlife could easily relocate. Replanting and reforestation of any cleared areas shall be done in accordance with the Forest Conservation Act.

Wetlands

Construction of the proposed action will result in approximately 1.1 acres of wetland impacts. In addition, approximately 1,300 linear feet of stream impacts will occur to Harkins Branch, Clark Branch, Kitten Branch and Signal Branch. On July 1, 1996, the U.S. Army Corps of Engineers issued a State Programmatic General Permit (MD SPGP) for activities in coastal and inland waters and wetlands within the State of Maryland. This permit allows the sponsor to operate the State regulatory program that protects the aquatic environment, provided the activities result in no more than minimal adverse impacts on the environment. Appropriate mitigation of these wetland impacts will need to occur and coordination with the Corps of Engineers and the Maryland Department of the Environment has concurred in the mitigation plan for this action. All applicable permits will need to be obtained prior to construction and is included in this Finding as a mitigating measure.

COASTAL ZONE MANAGEMENT

The BWI Airport is located within the Maryland Coastal Zone Management Area (CZMA). Any work undertaken within the CZMA is subject to consistency with the Maryland Coastal Zone Management Plan (CZMP).

A coastal zone consistency determination was prepared and submitted to the Maryland Department of the Environment (MDE) to determine if the proposed action was consistent

with the approved coastal zone management plan. On January 6, 1998 the MDE concurred by letter that the proposed action is consistent with the State's CZMP. A copy of this letter is attached to this Finding.

Therefore, it can be considered that the proposed action is consistent with the Coastal Zone Management Act with the stipulation that the airport sponsor obtain a Nontidal Wetlands and Waterways permit from the MDE. This is included within this Finding as a mitigation measure.

Solid Waste

The EA identified that all solid waste generated by the proposed action would be disposed of in the Annapolis sanitary landfill located 12 miles from BWI. However, during the coordination of the EA with interested agencies within the Maryland Department of the Environment, it was determined that this landfill did not have a current refuse disposal permit from the Waste Management Administration. The Waste Management Administration noted that all solid waste, including construction and demolition material, must be disposed of at a permitted facility.

Therefore, the Airport Sponsor must ensure that all solid waste will be disposed of in a facility that has a current refuse disposal permit issued by the Waste Management Administration. This is included in this Finding as a mitigation measure.

Construction Impacts

Construction impacts will typically create temporary environmental impacts during their duration. Short-term construction impacts include noise impacts caused by construction equipment, air quality impacts from dust and water quality impacts from soil erosion and sedimentation.

Requirements for mitigation of temporary construction impacts will be included within the construction contract documents. These requirements will control temporary impacts to air quality, erosion and sedimentation, noise, water, safety and public inconvenience.

Based on the above, there are no unmitigated temporary construction impacts as a result of the wetland creation.

Other Impact Categories

The proposed action has been reviewed and found not to create any significant impacts in the following areas: Induced Socioeconomic Impacts, Floodplains, Coastal Barriers, Wild and Scenic Rivers, Prime and Unique

Farmlands, Energy Supply and Natural Resources or Light Emissions.

Public Hearing

On December 17, 1996, a public hearing was held in the Glen Burnie Senior High School in Glen Burnie, Maryland to consider the economic, social and environmental effects of the proposed development as presented in the Environmental Assessment Report. The transcript of the public hearing can be found in Appendix B of the EA. In general, the comments raised by speakers at the hearing included requests for continuation of noise abatement procedures, replanting of trees to shield the airport from adjacent areas and completion of a BWI bike trail. The EA addressed the noise issue and the reforestation of the airport. However, the issue of the bike trail is beyond the scope of this EA.

Mitigating Measures

The following mitigating measures are conditions of this Finding and will become conditions of any Federal Grant for this project:

1. Construction contract specifications will contain the provisions of FAA Advisory Circular 150/5370-10A titled "Standards for Specifying Construction of Airports", Item P-156, Temporary Air and Water Pollution, Soil Erosion, and Siltation Control.

2. An Erosion and Sediment Control Plan shall be prepared and implemented in accordance with applicable regulations prior to construction. All plans for the proposed action shall be reviewed and approved by the Maryland Department of the Environment for compliance with all applicable water quality regulation prior to construction.

3. As required, the construction of stormwater management infiltration basins to control the discharge of stormwater shall be in place prior to construction. A Section 401 Water Quality Certification permit will be required prior to construction.

4. A fence will be constructed around the historic site designated 18AN1051 and will remain in place during and after construction.

5. Mitigation of wetland impacts shall occur in accordance with the U.S. Army Corps of Engineers and Maryland Department of the Environment approved mitigation plan. All applicable permits pertaining to work in a wetland shall be obtained prior to construction.

6. In order to be in compliance with the Maryland Coastal Zone Management Plan, the sponsor shall obtain a Nontidal Wetlands and Waterway permit from the Maryland Department of the Environment prior to construction.

7. All solid waste, including construction, demolition and land clearing debris which may be generated as a result of the proposed action shall be disposed of at a solid waste facility which has a current refuse disposal permit issued by the Waste Management Administration.

Conclusion and Approval

After careful and thorough consideration of the facts contained herein, the undersigned finds that the proposed Federal action is consistent with existing national environmental policies and objectives as set forth in Section 101 (a) of the National Environmental Policy Act of 1969 (NEPA) and that it will not significantly affect the quality of the human environment or otherwise include any condition requiring consultation pursuant to Section 102 (2) (c) of NEPA. As a result, the FAA will not prepare an environmental impact statement for this action.

Approved: _____ 6/15/94
for Robert B. Mendez
Manager, Airports Division
Date

Disapproved: _____ _____
Robert B. Mendez
Manager, Airports Division
Date

FINAL

ENVIRONMENTAL ASSESSMENT

FOR THE

PROPOSED EXPANSION OF AIR CARGO FACILITIES AT BALTIMORE/WASHINGTON INTERNATIONAL AIRPORT

MAA-AE-94-003

Prepared for the

FEDERAL AVIATION ADMINISTRATION
EASTERN REGION

Prepared by the

MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION
OFFICE OF PLANNING AND ENGINEERING

MAY 1998

This Environmental Assessment becomes a Federal document when evaluated and signed by the responsible FAA Official.

Frank L. Squeglia
Responsible FAA Official

6/15/98
Date

Final Environmental Assessment and Finding of No Significant Impact

For the

Proposed Expansion of Air Cargo Facilities

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Prepared for the

Maryland Department of Transportation
Maryland Aviation Administration
Office of Planning and Engineering

JUNE 1998

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

This Environmental Assessment (EA) has been prepared to evaluate the potential environmental impacts associated with the proposed expansion of air cargo facilities at Baltimore/Washington International (BWI) Airport in Anne Arundel County, Maryland. The main sections of this EA identify the need for the project, the alternatives that were considered, the existing natural and socioeconomic environmental conditions within and adjacent to the project area, and the environmental consequences of each of the proposed alternatives.

BWI Airport is located approximately nine miles south of the City of Baltimore and approximately 30 miles northeast of Washington, DC. Primary access to the terminal and cargo facilities is provided by MD Route 195, a four-lane divided road. Elm Road and Aviation Boulevard provide secondary access to the Airport. The Airport, which comprises 3,158 acres, is owned by the State of Maryland and operated by the Maryland Aviation Administration (MAA).

PROJECT BACKGROUND AND NEED

Air cargo facilities and services are an integral part of development at BWI Airport. The 1987 Airport Master Plan identified the need for additional cargo facilities as the Airport's existing cargo facilities operated near capacity. The existing BWI Cargo Complex occupies approximately 65 acres north of the passenger terminal. There is approximately 355,000 square feet of cargo warehouse/office space at the existing BWI Cargo Complex.

In 1995, the MAA performed an Air Cargo Complex Evaluation to evaluate the effect of increased passenger and cargo airline activity at BWI and how this increased activity could affect facility planning. This evaluation recommended that cargo development for all-cargo operators should occur in the area south of existing Runway 10-28 and that the existing BWI Cargo Complex should be dedicated to cargo operations which need to be near the passenger terminal (typically, cargo loaded into the "belly" of passenger aircraft). In 1996, the MAA

completed forecasts for three scenarios (no growth, high growth, expected growth) of air cargo operations and tonnages.

The no growth scenario assumes cargo tonnage will remain consistent at its 1995 level of 162,834 tons. The high growth scenario projects a 6.9 percent increase in cargo tonnage between 1995 and 1999 and a 4.6 percent increase beyond 1999 with approximately 403,000 tons of cargo entering BWI Airport by the year 2015. Under the expected growth scenario, moderate growth in all-cargo services is projected. Between 1995 and 1999, air cargo activity is projected to increase 6.0 percent at BWI Airport. Beyond 1999, a 3.5 percent increase in air cargo activity is projected, resulting in approximately 327,000 tons of cargo being processed through BWI Airport in the year 2015.

Based on the results and forecasts of the MAA's 1987 Airport Master Plan and the 1995 Air Cargo Complex Evaluation, BWI Airport's air cargo facilities will not be able to accommodate expected cargo activity through the year 2015.

ALTERNATIVES

Five "build" alternatives and a "no-build" alternative were evaluated for their potential to satisfy the identified purpose and need for additional cargo facilities at BWI. The location of each of the proposed Build Alternatives is shown on Exhibit II-1. The following is a brief description of the proposed alternatives:

- No-Build Alternative: Provides no new cargo facilities at the Airport;

- Build Alternative 1: Expansion of the existing Cargo Complex into the existing Maintenance Area and construction of two new cargo buildings in the midfield area of the Airport;

- Build Alternative 2: Construction of new cargo facilities in the southeast quadrant of the Airport;

- Build Alternative 3: Construction of new cargo facilities in the southwest quadrant of the Airport;

- Build Alternative 4: Construction of new cargo facilities in the midfield area of the Airport with a south parallel taxiway; and

- Build Alternative 4R: Construction of new cargo facilities in the midfield area of the Airport with a north parallel taxiway.

SUMMARY OF ENVIRONMENTAL IMPACTS

The following is a summary of the potential environmental impacts associated with the proposed alternatives.

- The No-Build Alternative is being evaluated as the baseline condition and would not result in any environmental impacts.

- Build Alternative 1 would impact approximately 0.1 acre of wetlands, 1,870 linear feet of streams, and the removal of approximately 117 acres of forest. Approximately 49 acres of this site have low to moderate probability for prehistoric sites and approximately 17 acres of this site have high probability for prehistoric sites.

- Build Alternative 2 would not impact any streams or wetlands, but would impact approximately 80 acres of forest. Approximately 7 acres of this site have low to moderate probability for prehistoric and historic sites; approximately 16 acres of this site have high

probability for prehistoric sites; and approximately 29 acres have high probability for historic sites.

- Build Alternative 3 is the most environmentally impactive of all of the proposed alternatives. Approximately 17 acres of wetlands, 2,690 linear feet of streams, and 247 acres of forest would be impacted by this alternative. In addition, approximately 147 acres of this site have low to moderate probability for prehistoric and historic sites.

- Build Alternative 4 would impact approximately 1.1 acres of wetlands, 2,560 linear feet of streams and 90 acres of forest. Approximately 8 acres of this site have high probability for prehistoric sites.

- Build Alternative 4R would affect approximately 1.1 acres of wetlands, 1,330 linear feet of streams and 105 acres of forest. There will be no effect on the archaeological sites identified within the area of potential effect associated with this alternative.

The proposed cargo facility is not anticipated to generate any adverse socioeconomic, noise, land use, or air quality impacts. The new cargo facility would generate new employment opportunities and add tax revenue to the State and Anne Arundel County. In addition, the construction of a new cargo complex would provide revenue and jobs for the construction industry, aircraft refueling, cleaning and maintenance, air traffic control, customs clearance, and freight forwarding.

PERMITS REQUIRED

A joint Federal and State Permit Application for the alteration of any floodplain, waterway, tidal or nontidal wetland in Maryland has been obtained from the U.S. Army Corps of Engineers and to the Maryland Department of the Environment (MDE) in accordance with Section 404 of the Clean Water Act (see **Appendix A**). Erosion and sediment control plans and stormwater management plans will also be submitted to MDE for approval. A Water Quality Certification has also been obtained from the MDE in accordance with Section 401 of the Clean Water Act (see **Appendix A**). BWI Airport has a National Pollutant Discharge Elimination System (NPDES) permit for its point discharges; however, a separate construction activities permit associated with non-point land disturbance activities affecting a total of five or more acres may be required as part of the NPDES program.

PROPOSED ACTION

Based on the purpose and need to expand air cargo facilities at BWI Airport to accommodate demand through the planning period (year 2015), and the evaluation of alternatives to meet the need, the anticipated action for the Environmental Assessment is the approval of a revision to the existing Airport Layout Plan based on the Alternative 4R design concept.

The location of this alternative in the midfield area of the Airport provides the most benefits for aircraft operations; offers the most room for ultimate expansion of future cargo facilities and does not require the relocation of existing cargo or Maintenance facilities which would disrupt ongoing Airport and tenant operations. The relocation of the parallel taxiway from south of the runway to the north was recommended by the Air Traffic Control Tower personnel to provide an improvement to aircraft ground operations and efficiency. Alternative 4R also reduces the impacts to the Kitten Branch stream system; reduces the volume of material to be stockpiled; and provides additional water quality management area.

SECTION I

INTRODUCTION AND NEED FOR THE PROJECT

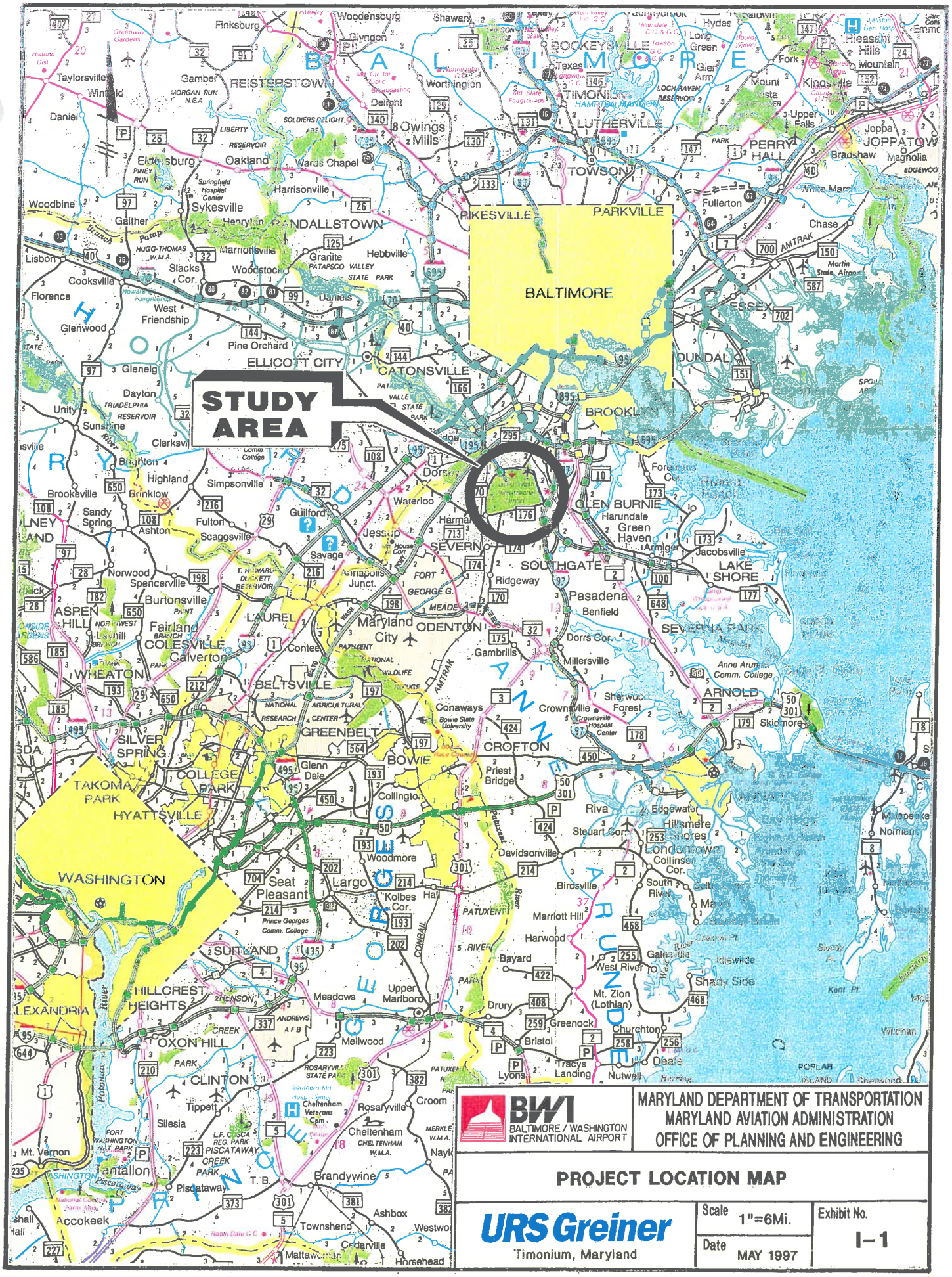
SECTION I: INTRODUCTION AND NEED FOR THE PROJECT

This Environmental Assessment (EA) has been prepared to address potential impacts from planned expansion of air cargo facilities at Baltimore/Washington International Airport (BWI), Anne Arundel County, Maryland. The construction would provide BWI with expanded domestic and international cargo facilities required to accommodate projected increases in cargo demand.

This EA has been prepared in accordance with Federal Aviation Administration (FAA) Order 5050.4A "Airport Environmental Handbook" dated October 5, 1985. As such, this EA serves to comply with the National Environmental Policy Act of 1969 (NEPA) which established the need to "ensure that presently unquantified environmental amenities and values may be given appropriate consideration in decision making along with economic and technical considerations." Also, the EA will be used to determine whether the environmental effects of the Proposed Action would be of a significance to necessitate the preparation of an Environmental Impact Statement (EIS) or that the environmental consequences are such that a Finding of No Significant Impact (FONSI) would be issued.

GENERAL PROJECT LOCATION

Baltimore/Washington International Airport is located in Anne Arundel County, Maryland between the metropolitan centers of Baltimore and Washington, D.C., approximately nine miles south of the City of Baltimore and approximately 30 miles northeast of Washington, D.C. (see **Exhibit I-1**). BWI Airport is generally bounded on the north, east, and west by Aviation Boulevard (MD Route 170), and on the south by Dorsey Road (MD Route 176) (see **Exhibit I-2**). The primary access point to the Airport Terminal area and cargo facilities is via MD Route 195, a four-lane divided road. There is also a secondary access point to the Terminal and cargo facilities via Elm Road and Aviation Boulevard.


STUDY AREA
BALTIMORE
PIKESVILLE
PARKVILLE
TOWSON
CATONSVILLE
ELLICOTT CITY
GLEN BURNIE
SEVERN
SOUTHGATE
ODENTON
LAUREL
BELTSVILLE
GREENBELT
COLLEGE PARK
HYATTSVILLE
TAKOMA PARK
WASHINGTON
SILVER SPRING
WHEATON
ANNAPOLIS
CROFTON
BOWIE
LARGO
UPPER MARLBORO
CLINTON
OXON HILL
HILLCREST HEIGHTS
SUITLAND
ACCOKEEK
PISCATAWAY
BRANDYWINE
CHELTENHAM
ROSARYVILLE
MARRIOTTSVILLE
REISTERSTOWN
OWINGS MILLS
RANDALLSTOWN
ESSEX
DUNDALK
BROOKLYN
PASADENA
SEVERNA PARK
ARNOLD
LAKE SHORE
EDGEWATER
DAVIDSONVILLE
LONDONTOWN
GALESVILLE
SHADY SIDE
DEALE
MT. ZION (LOTHIAN)
PATUXENT RIVER
PATAPSCO VALLEY STATE PARK
PATUXENT RIVER NAVAL AIR STATION
BWI BALTIMORE / WASHINGTON INTERNATIONAL AIRPORT
MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION
OFFICE OF PLANNING AND ENGINEERING
PROJECT LOCATION MAP
URS Greiner
Timonium, Maryland
Scale 1"=6Mi.
Date MAY 1997
Exhibit No. I-1

BWI BALTIMORE / WASHINGTON INTERNATIONAL AIRPORT

MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION
OFFICE OF PLANNING AND ENGINEERING

VICINITY MAP

URS Greiner
Timonium, Maryland

Scale	Exhibit No.
NONE	I-2
Date MAY 1997	

PHOTO DATE: OCT. 1996

AIRPORT HISTORY

Prior to the construction of Friendship International Airport in the late 1940s, the existing Airport property remained rural and agricultural. The site was originally comprised of a number of large seventeenth- and eighteenth-century estates, and prior to the Revolutionary War, the area was predominantly utilized for the production of tobacco. By the mid- to late-1800s, the agricultural significance of what is now Airport property shifted to the production of corn, potatoes, peas, beans, orchard products, wheat and cattle. The landscape during this time was dotted with family farms.

In 1940, the City of Baltimore began to purchase the land for the Airport and, in 1950, Friendship International Airport was formally opened. Then-existing structures were razed and two of the three large cemeteries and most of the family cemeteries were relocated. Friendship Cemetery, the only remaining large cemetery, is still located on Airport property just south of Runway 10-28 and west of Runway 15R-33L.

Currently, the Airport property comprises 3,158 acres. Most of the north half of the Airport has been developed, whereas there are large undeveloped portions of the Airport in the southern quadrants. The Airport is now owned by the State of Maryland, and is operated by the Maryland Aviation Administration (MAA), an agency of the Maryland Department of Transportation (MDOT).

PROJECT BACKGROUND

The air cargo sector of the aviation industry provides many services in an expanding global marketplace: scheduled and charter freight, express and small package transport, and mail service. As the air cargo industry has evolved during the past twenty years, air cargo facilities and services have become an integral part of the development of the Baltimore/ Washington International (BWI) Airport.

The Maryland Aviation Administration (MAA) has employed an ongoing planning process to identify the need and timing for Airport facilities. In 1987, the Airport Master Plan Update indicated that existing cargo facilities were operating near their capacity (95%), resulting in the need to plan for additional capacity. The 1987 Master Plan recommended construction of additional cargo facilities within the existing Cargo Complex, and potential development expansion into the midfield area south of existing Runway 10-28. Both Cargo Buildings E and F have since been constructed, thus filling all sites in the existing Cargo Complex.

As both passenger and cargo airline activity at BWI have increased, the MAA has sought to identify how this increased activity could affect the future development of cargo and other facilities. To evaluate the effect of industry trends on BWI facility planning, the MAA performed an Air Cargo Complex Evaluation (ACCE) in 1995. This evaluation recommended that the existing Cargo Complex should be dedicated to cargo operations which need to be near the passenger terminal (typically, cargo loaded in the "belly" of passenger aircraft), and that cargo development for all-cargo operators should occur in the area south of existing Runway 10-28.

EXISTING AIR CARGO FACILITIES

The existing BWI Cargo Complex occupies approximately 65 acres north of the passenger terminal complex, and is divided into two primary areas: the Main Cargo Complex and the Elm Road Complex. The Main Cargo Complex currently has five buildings (A-E) totaling nearly 226,000 square feet. Cargo Building F, completed in 1997, will add approximately 56,000 square feet of space, bringing the total available space in the Main Cargo Complex to approximately 282,000 square feet. Three cargo buildings along Elm Road provide an additional 73,000 square feet of space for a grand total of 355,000 square feet of cargo warehouse/office space.

Within the Cargo Complex, there are airside and landside facilities utilized by passenger airlines and all-cargo carriers. The following represents a summary of the current status of cargo facilities and operations at the Airport.

Airside Facilities

Airside cargo facilities at BWI are operated as shared or non-exclusive facilities, controlled by the MAA. They consist of ramp and apron areas, taxiways, taxilanes, service roads and security points for access between the landside and the airside. Building tenants also lease a 30-foot-deep strip of apron adjacent to the buildings, which is used for cargo handling and ground support equipment (GSE) staging.

Airside cargo facilities at BWI cover approximately 30 acres (**Exhibit I-3**). The airside is divided into two apron areas (referred to hereafter as Cargo I and Cargo II) serving cargo Buildings A through E and 107, 111, and 112.

Cargo I consists of an 11.7-acre site containing eight aircraft parking positions as depicted in **Exhibit I-3**. A total of 1,310 linear feet of apron space is available for aircraft parking in the eight designated parking spaces in Cargo I. All but one position is currently designated for narrow-body aircraft because of deficiencies in space and pavement strength of the parking positions. The Elm Road Cargo Ramp adjacent to Buildings 107, 111, and 112 provides 650 linear feet of narrow-body ramp space. All ramp parking positions are in use daily with the exception of two that are currently being used part-time for passenger aircraft overflow parking and military equipment shipping. Four cargo carriers operating at BWI do not currently lease cargo building space on the Airport and require that their trucks be escorted through security gates to the apron for loading.

Cargo II can accommodate approximately nine aircraft parking spaces on a 12-acre site, including six narrow-body and three wide-body aircraft as shown in **Exhibit I-3**. A total of 1,390 linear feet of apron space is available for aircraft parking in a "U" shaped parking configuration. Only three of the nine aircraft parking positions are directly "fronting" on Cargo Building D, a circumstance which requires operators to load and unload a majority of the

Photo Date: July 19,1995

Elkridge Landing Parking Lot

Aviation Blvd. (Md. Rt. 170)

Cargo Building F
(Under Construction)

D

F14 F15 F16 F17

F13

CARGO II APRON

F12

F11 F10 F9

A B C

E

F5 F6 F7 F8

CARGO I APRON

Aircraft Parking Position (Typ.)

F4 F3 F2 F1

Airfield / GSE

Maintenance Complex

Spring Lane

112 111 107

Elm Road

BWI BALTIMORE / WASHINGTON INTERNATIONAL AIRPORT

MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION
OFFICE OF PLANNING AND ENGINEERING

EXISTING AIR CARGO AREA

URS Greiner
Timonium, Maryland

Scale NONE

Date MAY 1997

Exhibit No. I-3

aircraft out on the apron. This transfer from plane to tug, to building, to truck and vice versa is more time consuming, less efficient and more costly.

Cargo Buildings

Cargo buildings at BWI are located within the Main Cargo Complex and the Elm Road Cargo Complex previously described. Currently, the buildings used to process cargo are flow-through warehouse facilities between the airside and the landside, rather than major sorting facilities. Arriving cargo is deplaned and enters the buildings on the airside. Once processing or sorting is complete, the cargo is then loaded into trucks on the landside. The reverse occurs for enplaning cargo.

Main Cargo Complex

The main cargo area currently has five buildings totaling nearly 226,000 square feet. Individual buildings range in size from 14,000 square feet for Building A, to 64,000 square feet for Building E. Cargo Building F is currently under construction. When completed in 1997, this facility will add approximately 56,300 square feet of cargo building space, bringing the total available space in the existing Cargo Complex to approximately 282,000 square feet.

Building A is the smallest of the cargo buildings at 14,085 square feet, has a single-level floor plan and is not adjacent to an airside aircraft parking apron. In total, there are 22 bays within Building A with 12 loading docks on the east side of the building and 14 loading docks on the west side. In total, Building A has 550 linear feet of loading dock frontage available for freight forwarder operations and 21 adjacent parking spaces.

Building B consists of 44,182 of leasable square feet of floor space located on two levels. Tenants include a cargo broker office area of 5,323 square feet, Crash/Fire/Rescue with 5,174 square feet, U.S. Customs with 2,123 square feet, four other companies with 28,962 square feet, and 2,600 square feet of vacant space. The three southernmost bays consist of office space on both levels. These offices are occupied by freight forwarders and related cargo businesses.

Building B has partial Airport Operations Area (AOA) access to most of the southwest portion of the building. Although this portion of the building is within the airside boundaries, there are no aircraft parking positions directly adjacent to this building. All cargo is transferred from parked aircraft to the building via trucks and tug trains. There are 375 linear feet of loading docks on the landside or northeast side of the building and 100 linear feet of docks on the southwest side. In addition, there are 475 linear feet of loading dock frontage available for cargo operations.

Building C is similar in design to Building B with the exception of the added canopy on the southwest portion of the building. The approximately 43,300 square feet of leasable floor space in Building C is occupied by three tenants. Similar to Building B, Building C is not directly adjacent to aircraft parking. Cargo is transferred from aircraft to the trucks via airside loading docks to landside loading docks. In total, Building C has 415 linear feet of loading dock frontage available for cargo operations.

Building D is one of the newest cargo buildings at BWI, with 60,000 square feet of leasable floor space. Much of Building D has upper level office space that maximizes operation and storage space on the lower level. Four tenants lease space in Building D for cargo and administrative use. Building D is located adjacent to the aircraft apron referred to as Cargo II. Transfer of cargo to and from aircraft is still maintained from trucks and bag trains because of the lack of a direct conveyor system and the distant nature of some of the parking positions. In total, Building D has 600 linear feet of loading dock frontage available for cargo operations.

Building E is the newest cargo building at BWI, with 64,000 square feet of leasable floor space occupied by four tenants. Both ends of the building have upper-level office areas. Building E's southwest side is completely adjacent to the Cargo I apron. In total, Building E has 600 linear feet of loading dock frontage available for cargo operations.

Elm Road Cargo Complex

The three older cargo buildings along Elm Road (numbered from Southeast to Northwest as 107, 111, and 112) are occupied by a mixture of integrated cargo carriers (carriers

operating freighters to BWI) and cargo operations for international and domestic passenger airlines.

Building 107 contains 34,479 square feet of total building space. From that total, 27,213 square feet of cargo warehouse and office space is occupied by two airlines that transfer belly cargo from passenger aircraft; however, these tenants do not require aircraft apron. The remainder of the structure consists of a 7,266-square-foot vehicle maintenance facility for United Airlines which remain from its previous occupancy of the building.

Building 111 contains 13,253 square feet of leasable space, half of which is occupied by six airlines. The remaining half of Building 111 is occupied by a flight support company that operates at BWI.

Building 112 contains 25,561 square feet and is occupied by three airline tenants, one of which currently uses the building for administrative purposes.

These facilities provide a total of approximately 73,000 square feet of space. The majority of the Elm Road Cargo Facilities is used for the transfer of belly cargo. This type of cargo is carried in the cargo hold (belly) of passenger aircraft, and is transferred to and from the Elm Road Cargo Buildings to the passenger terminal aircraft gates via cargo tugs. The Elm Road Cargo Buildings have specific locational requirements because they must be situated within a feasible cargo tug drive from the passenger terminal and must be located so the cargo tugs, which are not registered on-road vehicles, do not have to access public roadways.

Landside Facilities

Air cargo landside facilities consist of loading docks, parking areas, landscaped areas, and roadways providing vehicular access to the cargo buildings. These facilities support the operation of the cargo area by providing a location for loading and unloading trucks, and by providing access to the surrounding roadway network. The landside cargo facilities cover an area of approximately 25.5 acres. The main cargo landside area is bounded by MD Route 170 on the north, the cargo buildings on the west and south, and the security fence on the east. The

Elm Road cargo landside area covers 2.0 acres and is defined by Elm Road to the west, the cargo buildings to the east, the Airfield Maintenance Complex to the north and the New International Terminal (Pier E) (under construction) to the south. The layout of the parking areas and the associated roadways is shown in **Exhibit I-3**. In addition to the private vehicle parking areas, there is a bus and truck parking area.

Automobile Parking

Existing landside parking areas contain a total of 573 marked spaces in the Main Cargo Complex parking area at the Elm Road Cargo Facilities. Use of these 573 spaces is determined by the air cargo area tenants and includes parking provided at the cargo buildings for visitors. The construction of new Cargo Building F and adjacent service station, combined with removal of 96 spaces for circulation within the Main Cargo Complex, will reduce the total number of Main Cargo Complex spaces from 573 to 374 by Spring of 1997.

Truck Loading Docks

Each air cargo complex tenant leases their adjacent truck loading dock area. Docks are 50-foot-deep with the exception of Building A, which has 40-foot-deep docks on both sides of the building. There is a total of 3,130 linear feet of loading dock frontage for a total of 34 truck spaces on the landside.

Truck Staging Areas

There is a paved site directly west of Cargo Building A being used as a truck staging area. This site provides 29 drive-through parking slots and is used by the trucking companies for early arrivals and overnighters, thereby reducing the need to tie-up loading dock space.

HISTORIC AND FORECAST AIR CARGO ACTIVITY

Historical Growth - 1972 to 1995

A review of historic air cargo activity at BWI indicates growth in annual tonnage of total cargo handled at the Airport from 71,876 tons in 1972 to 162,834 tons in 1995, an average annual increase of 3.6 percent. Records for the percentage of all-cargo tonnage versus belly cargo tonnage were available for the last 12 years, and reveal that the percentage of all-cargo handled has fluctuated. In 1984, the percentage of all-cargo tonnage was 48.9 percent and rose to 59.5 percent in 1995. The all-cargo percentage reached a 12-year low in 1985 (37.2 percent) and a 12-year peak in 1987 (66.2 percent), but has averaged 54.2 percent overall during that period.

Industry Growth Trends

The air cargo sector of the aviation industry is comprised of several components—scheduled and charter freight, express and small package transport, and mail. Recent analysis of world air cargo growth by the Boeing Commercial Airplane Group projects an average annual growth of 6.5 percent to the year 2010. Most of the world's air cargo is based on U.S. domestic traffic and trade between the United States and other countries. The Boeing study notes that the U.S. domestic traffic share of the total world air cargo market will be stable through the year 2010, and that international air cargo traffic is projected to grow more rapidly during the same period. As a result, the Boeing study predicts that U.S. airports which serve international markets appear to be best positioned to see substantial increases in air cargo activity.

Air cargo fleets are also expected to change in the future. It is projected that by 2010, 35 percent of cargo freighter aircraft will be large (wide-body), 32 percent will be medium (B-707, DC-8) and 33 percent will be small (narrow-body), compared to 17 percent large, 38 percent medium, and 45 percent small, in 1992. A fleet mix comprised of increasingly larger aircraft will require more aircraft parking apron than now exists at BWI.

Cargo Forecasts for BWI

In February of 1996, the MAA completed forecasts for three scenarios of air cargo operations and tonnages at BWI through the Year 2015. The "No-Growth"; "High Growth"; and "Expected Growth" forecasts are summarized in the following paragraphs.

No Growth Forecast

The No Growth scenario developed by the MAA assumes that cargo tonnage handled at BWI will remain consistent at its 1995 level of 162,834 tons.

Expected Growth Forecast

The Expected Growth scenario is based, in part, on the attraction of new markets to BWI while maintaining and expanding the markets already served. Growth is also expected from increased cargo capacity of international flights (including wide-body aircraft) after the opening of the new International Terminal (Pier E) in 1997. The forecast also projects moderate growth in both domestic and international all-cargo services.

In addition to air cargo transported in the belly of approximately 600 daily passenger airline operations (takeoffs and landings), BWI currently accommodates an average of 25 all-cargo aircraft operations per day. Under the Expected Growth scenario, all-cargo operations are expected to increase to 30 operations per day by 1999, and to 35 per day by the year 2015. Between 1995 and 1999, growth in air cargo activity at BWI is projected to be generally consistent with the previously stated international growth rates (6.0 percent per year). Between 1999 and 2015, the average annual growth rate is projected to return to near historical activity trends (approximately 3.5 percent per year), resulting in a total of approximately 327,000 tons of cargo being processed through BWI in 2015.

High Growth Forecasts

Between 1995 and 1999, the High Growth scenario projects overall air cargo tonnage at BWI to increase at an average annual rate of 6.9 percent. Growth during this period is expected to be strong in response to market demands and new market and service opportunities. Beyond 1999, the annual growth rate is expected to decline slightly to 4.6 percent. This reflects a maturing of the air cargo industry at BWI, but anticipates that new service opportunities will continue at a higher level than under the expected growth scenario. Under the high growth scenario, cargo would increase to approximately 403,000 tons by the Year 2015.

FACILITY REQUIREMENTS

The following is an assessment of the adequacy of existing cargo facilities at BWI. These assessments have been based on the Expected Growth forecasts developed and approved by MAA officials, as well as recommendations from previous studies such as the 1987 Master Plan Study and the 1995 evaluation of the Air Cargo Complex. Based on these report forecasts, as well as February 1996 MAA projections of future cargo activity, it is projected that existing BWI air cargo facilities will not be able to accommodate expected growth in cargo activity through the Year 2015. Additional airside, landside, and cargo building facilities will likely be needed during the planning period. A description of the existing facilities and an estimate of the additional airside, landside, and cargo building facilities projected to be needed during the planning period are presented in the subsections below.

Airside Facilities

The current cargo apron facilities are becoming constrained for existing users, as well as potential new tenants. Federal Express (FedEx) and United Parcel Service (UPS) are major tenants in Cargo Buildings D and E, and utilize existing available cargo aprons. FedEx has examined the possibility of adding a third B-727-200 flight to its daily service, and the MAA has evaluated additional cargo apron locations to accommodate this increase. In addition, several other cargo carriers utilize the existing available apron space on a regular basis, thus adding to

the existing demand for ramp facilities. Considering that six of the nine positions on the Cargo II ramp at Building E do not have direct apron frontage, and that available aircraft parking positions in the Cargo Complex are sometimes used for passenger aircraft overflow from the terminal area, there is a potential for short-term apron deficiencies.

The trend in the air cargo industry is towards the use of larger aircraft with greater lift capacity which will serve to reduce unit costs of cargo transport. Should wide-body all-cargo aircraft service be initiated at BWI, the available apron space would not be able to accommodate this demand efficiently.

In conclusion, in order to meet these projected increases in demand for airside cargo facilities at BWI, the existing ramp frontage of 3,130 linear feet will need to be expanded to a level based on specific air cargo carrier needs. Additional ramp frontage should provide direct access to cargo building facilities to best serve the existing and future needs of the all-cargo carriers.

Landside Facilities

The landside facilities at the existing Air Cargo Complex are also becoming constrained. A key factor is the location of both the Main and Elm Road cargo complexes, which offer little room to expand due to both the adjacent Airfield/GSE Maintenance Complex and the new Pier E. Also due to site constraints, there is insufficient maneuvering area for efficient operation of truck and private vehicle traffic in the Main Cargo Complex. A recent evaluation of parking, access, and circulation within the Main Cargo Complex (1996 Air Cargo Complex Circulation Study) highlighted the need to improve internal circulation conditions. It was noted in the study that the mixing of cargo truck traffic with general employee vehicle movements and customers using the new service station (currently under construction) would begin to cause congestion within the Complex. Several recommendations were made in the study to alleviate some of the potential congestion; however, should there be an increase in cargo activity in the Main Complex, the existing landside facilities would need to be reevaluated for their ability to accommodate vehicle demand.

Other landside constraints in the existing Cargo Complex include access and circulation conditions along Elm Road. Construction of Pier E and a new Light Rail Transit line along Elm Road, both of which will be completed in the near future, will greatly diminish some of the utility and convenience of the Elm Road cargo facilities. It is also possible that the Elm Road cargo facilities will be further affected by long-term planned expansion of Pier E to accommodate future passenger activity. In addition, vehicle parking in the existing Cargo Complex is becoming deficient based on the needs of cargo tenants. An additional 765 parking positions (625 for employees, 100 for visitors, and 40 for trucks) will be required by the Year 2015 to meet the Expected Growth forecast.

Buildings

Cargo Buildings A through E provide a total of 226,000± square feet of gross usable cargo space. Cargo Building F (under construction) will add approximately 56,000 square feet, while the Elm Road facilities provide an additional 73,000 square feet. In total, within the existing Main Cargo Complex and the Elm Road facilities, there will soon be approximately 355,000 square feet of total cargo handling space at BWI.

However, during the planning period for this study, several modifications to the existing building inventory are anticipated. These modifications will affect the ability of these facilities to accommodate future air cargo demand. In 1997, Cargo Building A (14,000 square feet) is planned to be converted to MAA warehouse use. By the year 2005, it is expected that increased passenger activity may require the expansion of Pier E to the north, resulting in the demolition of the Elm Road cargo buildings (73,000 square feet). The MAA has also determined that the condition of many of the existing cargo buildings is deteriorating, and some are, in fact, approaching the limit of their normal life expectancy. Considering that cargo building supply may actually be reduced as demand is increasing, it is apparent that additional building facilities will need to be constructed in order to meet future demand.

Another emerging trend in the industry is the increased demand for both 2nd-day and 3rd-day parcel service. This service can be beneficial to firms not requiring overnight delivery of goods. In order to accommodate this type of operation, additional cargo warehousing

facilities will need to be constructed. The existing Air Cargo Complex does not have room to provide the additional warehouse and storage space required by these types of services due to current physical site constraints.

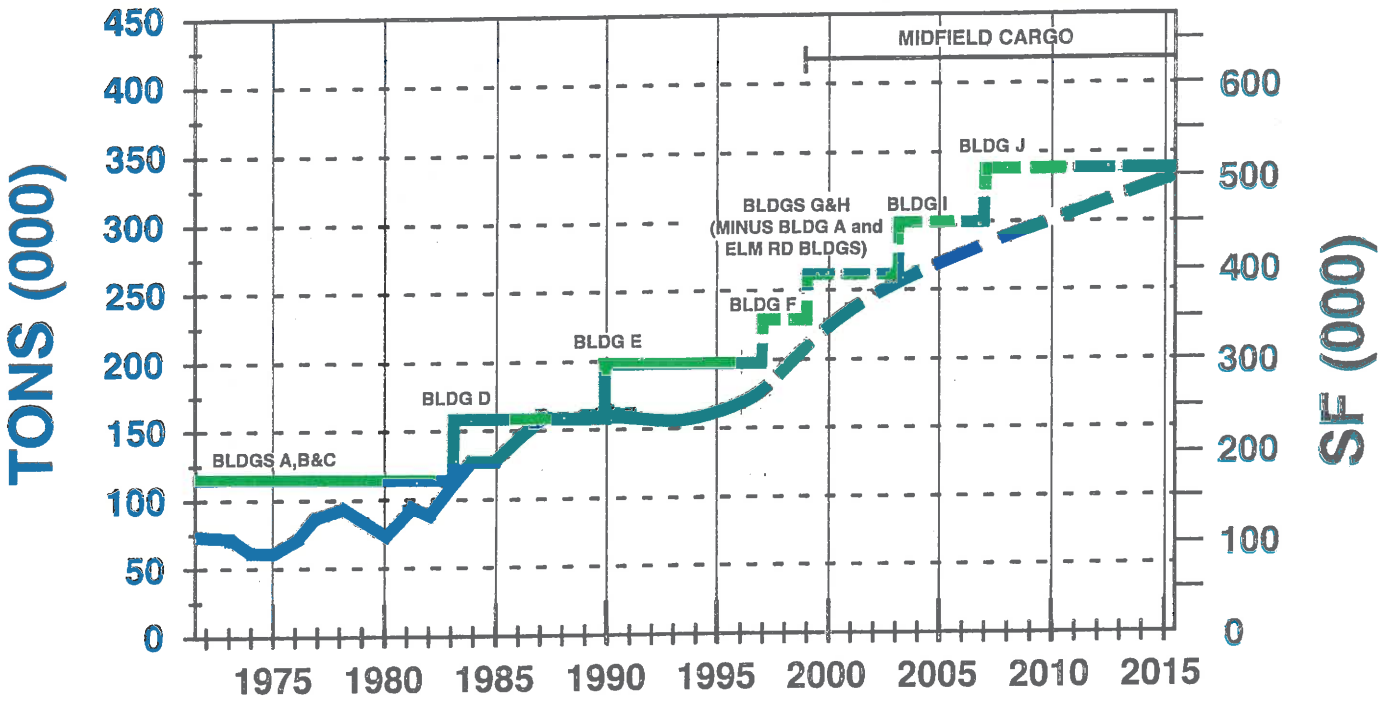
By the Year 2015, an additional 220,000 square feet of cargo building space is projected to be needed. **Exhibit I-4** provides a graphic comparison between forecast demand and capacity for air cargo facilities at BWI through the year 2015. The graphic illustrates the incremental demand in facilities which will be needed to support air cargo growth at BWI.

PURPOSE AND NEED FOR THE PROJECT

The 1987 Master Plan Study for BWI indicated that cargo facilities at the Airport were operating at or near capacity. To accommodate projected demand, construction of two new cargo buildings (E and F) was recommended. Building E has since been constructed, and Building F is expected to be completed by 1997. Cargo Building F will essentially use all of the remaining land available for cargo building facilities within the existing Air Cargo Complex.

The MAA's 1995 evaluation of the existing air cargo complex and its 1996 forecasts indicate that the demand for air cargo facilities will exceed available facilities through the planning period (Year 2015). Required facilities will include additional aircraft parking apron, landside facilities, and cargo buildings. Additional aircraft parking apron cannot be constructed in the existing Cargo Complex unless the Airfield/GSE Maintenance Complex is relocated. However, the MAA has determined that relocation of the Maintenance Complex would be very expensive, but, more importantly, would be inappropriate since the current location is very effective in meeting airfield maintenance needs. Available landside space for employee and truck parking and support facilities is also constrained in the existing Cargo Complex and adjacent Elm Road cargo area. Similarly, additional cargo buildings cannot be located in the existing Cargo Complex.

Using industry planning guidelines for cargo complex layouts, approximately 65 acres are needed to contain 220,000 square feet of cargo building space and adjacent parking apron capable of supporting wide-body aircraft. In addition, an area of approximately 25 acres



Note: Includes Enplaned and Deplaned Cargo

Source: MAA Forecasts, 1996.

BWI BALTIMORE / WASHINGTON INTERNATIONAL AIRPORT	MARYLAND DEPARTMENT OF TRANSPORTATION MARYLAND AVIATION ADMINISTRATION OFFICE OF PLANNING AND ENGINEERING
AIR CARGO DEMAND/CAPACITY COMPARISON	
URS Greiner Timonium, Maryland	Scale NONE Date MAY 1997 Exhibit No. I–4

is needed to provide cargo support facilities, such as truck and employee/customer parking, fueling facilities, ground support equipment (GSE) storage, truck wash, etc.

Considering land requirements for vehicle access and circulation, it is estimated that an area comprising approximately 100 acres will be needed for locating additional air cargo facilities at BWI. It should be noted that facilities will be developed as the need arises rather than on speculation of future use. In the MAA's planning process, timing of actual development is reviewed on an ongoing basis, and another evaluation of the demand for future cargo development is likely to occur before construction commences.

SECTION II

ALTERNATIVES

SECTION II: ALTERNATIVES

INTRODUCTION

The previous Section identified the nature and extent of existing air cargo facilities and services at the Baltimore/Washington International Airport (BWI). It also identified the ongoing and projected expansion within the air cargo sector of the aviation industry, and the opportunities for expansion of cargo facilities and services at BWI. The Section documented that, in order to accommodate projected growth in air cargo activity at BWI for the foreseeable future, additional facilities would need to be constructed.

In total, it has been estimated that an area comprising approximately 100 acres would be needed for additional air cargo handling facilities, aircraft parking apron, employee and customer parking, access and circulation, and other cargo support services and facilities through the Year 2015.

The following subsections provide a description and evaluation of alternatives considered in terms of meeting the identified purpose and need for additional cargo facilities at the Airport. Facilities required to meet future air cargo demand (through the Year 2015) were evaluated in the July 1995 "Air Cargo Complex Evaluation" (ACCE), and additional (February 1996) forecasts of cargo activity were developed by the MAA.

ALTERNATIVES CONSIDERED BUT NOT STUDIED IN DETAIL

Redevelopment of Existing Facilities

During the ACCE study process, three alternatives were considered but were found not to be reasonable options from an airport operations perspective. The first option examined was to redevelop the entire existing Cargo Complex northeast of Elm Road to meet projected

demand. This alternative would have required the relocation of airport and ground support equipment (GSE) maintenance facilities, and demolition of existing cargo buildings to provide for overall cargo facility needs and more efficient operations. While projected cargo facility requirements would have been met under this option, the phasing of construction and demolition would be complex and costly, and would result in loss of utility while construction was taking place. Therefore, this option was eliminated from further consideration.

Relocation of Existing and Future Facilities

A second alternative examined during the ACCE process included the relocation of both existing and additional new cargo functions and facilities to a new midfield area south of existing Runway 10-28. The greatest advantage of this option would be the flexibility in arranging a new midfield development to meet the unique total needs of passenger airline (belly) cargo and all-cargo airline (freighter) cargo functions. However, there were noticeable disadvantages to this option. The nature of belly cargo operations dictates that support facilities for this activity be located close to the passenger terminal building to better serve the airlines. Relocation of all existing cargo functions to the new midfield area would have required the construction of a costly tunnel under the airfield for tug operations to and from the terminal gates, or the daily crossing of active runways. For these reasons, this alternative was removed from further consideration.

Relocation of Demand to Another Airport

In addition to alternatives presented in the ACCE, consideration was given to an alternative which encourages relocation of future air cargo demand to another airport. Such an alternative would basically be an extension of a No-Build scenario, whereby no new facilities would be provided at BWI, and future air cargo demand would be encouraged to develop or relocate elsewhere. This would be accomplished by not reserving land for additional cargo facility development at BWI; developing other uses in available land areas; and providing cargo airfield and landside facilities at another airport.

There are several reasons why this alternative was not considered further. A substantial financial investment in airside and landside cargo facilities has already been made at BWI to serve the region's cargo needs. Existing investment consists of Cargo Buildings A-E, Cargo Building F (under construction), the Elm Road cargo buildings, approximately 45 acres of aircraft parking apron, and facilities for ground support equipment, auto and truck parking, truck washing, and fueling. Combined, these specialized facilities provide support for both passenger airline (belly cargo) and all-cargo airline services at BWI and could not be easily nor cost-effectively converted to a non-cargo use.

The demand for cargo services at BWI brings a substantial return to the Baltimore/Washington region in the form of capital investment, employment, and income; and also adds to total revenues for the Airport in the form of aircraft landing fees and ground and building leases. In addition, BWI has sufficient undeveloped airfield area to accommodate future expanded cargo operations and other aviation activity, whereas comparable facilities could not be easily duplicated at other regional locations (such as Martin State Airport) without substantial financial investment and potential significant environmental impacts.

There is no guarantee that building cargo facilities at other airports would be economically or environmentally feasible for another airport sponsor, or that sufficient planning has been performed at these facilities to accommodate new demand from the BWI market. In addition, a relocation of BWI cargo demand is likely to diminish economic and operational benefits for the Airport and region, and would be inconsistent with current regional long-range economic development plans for this region of the State. For these reasons, the relocation of cargo demand to other airports or modes of transport was not examined in detail in this Environmental Assessment.

The alternatives which were developed to a level of detail so that they could be comparatively assessed included:

- "No-Build" Alternative: Provide No New Cargo Facilities;

- Build Alternative 1: Expansion of the Existing Cargo Complex into the Existing Maintenance Area and Construction of a New Midfield Cargo Complex;

- Build Alternative 2: Construction of New Cargo Facilities in the Southeast Quadrant of the Airport;

- Build Alternative 3: Construction of New Cargo Facilities in the Southwest Quadrant of the Airport;

- Build Alternative 4: Construction of New Cargo Facilities in the Midfield Area of the Airport with a South Parallel Taxiway; and

- Build Alternative 4R: Construction of New Cargo Facilities in the Midfield Area with a North Parallel Taxiway.

NO-BUILD ALTERNATIVE

For the purposes of this EA, the No-Build option means that no additional cargo facilities would be developed at BWI, regardless of future increases in demand.

The 1987 Master Plan and subsequent studies have indicated a need for further cargo development at this Airport. In addition, the MAA has land available within its property boundary to accommodate new growth in aviation facilities and services, and has consistently employed a comprehensive planning process to identify the need, timing, and extent of additional airport development to accommodate demand. The No-Build scenario would alter the MAA planning process by restricting further development of cargo facilities. Insofar as land is available for further cargo facility improvements, and that the MAA is committed to providing a world class air transportation facility for all existing and potential airport users, as well as for the general public benefit, the No-Build alternative would represent an inconsistent course of action.

Consistent with State and Federal interests in the success of BWI, the MAA has recently developed additional cargo facilities to accommodate increased demand. Cargo Buildings D and E were constructed in 1983 and 1990, respectively, and a large aircraft parking apron was also developed to accommodate the needs of users such as FedEx, UPS, and Emery Worldwide. In addition, construction began in early Summer of 1996 on Building F, which will provide approximately 56,000 square feet of cargo handling facilities. These facility additions have resulted from increasing demand for cargo facilities and services at BWI.

Other Airport improvement projects are also having an effect on the current and projected supply of cargo facilities. Due to the need for additional MAA warehouse space, there will be a near-term loss of air cargo facilities at Cargo Building A. In addition, as passenger demand increases in the future, an extension of the new Pier E to the north is planned, resulting in the loss of Elm Road cargo buildings. To account for future gains and losses in cargo building supply, it is projected that an additional 220,000 square feet of cargo building space may be required by the Year 2015 as a result of increasing cargo activity at BWI.

The No-Build alternative would not accommodate future expansion of BWI's cargo capabilities, and therefore would not satisfy the identified purpose and need for additional facilities and services. In addition, the result of the No-Build alternative would be to dampen the positive economic effects of prior and current public and private investment in facilities at BWI, and to negate the potential for additional regional employment and income opportunities associated with future cargo facilities and services. Failure to expand the Airport's cargo handling capabilities would therefore likely result in the relocation of future cargo demand to another airport which could have negative economic impacts on BWI, the State, and the region.

BUILD ALTERNATIVES

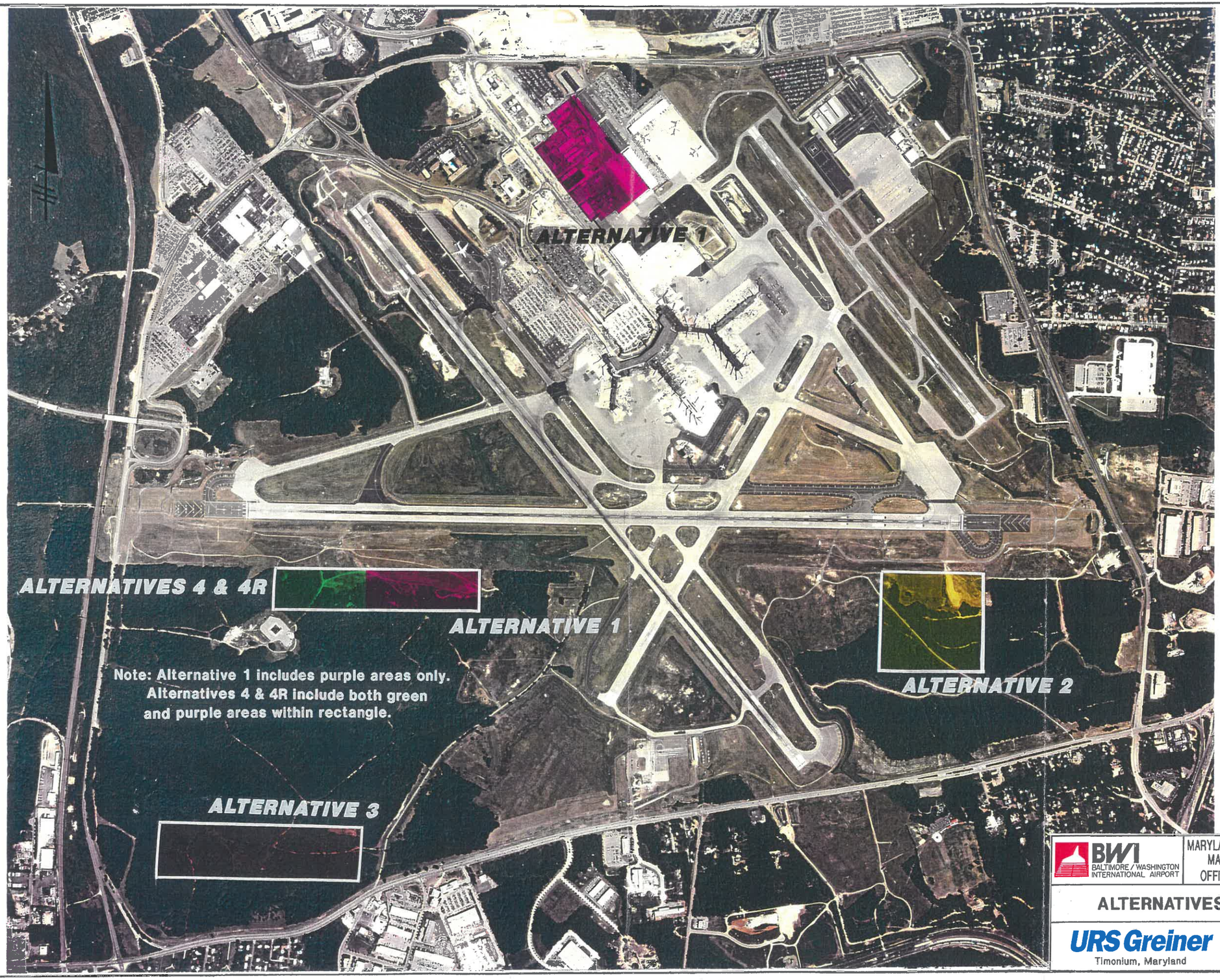
Each of the "Build" alternatives provides for incremental development of new cargo facilities as demand increases through the planning period. The criteria used for analyzing each of the alternatives included:

- its ability to satisfy the purpose and need for additional cargo facilities;
- the operational efficiencies associated with its location on the Airport;
- the nature and extent of potential environmental impacts due to its construction;
- its compatibility with existing and planned Airport facilities;
- its feasibility and cost of construction; and
- its capability to provide for expansion to meet demand beyond the Year 2015.

Exhibit II-1 depicts the general location of each of the Build alternatives considered. The remainder of the graphics in this section indicate the general layout of the individual alternatives. On each of them, the area within which any potential construction activities would occur is delineated by a red dashed line identified as the "limit of disturbance."

Alternative 1: Airport Layout Plan Alternative (Expansion of Existing Air Cargo Complex and Development of a New Midfield Cargo Complex)

Alternative 1 reflects cargo facility expansion as depicted on BWI's current Airport Layout Plan (ALP). Specifically it involves both the expansion of air cargo facilities in the existing Cargo Complex (see **Exhibit II-2**) and construction of new facilities within an area south of Runway 10-28 and west of Runway 15R-33L (see **Exhibit II-3**). Under this alternative, Cargo Buildings B through E and Building F (currently under construction) would be retained, and expansion within the existing Cargo Complex would consist of construction of two additional cargo buildings (G and H) approximately 750 feet west of and parallel to Buildings



BWI BALTIMORE / WASHINGTON INTERNATIONAL AIRPORT

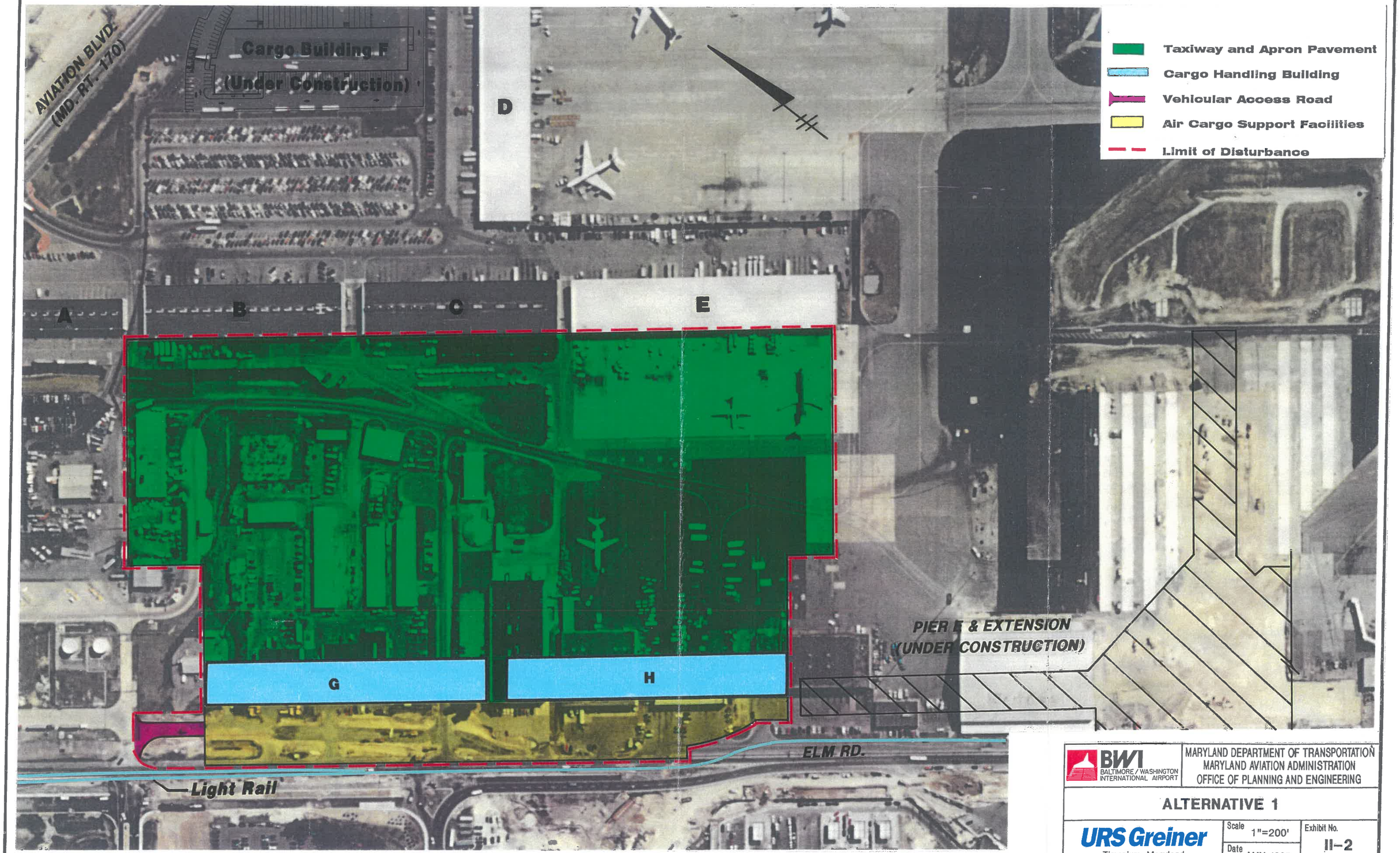
MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION
OFFICE OF PLANNING AND ENGINEERING

ALTERNATIVES LOCATION MAP

URS Greiner
Timonium, Maryland

Scale: NONE
Date: MAY 1997

Exhibit No. II–1



BWI BALTIMORE / WASHINGTON INTERNATIONAL AIRPORT

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MARYLAND AVIATION ADMINISTRATION
OFFICE OF PLANNING AND ENGINEERING

ALTERNATIVE 1

URS Greiner
Timonium, Maryland

Scale 1"=200'

Date MAY 1997

Exhibit No. II–2

RUNWAY 10-28

MD. RT. 170

J

I

ARFF FACILITY

RUNWAY 15R-33L

RUNWAY 4-22

AVIATION BLVD.

DORSEY RD.

MD. RT. 176

LEGEND

- Existing Wetlands
- Taxiway and Apron Pavement
- Cargo Handling Building (600'x100')
- Vehicular Access Road
- Air Cargo Support Facilities
- Stockpile Area
- Area to be Graded
- Limit of Disturbance

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ALTERNATIVE 1

URS Greiner
Timonium, Maryland

Scale 1"=600'

Date MAY 1997

Exhibit No. II-3

A through E. Approximately 120,000 square feet of cargo building space would be added by constructing Buildings G and H.

New Buildings G and H would be directly accessible to aircraft via construction of a new taxilane and aircraft parking apron. This taxilane and apron area would be approximately 130,000 square yards (28 acres) in size, and would also provide direct airfield access to existing Buildings B and C, which currently do not have such access available. New Buildings G and H would have access to existing Elm Road; however, this access will be constrained when the new Light Rail commuter line currently under construction is completed.

Compatibility with existing and planned land uses within the existing Cargo Complex would be difficult under Alternative 1. Construction of Buildings G and H and the new aircraft parking apron adjacent to the existing Air Cargo Complex would require the demolition and relocation of existing Elm Road cargo facilities, as well as the Airfield/GSE Maintenance Complex, to another portion of the airport. These buildings include cargo handling facilities, a ground support equipment (GSE) building, an airline commissary, an aircraft hangar, and several MAA maintenance buildings.

Although the 1987 Master Plan recommended that the airfield maintenance facilities be relocated to a site east of Runway 15L-33R (south of the general aviation complex), a recent evaluation (1996 Airfield and GSE Maintenance Study) re-examined the potential relocation of airfield and GSE maintenance facilities and found that the current location of the maintenance facilities would be best suited for these functions. The retention of Airfield and GSE Maintenance facilities in their existing locations will severely limit the ability to construct additional air cargo facilities within the existing Cargo Complex. In addition, phased construction of the new facilities in the existing Cargo Complex would result in temporary losses in accessibility and utilization for current tenants during construction. While Cargo Building F is currently under construction, it will not have airfield access, thus requiring a tug operation from aircraft to the building. In addition, Cargo Building A is projected to be converted to a warehouse for MAA use in 1997, and will become unavailable for cargo activity. These conditions ultimately restrict the ability of Alternative 1 to provide for expansion of air cargo facilities in or adjacent to the existing Air Cargo Complex, thus requiring any additional facilities to be built in the midfield area.

In the new midfield area, the current ALP illustrates the proposed construction of Buildings I and J. These buildings would offer an additional 120,000 square feet of cargo handling space, and would be constructed parallel to Runway 10-28. Buildings I and J would have direct airfield access via taxilanes, and a parallel taxiway serving existing Runway 10-28 would provide a connection from the new midfield cargo complex to Runways 10-28 and 15R-33L. An access road would be constructed south of Buildings I and J to accommodate vehicular traffic to the midfield cargo complex from Aviation Boulevard (MD Route 170). The ALP also shows development of approximately 20 acres along MD Route 170 for aircraft support facilities.

Combined, the existing Cargo Complex and new midfield area would provide sufficient land area to accommodate projected air cargo activity through 2015, and therefore would meet the purpose and need for additional cargo facilities. Aircraft access from the new midfield cargo complex, convenient to both existing Runway 10-28 and Runway 15R-33L, would enhance the attractiveness of additional cargo facilities.

The new midfield area is currently undeveloped except for several mostly unimproved access roads, an existing cemetery, the Airport's fire training facility (burn pit), and new Aircraft Rescue and Fire Fighting (ARFF) facility now under construction. The area identified for the new midfield cargo complex under Alternative 1 would impact existing forested areas and wetlands associated with Signal Branch, Clark Branch, Hawkins Branch, and Kitten Branch. Wetland impacts would occur from construction of the support area for the new midfield area. In addition, their relocation to just west of the planned cargo complex would preclude further expansion of the complex past the 2015 planning period. Construction of Alternative 1 would require approximately 117 acres of tree removal, disturbance of the Signal Branch wetland, and an estimated 1.8 million cubic yards of excavation due to the high existing terrain south of existing Runway 10-28. This excess material would be stockpiled for future use on-site in the areas shown on **Exhibit II-3**. While demand may not warrant initial construction of both midfield buildings, it is assumed that site preparation for both buildings would be performed at the time of construction of Building I.

Construction of Alternative 1 would cost approximately $68 million. Construction of the additional cargo buildings and associated facilities would cost approximately $51 million, while demolition and relocation of existing facilities as a result of construction of both Buildings G and H, as well as the taxilane and apron would comprise the remaining $17 million.

Alternative 2: Construction of New Cargo Facilities in the Southeast Quadrant of the Airport

Alternative 2 proposes to retain cargo facilities in the existing Cargo Complex and to accommodate any additional air cargo facilities in the southeast quadrant of the airport (south of Runway 10-28 and east of Runway 15R-33L). The site area is bounded by Aviation Boulevard (MD Route 162) on the east; the Baltimore Very High Frequency Omnidirectional Range with Tactical Air Navigation (VORTAC) critical area on the west (consisting of a radius of 1,000 feet around the VORTAC); the Glide Slope Critical Area (GSCA) for Runway 28 on the north; and Dorsey Road on the south (see **Exhibit II-4**).

Similar to the new midfield location proposed in the discussion of Alternative 1, the southeast quadrant of the airport is forested area with several unimproved access roads. Development in the area is limited by the approach surfaces for Runway 33R and planned Runway 10R-28L. In addition, the low existing elevations in the southeast area will result in substantial filling requirements for any development.

As depicted on **Exhibit II-4,** Buildings G and H would be constructed approximately 1,150 feet south of Runway 10-28, outside of the Runway 28 Protection Zone, and Buildings I and J would be constructed 350 feet directly south of Buildings G and H. Access to the airfield would be provided via two taxiways connecting the new cargo facilities with existing Runway 10-28 and Runway 15R-33L. Ground access would be provided by a road connecting to Aviation Boulevard (MD Route 162). Air cargo support facilities would be constructed immediately east of the cargo apron, and would share access to Aviation Boulevard via the cargo access road.

Although initially conceived feasible, the total available acreage (75 $\pm$ acres) in the southeast quadrant does not provide sufficient land to support projected demand for cargo facilities past the Year 2015. The southeast quadrant is constrained by the VORTAC and Glide

LEGEND

- Existing Wetlands
- Taxiway and Apron Pavement
- Cargo Handling Building (600' x 100')
- Vehicular Access Road
- Air Cargo Support Facilities
- Limit of Disturbance

RUNWAY 10-28

GLIDE SLOPE CRITICAL AREA

RUNWAY 33R RPZ

AVIATION BLVD.

RUNWAY 4-22

ARFF FACILITY

1,000' VORTAC CRITICAL AREA

H

G

J

I

RUNWAY 15R-33L

MD. RT. 162

FUTURE RUNWAY 28L RPZ

PROPOSED FUTURE RUNWAY 10R-28L

MD. RT. 176

DORSEY RD.

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ALTERNATIVE 2

URS Greiner
Timonium, Maryland

Scale 1"=600'

Date MAY 1997

Exhibit No. II-4

Slope critical areas, as well as the obstacle clearance requirements associated with planned Runway 10R-28L. If demand for air cargo facilities meets expectations during the next twenty years, the southeast quadrant would not be able to accommodate expected increased demand past that point. At that time, additional facilities would need to be developed elsewhere on Airport property. This would diminish the efficiency of operations, as air cargo support facilities (constructed adjacent to the southeast quadrant cargo buildings under this alternative) would not be in the vicinity of ultimate cargo development.

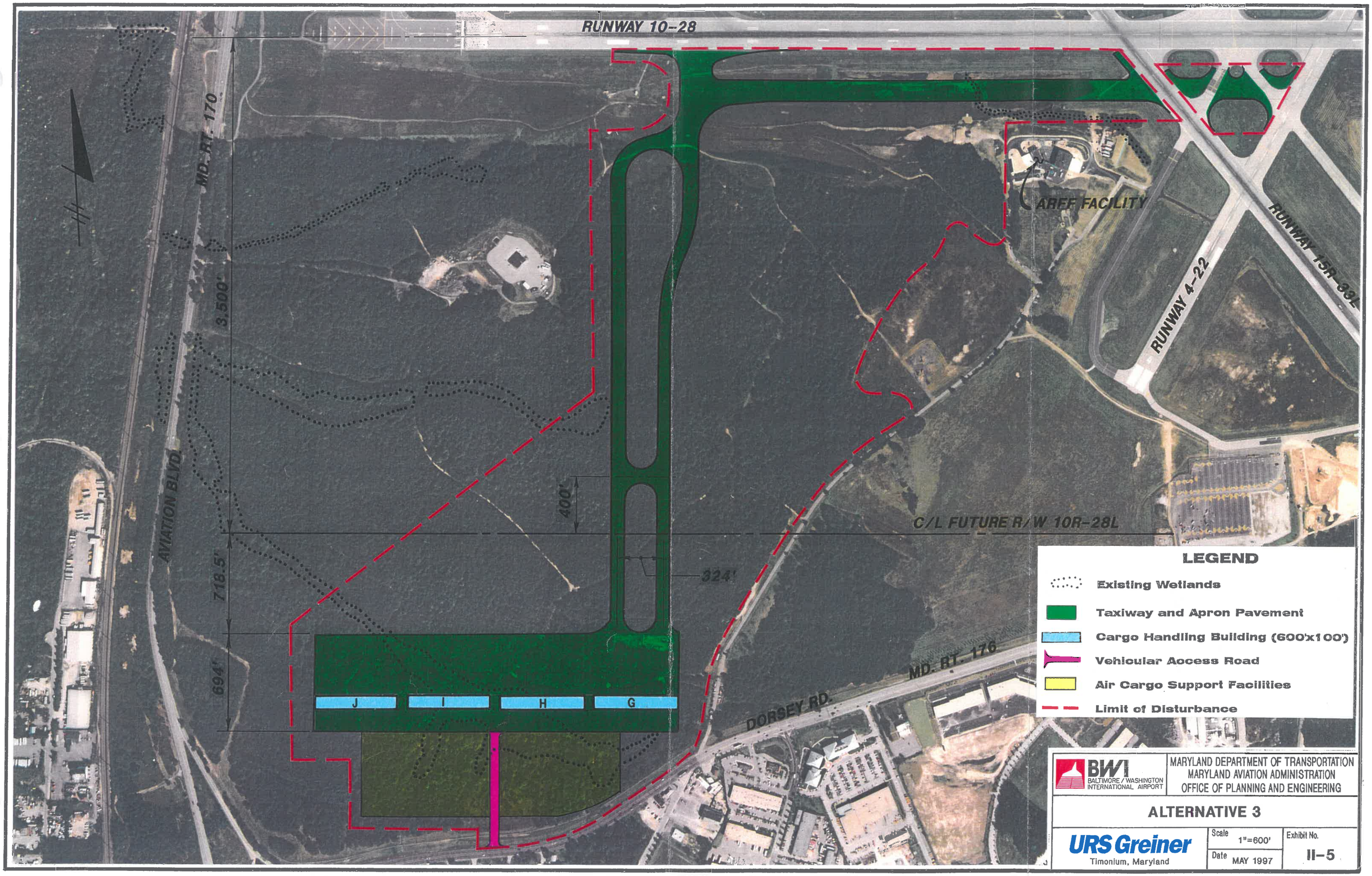
Potential environmental impacts associated with Alternative 2 include a substantial amount of earthwork (approximately 2.0 million cubic yards of borrow material would be needed) and tree clearing (approximately 80 acres). No wetland or waterway impacts occur as part of this alternative. Cargo development in the southeast quadrant should be mostly compatible with existing and planned land uses.

The estimated cost to design and construct cargo facilities in the southeast quadrant is $74 million, which includes the cost of site preparation, structures, access and circulation, aircraft parking apron, and vehicle parking facilities.

Alternative 3: Construction of New Cargo Facilities in the Southwest Quadrant of the Airport

Alternative 3 would retain the existing Cargo Complex development and construct new air cargo facilities in the extreme southwest quadrant of the airport south of planned Runway 10R-28L and west of Runway 4-22. The site area is bounded by Aviation Boulevard (MD Route 170) on the west; Dorsey Road on the south; the access road to the existing Friendship Cemetery on the east; and planned parallel Runway 10R-28L on the north (see **Exhibit II-5**).

Due to several natural features and other planned improvements, approximately 125 acres are available for cargo development in the southwest quadrant. The southwest quadrant of the airport is almost entirely forested with three tributaries to Stony Run Creek traversing



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ALTERNATIVE 3

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Date MAY 1997

Exhibit No. II-5

portions of the property (Clark Branch, Hawkins Branch, and Signal Branch). Development in the area is also limited by the future approach surface associated with planned Runway 10R-28L.

As depicted on **Exhibit II-5,** Buildings G through J would be constructed approximately 4,700 feet south of the existing Runway 10-28 centerline, and 1,200 feet south of the planned parallel Runway 10R-28L centerline. Ground access to the southwest cargo quadrant complex would be provided via construction of a new road that would access Dorsey Road midway between the Aviation Boulevard intersection and the road to the Friendship Cemetery.

Aircraft operating on Runways 10-28 or 15R-33L would access the new southwest quadrant cargo complex via a series of connecting and parallel taxiways to Runway 10-28, Runway 15R-33L, and planned Runway 10R-28L. The operational requirements of taxiing from the runway system to the southwest quadrant air cargo complex would require a dual crossover taxiway system which would be a distinct operational and cost disadvantage to this alternative. Aircraft operating to and from the southwest quadrant air cargo complex would also be required to cross planned Runway 10R-28L, resulting in potential aircraft delays and operational inefficiencies.

In general, the combination of land within the existing Air Cargo Complex and the new southwest quadrant would provide sufficient room to satisfy the overall purpose and need for cargo development through the planning period (2015). However, the southwest quadrant site is constrained by Clark Branch and associated wetlands northeast of the Aviation Boulevard and Dorsey Road intersection, and by ultimate development of planned Runway 10R-28L. Therefore, the site does not provide sufficient room for ultimate expansion, should the need arise beyond the planning period.

The amount of tree removal required to provide unobstructed line-of-sight from the ATCT would be approximately 200 acres, adding substantially to the cost to implement this alternative.

The estimated cost to implement this alternative is $72 million. This cost includes approximately 247 total acres of tree removal, and site preparation, as well as the permanent impact to nearly 17 acres within the Clark Branch and Hawkins Branch wetland areas. Also included in the cost of Alternative 3 is structural and airfield construction, and the cost of access, circulation, and vehicle parking requirements.

Alternative 4: Construction of New Cargo Facilities in the Midfield Area of the Airport

Alternative 4 proposes to retain existing development in the cargo complex north of the passenger terminal area, and place additional all-cargo facilities in a new midfield area southwest of existing Runway 10-28 and Runway 4-22. In essence, Alternative 4 is a modification of Alternative 1, where the primary difference is the abandonment of the existing ALP concept of constructing additional cargo facilities in (or adjacent to) the existing Cargo Complex.

The new midfield area boundary is defined by Aviation Boulevard (MD Route 170) on the west; obstacle clearance limits associated with planned parallel Runway 10R-28L on the south; Runway 4-22 on the east; and existing Runway 10-28 on the north (see **Exhibit II-6**). The total area within the new midfield section of the airport is approximately 250 acres. After subtracting land currently in use for the Friendship Cemetery and new ARFF building (under construction), there are approximately 175 acres of land available for the development of midfield cargo facilities and support uses.

The midfield cargo complex (Cargo Buildings G through J) would be constructed approximately 1,150 feet south (and parallel to) existing Runway 10-28 and 1,000 feet west of the ARFF station currently under construction. Aircraft would access the existing runway system via new connecting and partial parallel taxiways. The taxiing distances between the new midfield cargo complex and existing and planned runway system would be relatively short, assisting in reducing operational delays and construction costs. In addition, the location of the new midfield cargo complex provides a clear line-of-sight from the existing ATCT to maneuvering aircraft.

RUNWAY 10-28

MD. RT. 170

J I H G

AFFF FACILITY

RUNWAY 4-22

RUNWAY 15R-33L

AVIATION BLVD.

MD. RT. 176

DORSEY RD.

LEGEND

- Existing Wetlands
- Taxiway and Apron Pavement
- Cargo Handling Building (600' x 100')
- Vehicular Access Road
- Air Cargo Support Facilities
- Stockpile Area
- Area to be Graded
- Limit of Disturbance

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ALTERNATIVE 4

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Timonium, Maryland

Scale 1"=600'

Date MAY 1997

Exhibit No. II-6

Vehicular access to the new cargo complex would be provided by upgrading the unimproved access road connecting Aviation Boulevard at Gate 13 with the new ARFF facility to the east of the cargo complex. An area comprising nearly 35 acres west of the midfield cargo complex near Aviation Boulevard would be available for development of cargo support facilities and other uses. With the amount of land available for the new midfield cargo complex and support facilities, Alternative 4 satisfies the purpose and need for additional cargo development through the planning period. The amount of land potentially available for cargo facility development in this area is sufficient to provide room for Year 2015 demand and additional future expansion, should the need arise.

Potential environmental impacts associated with the midfield cargo complex include the removal of approximately 90 acres of forested areas in the southwest quadrant of the airport, as well as impacts to approximately 1.1 acres of wetlands in the Hawkins, Clark, and Kitten Branches.

The estimated cost of implementing Alternative 4 is $65 million, which includes tree removal. Site preparation with this alternative will require an extensive amount of earthwork (approximately 2.2 million cubic yards of excavation) which will necessitate the stockpiling of the excess material; therefore, many of the costs associated with site preparation for Alternative 4, compared with the other options which require borrow material (Alternatives 2 and 3), are less. The cost estimates for Alternative 4 also include approximate costs for structural development, as well as airfield pavement, access and circulation, and vehicle parking.

Alternative 4R: Construction of New Cargo Facilities in the Midfield Area of the Airport - Revised from Alternative 4 (Proposed Action)

Alternative 4R is similar to Alternative 4 in that it proposes to retain existing development in the cargo complex north of the passenger terminal area, and place additional all-cargo facilities in a new midfield area southwest of existing Runway 10-28 and Runway 4-22. Alternative 4R is a modification of Alternative 4, where the primary differences are: the relocation of the parallel taxiway from the south of Runway 10-28 to the north; and the relocation of a cargo support area south of the proposed access road rather than in the Signal Branch stream system

LEGEND

- Existing Wetlands
- Taxiway and Apron Pavement
- Cargo Handling Building (600' x 100')
- Vehicular Access Road
- Air Cargo Support Facilities
- Stockpile Area
- Limit of Disturbance

Taxiway F

Taxiway G

Runway 10-28

Md. Rt. 170

S.W.M.

J

I

H

G

S.W.M.

ARFF Facility

Runway 15R-33L

Runway 4-22

Newly Discovered Archaeological Site

Aviation Blvd.

Dorsey Rd. Md. Rt. 176

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ALTERNATIVE 4R

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Date MAY 1997

Exhibit No. II-7

north of the access road (see **Exhibit II-7**). Modifications were based on a number of factors as described below.

Based on the results of a meeting with the Air Traffic Control Tower (ATCT) personnel, the relocation of the parallel taxiway from the south of the runway to the north was recommended to improve aircraft ground operations and efficiency (by avoiding an area of convergence of three runways). A memorandum from the Air Traffic Manager at the Baltimore Tower to the FAA Airports District Office, dated May 15, 1997, is included in Appendix A. The relocation had the added benefit of decreasing impacts to the Kitten Branch stream system identified as "Waters of the U.S."; however, wetland impacts in Kitten Branch increased by 0.04 acres. Construction of the north parallel taxiway would require about 200,000 cubic yards of fill, reducing the volume of material to be stockpiled. Other benefits include the ability to provide additional water quality management facilities in the infield area north of the proposed taxiway and to provide flow path modification to reduce peak flows in the area (as outlined in the Airport's Comprehensive Stormwater Management Plan). There is also additional flexibility to provide water quality management and flow path modification south of the runway as the area is not as restricted by the construction of a south parallel taxiway.

As a result of comments received from various agencies during review of the Draft Environmental Assessment (EA), the cargo support facility was relocated from north of the proposed access road to the south of the access road. This layout may not be the most efficient from an operational standpoint, but the relocation results in fewer stream impacts to Signal Branch and provides a substantial area for a stormwater management infiltration basin.

The footprint of the stockpile was modified to avoid an archaeological site discovered as part of a Phase I archaeological survey and to maintain a 200-foot buffer between the Hawkins Branch wetlands and the limit of construction. The fill site located off the end of Runway 4 has been eliminated from Alternative 4R because of both the cost for constructing the fill in a separate and more remote location and because sufficient material to fill in this area has been found to exist in several scattered locations much closer to Runway 4.The total area of the modified footprint is approximately 43 acres.

Other associated construction includes the widening of Aviation Boulevard, Maryland Route 170 (MD 170) to provide a left-turn lane into the site for southbound traffic and a deceleration lane and acceleration lane for northbound traffic entering and leaving the site, respectively. During the preliminary planning for the Draft EA, consideration was given to two alternatives for widening of MD 170 in that area. Alternative A provided widening on both sides of the road. Impacts associated with this alternative included wetlands impacts on the east and west sides of the road, and impacts to an archaeological site on the west side of the road. Alternative B provided for widening on the east side of the road only, resulting in greater wetland impacts, but no impacts to archaeological sites. An additional impact of either alternative is the relocation of the State Highway Administration's Hiker/Biker trail. Since submittal of the Draft EA, Alternative B was chosen as the preferred alternative because of the reduced archaeological impacts.

Alternative 4R satisfies the purpose and need for additional cargo development through the planning period. The amount of land potentially available for cargo facility development in this area is sufficient to provide room for the Year 2015 demand and additional future expansion.

Potential environmental impacts associated with this Alternative include the removal of approximately 105 acres of forested area, and 1.1 acres of wetlands impacts and 1,330 linear feet of stream impacts in the Kitten Branch, Signal Branch, Hawkins Branch, and Clark Branch watersheds.

The estimated cost to implement Alternative 4R is $69 million, which includes 105 acres of tree removal and approximately 2.4 million cubic yards of excavation with the stockpiling of excess material. The cost estimates also include approximate costs for structural development, as well as airfield pavement, access and circulation, and vehicle parking. The cost increase from Alternative 4 to Alternative 4R is a result of several modifications. The majority of the increase resulted from relocating the parallel taxiway from the south of Runway 10-28 to the north. An additional drainage system was required to convey surface runoff from the north parallel taxiway that was not needed for the taxiway to the south. Similarly, locating the taxiway to the north resulted in the need for stormwater quality management measures that were not required previously as area was limited and more proposed pavement would drain to the proposed infiltration basin.

Additional excavation is required for the north taxiway and erosion and sediment control is more extensive. Other modifications include lengthening of the apron pavement, and improvements to the access road.

COMPARATIVE EVALUATION

An evaluation of each of the alternatives was performed using the criteria listed at the beginning of this Section. **Table II-1** presents the comparative evaluation of the alternatives. As presented in **Table II-1**, Alternative 4R adequately meets each of the evaluation criteria, though it would be more expensive than the original Alternative 4. The midfield area of the Airport provides the most benefits for aircraft operations; offers the most room for ultimate expansion of future cargo facilities; and does not, as in Alternative 1, require relocation of existing cargo or maintenance facilities which would disrupt ongoing airport and tenant operations.

Construction of cargo facilities in the southeast or extreme southwest areas of the Airport (Alternatives 2 and 3, respectively) would provide the least operational efficiency, the least room for ultimate expansion; and would be the most costly to implement. Each of the build alternatives will have an impact on forested areas; however, development in the extreme southwest area of the Airport would disturb the most natural systems.

TABLE II-1

COMPARATIVE EVALUATION OF ALTERNATIVES

Alternative	Meets Purpose and Need	Operational Efficiency	Potential Environmental Impacts			Land Use Compatibility	Estimated Cost (Million)	Provides Room for Expansion
			Wetlands (Acres)	Streams (Linear Feet)	Forest (Acres)			
Alternative 1	Yes	Yes	0.1	1,870	116.5	Yes	$68	Yes
Alternative 2	No	No	0.0	0	80.4	Yes	$74	No
Alternative 3	Yes	No	16.6	2,690	246.5	No	$72	Yes
Alternative 4	Yes	Yes	1.1	2,560	90.0	Yes	$65	Yes
Alternative 4R	Yes	Yes	1.1	1,330	105.0	Yes	$69	Yes

PROPOSED ACTION

Based on the purpose and need to expand air cargo facilities at BWI to accommodate demand through the planning period (2015), and the evaluation of alternatives to meet the purpose and need, the anticipated Federal action for this EA is the approval of a revision to the existing Airport Layout Plan based on the Alternative 4R design concept. It is anticipated that development of these proposed facilities will occur over a ten-year period, with the construction of the first two builidngs (G and H) and access road expected to begin in the Spring of 1998 and be completed in the Fall of 1999. Grading operations for the full development area and construction of the fuel farm will also occur during this initial development phase. Ultimate development of the remaining buildings (I and J) and the support area south of the access road will occur over the next eight years, with Building I anticipated for construction in 2003 and Building J in 2007, based on expected growth and demand.

SECTION III

AFFECTED ENVIRONMENT

SECTION III: AFFECTED ENVIRONMENT

EXISTING NOISE EXPOSURE

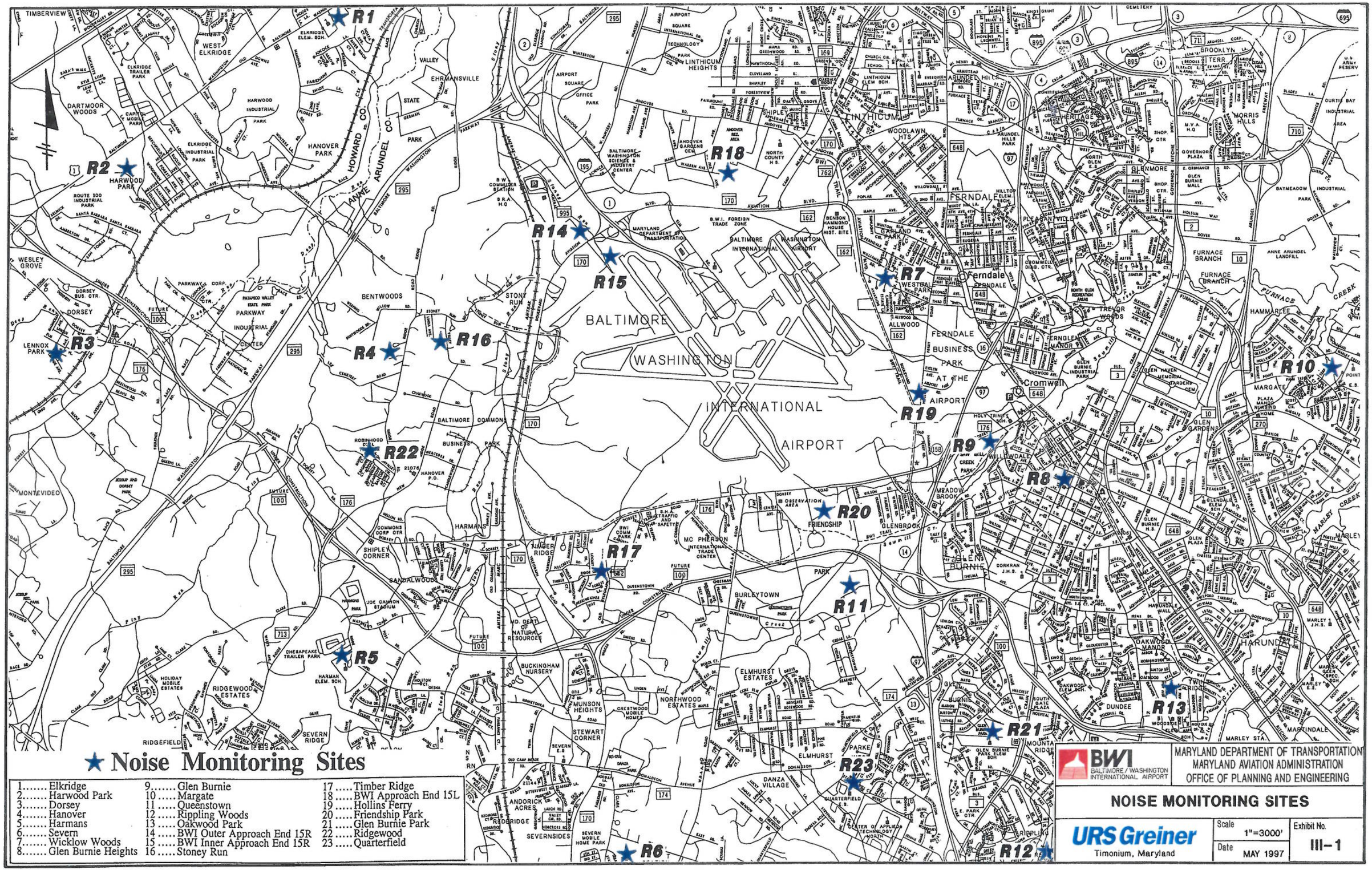
This subsection presents information on base year (1995) noise levels and aircraft operations at BWI. Section IV presents and discusses the various Build alternatives and examines their noise effects in relation to the No-Build condition. Appendix C discusses the fundamentals of noise, describes the noise metrics used in the assessment of the planned midfield cargo complex, and provides guidance on interpreting noise levels and changes in these levels. Appendix D presents the aircraft operational data used in the development of the noise contours for this study.

Existing Noise Levels

Existing noise levels include both the noise levels produced by the aircraft operations at BWI and the existing background noise levels comprised of the sounds emitted from a multitude of noise sources found in communities around BWI. This section tabulates the monitoring results produced by the 23 permanent noise monitoring sites around BWI, and presents the computed noise contours for 1995 aircraft operations at BWI. It also compares the computed contour levels with the levels measured by the noise monitors.

Measured Existing Levels

Table III-1 presents the data measured during 1995 at the 23 noise monitor sites shown in **Exhibit III-1**. These values are expressed in terms of the "day-night average sound level" (Ldn), which is more specifically defined in Appendix C. The Ldn values presented in the table are the measured levels without the aircraft contribution (Community), from aircraft alone (Aircraft), and the combined total Ldn. The noise monitoring system matches noise events with radar data. By correlating the radar and noise data, BWI's Flight Track Processing and Analysis System (FTPAS) can then estimate whether an aircraft or another noise source, actually created the "event."


R1
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ANNE ARUNDEL CO.
HOWARD CO.
Ferndale
Cromwell
Noise Monitoring Sites
1..... Elkridge
2..... Harwood Park
3..... Dorsey
4..... Hanover
5..... Harmans
6..... Severn
7..... Wicklow Woods
8..... Glen Burnie Heights
9..... Glen Burnie
10..... Margate
11..... Queenstown
12..... Rippling Woods
13..... Oakwood Park
14..... BWI Outer Approach End 15R
15..... BWI Inner Approach End 15R
16..... Stoney Run
17..... Timber Ridge
18..... BWI Approach End 15L
19..... Hollins Ferry
20..... Friendship Park
21..... Glen Burnie Park
22..... Ridgewood
23..... Quarterfield
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NOISE MONITORING SITES
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Scale 1"=3000'
Date MAY 1997
Exhibit No. III–1

TABLE III-1

NOISE MONITORING RESULTS
JANUARY - DECEMBER 1995

Site	Aircraft Ldn	Community Ldn	Total Ldn
1	55.8	60.3	61.7
2	59.7	63.2	64.8
3	67.4	63.2	68.8
4	76.0	68.7	76.8
5	55.4	59.9	61.2
6 (Jan.-May)	58.1	68.2	68.6
6 (Aug.-Dec.)	54.8	61.5	62.3
7	62.5	66.6	68.1
8	57.8	62.0	63.4
9	62.9	66.1	67.8
10	52.1	59.8	60.5
11	72.3	67.1	73.4
12	62.5	59.8	64.3
13	52.3	59.5	60.2
14	69.2	67.2	71.3
15	72.7	74.4	76.6
16 (Jan.-May)	77.1	70.9	78.0
16 (Aug.-Dec.)	75.5	66.9	76.0
17	52.6	61.0	61.6
18	61.7	63.8	65.9
19	68.2	67.2	70.7
20	75.3	68.9	76.2
21	65.3	62.0	66.9
22	66.1	61.2	67.3
23	62.4	61.2	64.9

Note: Sites 6 and 16 were moved to new locations in June 1995 and were off-line in June and July.

Computed 1995 Aircraft Noise Contours

This subsection presents the noise contours that result from 1995 average daily aircraft operations at BWI. Noise contours are used to define existing and future noise exposure and are used in this assessment as the primary method for examining the effects of the proposed midfield cargo facility. The 1995 contours represent the current level of noise exposure, and, in Section IV, contours for 1999 and 2015 show how the noise exposure will change if the cargo facility is constructed and operational. By comparing the various contours, and the areas and numbers of residents enclosed within the contours, it is possible to assess the noise effects of the proposed facility.

Noise contours are computed using the FAA's program, the Integrated Noise Model, INM. The most current version, INM 5.0, is used for all computations in this assessment. This version is a recent update from Version 4.11 in that it contains a revised noise database for the aircraft types as well as revised computational routines in calculating noise levels.

In order to compute contours, four categories of information need to be known and provided as appropriate input to the INM.

- Daily Aircraft Operations
- Runway Use
- Flight Track Locations
- Flight Track Use

Aircraft Operations

Average daily operations for calendar year 1995 were compiled directly from the Flight Track Processing and Analysis System (FTPAS), and were reviewed and checked by MAA staff. **Table III-2** presents the numbers of modeled daily operations in terms of daily departures for each aircraft group. The types are separated into groups that were each assigned runway usage characteristic of that group: heavy jets, other large jets, light jets and commuter

TABLE III-2

1995 DAILY DEPARTURES BY AIRCRAFT GROUP

Aircraft Group	Average Daily Departures	Percent of Total Operations
Heavy Jets	7.2	1.8%
Other Large Jets	200.6	50.4%
Light Jets/Commuter	123.8	31.1%
GA Props	66.8	16.8%
TOTAL	398.4	100.0%

aircraft, with single-engine and light twin-engine propeller aircraft treated as a separate group. Details of the specific number and type of aircraft used in the modeling analysis are presented in Appendix D.

Runway Utilization

Runway use rates depend on several factors including wind conditions, runway length and heading, aircraft type and performance, flight purpose (origin and destination) and terrain. Runway utilization used in the modeling of the 1995 condition was developed by the MAA with data gathered from the FTPAS for calendar year 1995. The runway utilization was applied to similar aircraft groupings, i.e. aircraft that would have similar patterns of runway use because of type, weight, and destination. Different utilization rates were used to model daytime and nighttime operations, and different utilization rates were used to model departures and arrivals. The runway utilization used in the development of the 1995 contours is presented in Appendix C.

Flight Tracks

Modeled flight tracks were developed using Automated Radar Terminal System (ARTS) data. These data are recorded from the FAA radar and include aircraft type, location, speed and altitude for all aircraft that arrive at or depart from BWI. The radar data are recorded on magnetic disks by the FAA, then read into a personal computer and plotted on the screen to show where aircraft fly depending upon which runway is used and aircraft destination. Data were plotted for the different aircraft groups, for the different runways, and modeled tracks constructed to represent the plotted radar data.

Radar data were available for August 26-28, 1990 and for November 6-7, 1990. These data were first used to develop flight tracks for the review of 1990 BWI contours, and were used again in the Runway 10-28 Extension FONSI. The flight tracks were kept for development of the 1995 contours presented here since there had been no changes in airspace use since that time. The radar tracks were plotted, and a middle track and two outside tracks that enclosed approximately 90% of the radar tracks were constructed. Where radar track dispersion

was large, four tracks were used. For runways and aircraft types where there was little or no radar data, generally because of infrequent use, tracks were constructed based on discussions with MAA personnel of airspace requirements and on knowledge of aircraft turning characteristics.

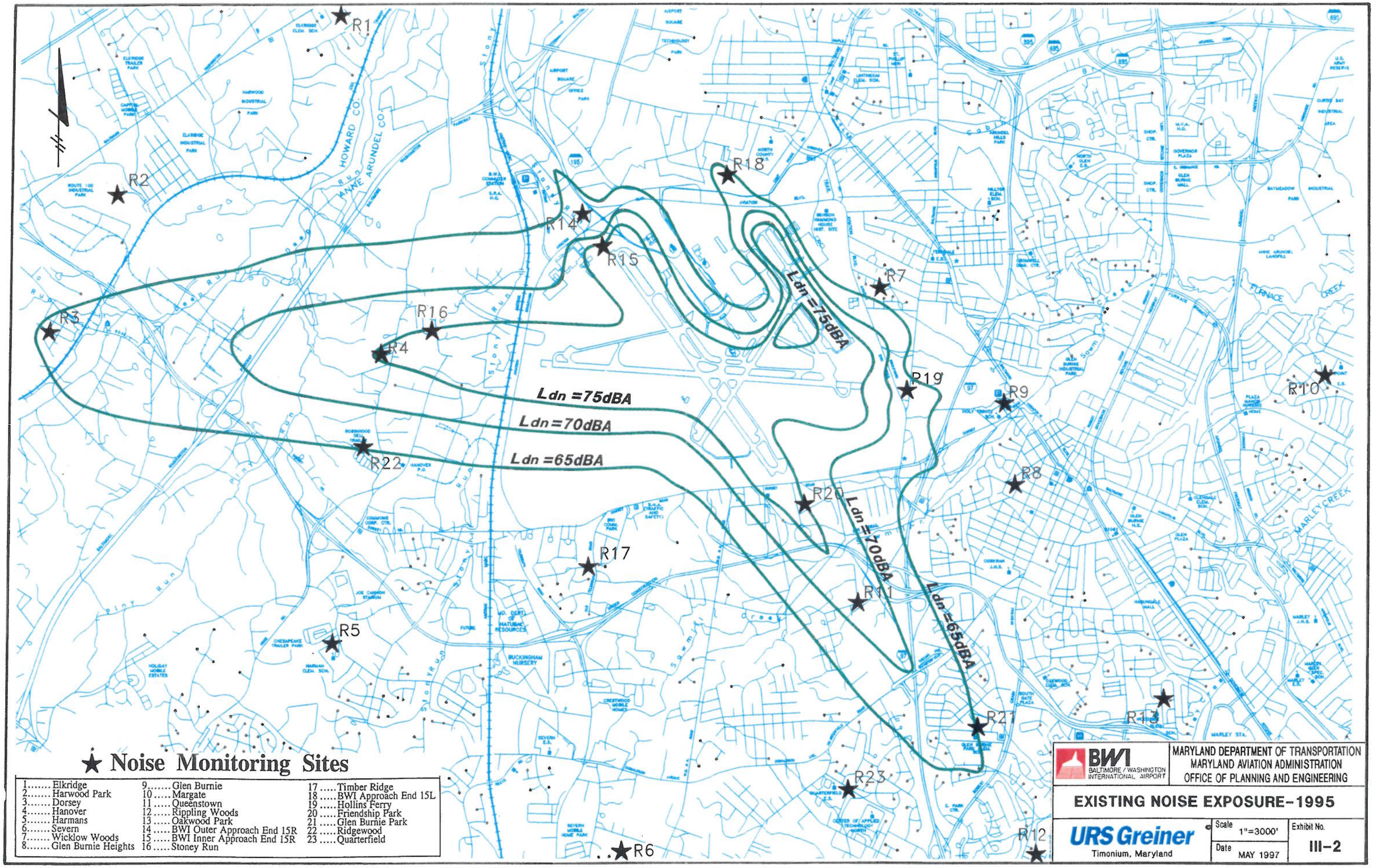
Flight tracks were constructed for all aircraft groups, for all runways. These tracks are documented, and are depicted in a previous MAA document. In general, heavy and other large jet departures using Runways 10-28 and 15R tend to determine most of the noise exposure around BWI. Arrival tracks were modeled as straight in tracks on runway heading except for propeller, light jet approaches to 33R which are turning approaches from the east, and an offset jet approach to 33L that arrives from the south.

Flight Track Use

Aircraft use of the various departure tracks was based on use of the various departure directions or fixes. **Table III-3** gives the percent use of each of the departure fixes. When more than one track was modeled as going to a fix, the departures were split equally across the tracks. For example, if four tracks were modeled for heavy jet departures from 15R toward the west, then each track received one-fourth of the number of departures assigned to that fix from 15R. (Since 42% of the departures go to the west, then, with four departure tracks, each track would have 10.5% of the departures.)

Ldn Contours

Exhibit III-2 presents the 1995 Ldn contours. The predominant runway use of 28 and 15R for departures and 33L for arrivals is reflected in the extension of the contours to the west and to the southeast. The use of 33R for departures by light jets and propeller aircraft results in the lobe extending to the northeast from the short 33R runway. Start of takeoff noise produces the bulges around the 28 runway end to the east, the 15R end to the northwest, and the 15L end to the northwest. The light use of runway 28 for arrivals produces the short narrow lobe directly to the east of the east and west runway. This small lobe is not from takeoffs on 28,



★ Noise Monitoring Sites

1..... Elkridge	9..... Glen Burnie	17 ..... Timber Ridge
2..... Harwood Park	10 ..... Margate	18 ..... BWI Approach End 15L
3..... Dorsey	11 ..... Queenstown	19 ..... Hollins Ferry
4..... Hanover	12 ..... Rippling Woods	20 ..... Friendship Park
5..... Harmans	13 ..... Oakwood Park	21 ..... Glen Burnie Park
6..... Severn	14 ..... BWI Outer Approach End 15R	22 ..... Ridgewood
7..... Wicklow Woods	15 ..... BWI Inner Approach End 15R	23 ..... Quarterfield
8..... Glen Burnie Heights	16 ..... Stoney Run	

TABLE III-3

DEPARTURE DIRECTION USE
AIR CARRIERS

Direction	Departure Fix	Use, Percent
East	SWANN	18%
	PALEO	5%
West	LINDEN/ARMEL/MONTEBELLO	42%
Northwest	BUFFER/JERES	18%
South	DAILY	17%
Total		100%

which are relatively quiet to the direct rear of the aircraft, but from the arrivals to 28 that come in from the east.

Comparison of Measured and Computed Levels

The noise exposure contours shown in **Exhibit III-2** have been verified using the long-term measurements made at the 23 noise monitoring sites. **Table III-4** compares the values of Ldn computed for each of the monitoring sites with the values measured at the sites during the twelve month period of January 1995 to December 1995. The table also presents the differences between the computed and measured levels where a negative number means the computed value is less than the measured value.

In general, differences between computed and measured values of Ldn of 0 to ± 2 dB are considered acceptable, and differences of up to ± 3 dB are not unusual. Greater differences can indicate one or more of several conditions. First, and most obviously, larger differences may mean that the operations data or runway use modeled do not accurately reflect actual operations. Second, the model (the INM and its database) tends to be somewhat more accurate at computing certain types of aircraft operations noise than it is at computing others. Hence, differences may result from model characteristics and not from inaccuracies in the modeled input.

Differences greater than 2 dB occur at Sites 8, 14, 15, 17, and 18. Sites 8 and 17 are located quite distant from the airport, well outside of the 65 DNL contour where direct overflights may be infrequent. Aircraft levels below about 60 dB DNL are difficult to measure and to compute. Local, non-aircraft noise sources can affect measured levels, and the broad dispersion of tracks that often occurs at these distances from an airport is difficult to model accurately. Hence, the differences at Sites 8 and 17 are reasonable.

Sites 14, 15 and 18 are quite close to runway ends. Site 14 is in an area where sound levels can change significantly with distance from the runway, and a 3 dB difference should not be considered of significance. Site 15 is almost next to the start of takeoff end of 15R, and the large difference of 10 dB is likely due to shielding provided by terrain. At this location, the

TABLE III-4

COMPUTED VS. MEASURED DNL VALUES

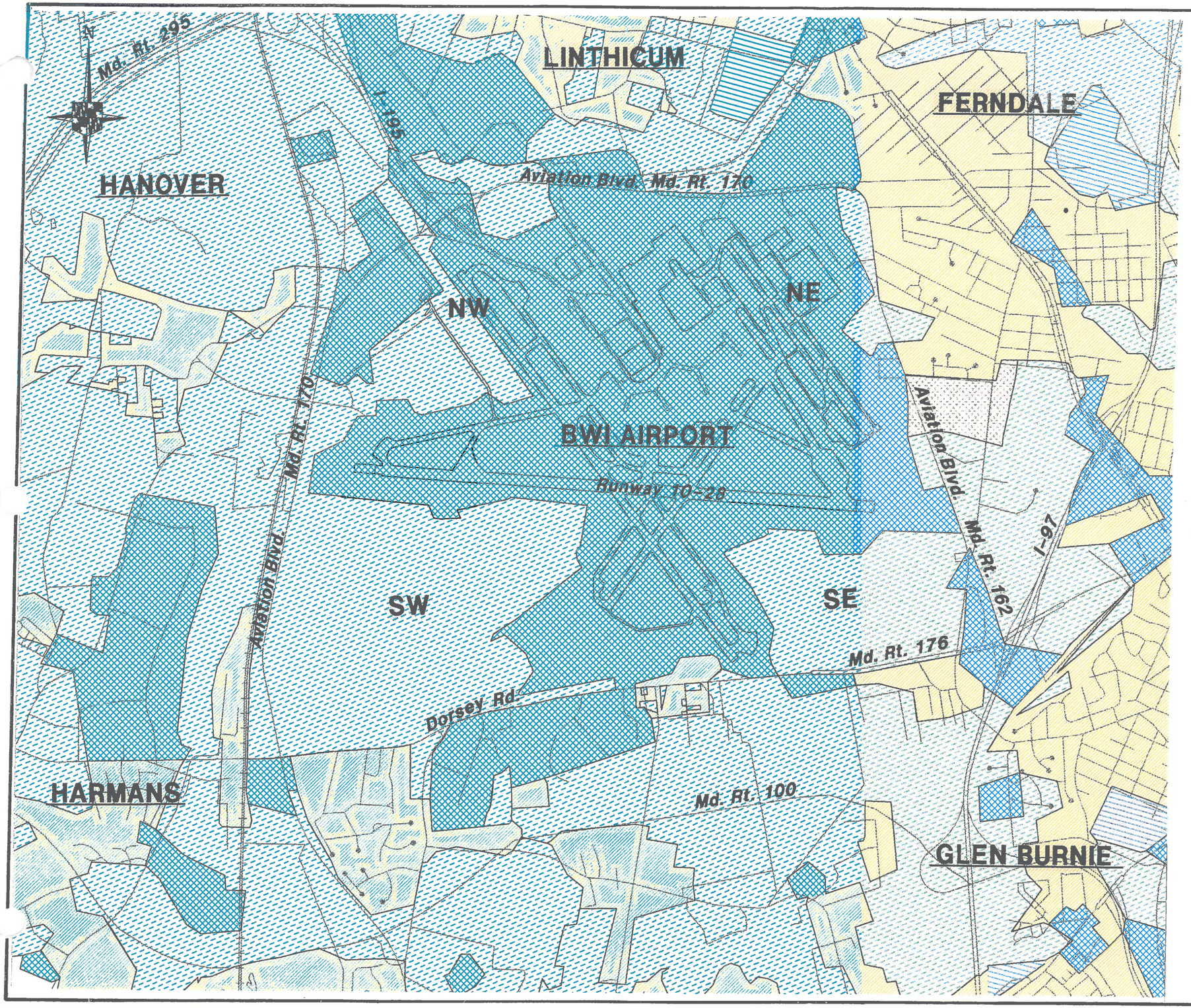
Site	Measured Aircraft DNL dB	Computed DNL dB	Difference (Computed Minus Measured) dB
R1	56	55	-1
R2	60	61	1
R3	67	65	-2
R4	76	76	0
R5	55	54	-1
R6	55	56	1
R7	63	63	0
R8	58	61	3
R9	63	62	-1
R10	52	51	-1
R11	72	73	1
R12	63	63	0
R13	52	54	2
R14	69	67	-2
R15	73	83	10
R16	76	76	0
R17	53	57	4
R18	62	67	5
R19	68	69	1
R20	75	75	0
R21	65	65	0
R22	66	65	-1
R23	62	60	-2

runway is elevated above the monitor, and as aircraft move down the runway, the monitor will not "see" the aircraft as it becomes hidden by the fill on which the runway is located. This shielding provided by the terrain could lower the measured levels by 5 to 10 dB, thus accounting for the difference between measured and computed levels. The difference at Site 18 is probably due to the limited types of corporate jet aircraft in the INM database. The largest contributor to the noise levels at Site 18 is corporate jets. Several different types of corporate jets use this runway, and some must be modeled using equivalent aircraft types that have been judged by FAA to be similar in noise characteristics. It is likely that some of the actual corporate jets using Runway 33R are quieter than the approved equivalents.

In summary, differences between computed and measured levels are taken to validate the basic approach to modeling BWI operations. Differences that occur between measured and computed levels are likely due to some limitations of the model itself (no accounting for terrain shielding or limited types of corporate jets), and to difficulties of modeling levels distant from the Airport where overflights are widely dispersed and community levels may make accurate monitoring of aircraft difficult.

EXISTING LAND USE

The land uses adjacent to the southern and western boundaries of BWI are comprised of a mix of single-family residential, commercial, institutional, industrial and undeveloped (vacant) property (see **Exhibit III-3**). The areas immediately west and south of the Airport are predominantly undeveloped, with the exception of scattered commercial and residential frontage properties along MD 176 (Dorsey Road). Along MD 176, there are industrial and office park developments such as the BWI Commerce Park and older single-family residential developments such as Timber Ridge and Glenbrook. West of the MD 176 and MD 170 intersection along Dorsey Road, the Baltimore Commons Business Park, the Dorsey Ridge Business Center and the Commons Corporate Center reflect the County's zoning of areas surrounding the Airport for regional industrial and office development. Within this area, there are older residential developments including the Ridgewood Mobile Home Park and Shipley's Corner; as well as an



LEGEND

- Undeveloped / Agriculture
- Residential
- Commercial
- Institutional
- Industrial

BWI BALTIMORE / WASHINGTON INTERNATIONAL AIRPORT

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MARYLAND AVIATION ADMINISTRATION
OFFICE OF PLANNING AND ENGINEERING

EXISTING LAND USE

URS Greiner
Timonium, Maryland

Scale 1"=2000'
Date MAY 1997
Exhibit No. III-3

active development project (Dorchester Planned Unit Development) which will consist of a mix of residential and industrial land uses on a 400-acre site.

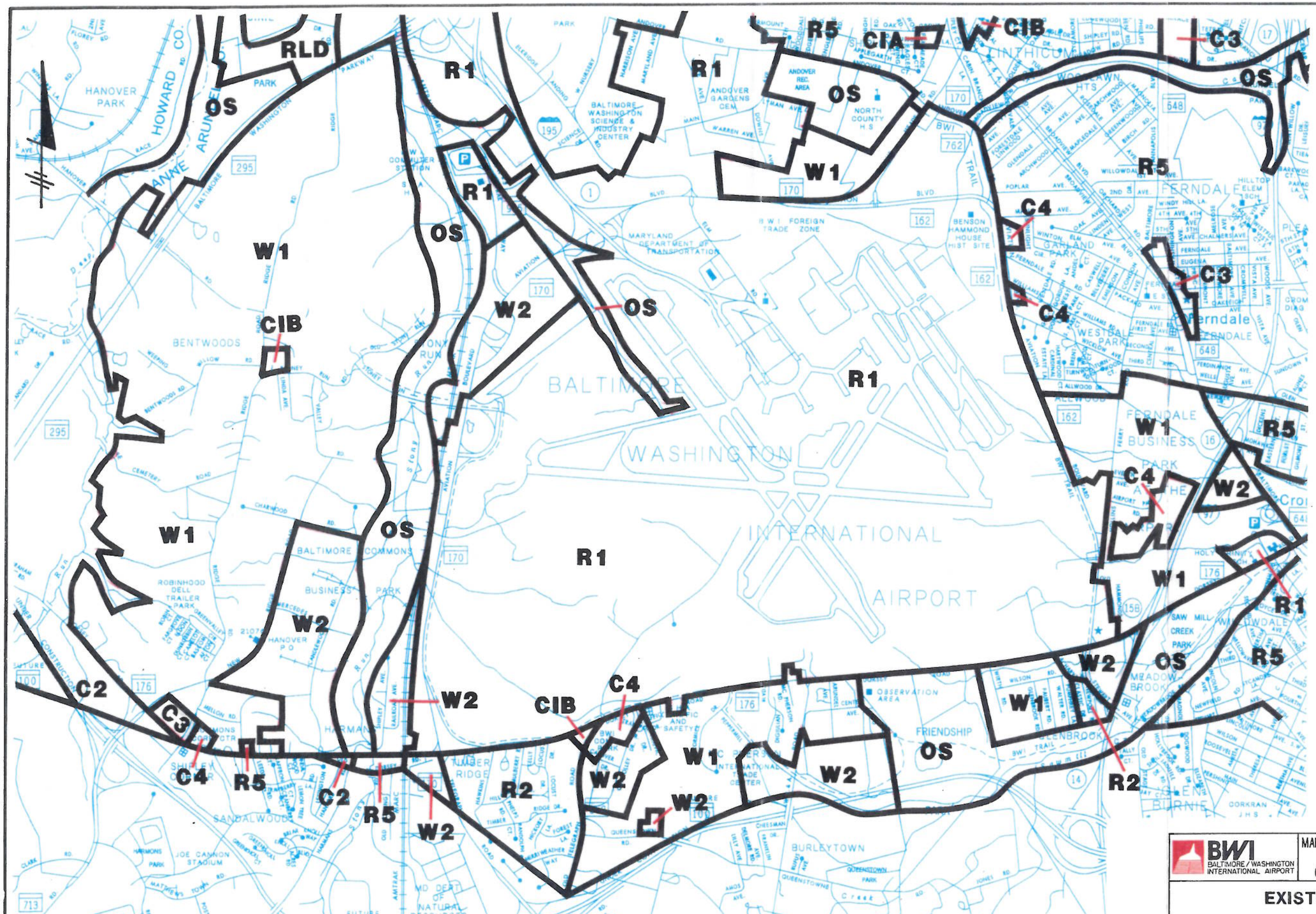
Lands west of the Airport along MD 170 (Aviation Boulevard) are less developed than other areas surrounding the Airport. These areas have not experienced significant development activity and consist of a mix of open field and wooded areas. The most significant development in this area is the Northrop Grumman facility (formerly a Westinghouse industrial site).

Land uses within the area north of Baltimore/Washington International Airport (BWI) consist of the Brooklyn Park Middle School, an older residential development (Homeland Park), industrial uses (Airport Square Industrial Park), and scattered undeveloped frontage properties. There are also two BWI satellite parking facilities located along Aviation Boulevard capable of accommodating several thousand vehicles.

The largest concentration of single-family residences is located in the northeastern quadrant of the study area (Linthicum and Ferndale communities). This area is characterized by older, small-lot, single-family neighborhoods. Included in these communities are institutional land uses such as the Ferndale Elementary School on Hollins Ferry Road, the Ferndale Fire Company located on Broadview Boulevard, Lindale Junior High School on 1st Avenue, and Hilltop Elementary School on Melrose Avenue.

The 1986 General Development Plan for Anne Arundel County recommends the continued development of the area around BWI as a regional industrial and office center and recognizes the Airport as an economic generator for the County. In addition, the Plan states that "the Airport noise zone impacts greatly on the area, making it unsuitable for residential development." Over the last several years, the County has rezoned much of the undeveloped land within the BWI noise zone for non-residential land uses that are compatible with Airport operations.

Development within the study area is regulated by the Anne Arundel County Zoning Ordinance and Map. **Exhibit III-4** indicates the various existing zoning classifications for the



Source: Generalized Comprehensive Zoning Map adopted by the Anne Arundel County Council: April 17,1989; Effective June 12,1989.

LEGEND

RESIDENTIAL

- RLD Residential Low Density
- R1 Residential 1 Unit/Acre
- R2 Residential 2 Units/Acre
- R5 Residential 5 Units/Acre

COMMERCIAL

- CIA Neighborhood Commercial
- CIB Community Retail
- C2 Commercial Office
- C3 General Retail
- C4 Highway Commercial

INDUSTRIAL

- W1 Park Industrial
- W2 Light Industrial

OTHER

- OS Open Space

BWI BALTIMORE / WASHINGTON INTERNATIONAL AIRPORT

MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION
OFFICE OF PLANNING AND ENGINEERING

EXISTING ZONING

URS Greiner
Timonium, Maryland

Scale 1"=2000'
Date MAY 1997

Exhibit No. III-4

area surrounding BWI. The zoning generally represents existing land uses in the area. The majority of the land immediately adjacent to the Airport is zoned for industrial use. However, there are areas designated as open space along the Stony Run Creek west of the Airport, south of the Airport (Friendship Recreation Area and Saw Mill Creek Park), and north of the Airport (Andover Park and Andover High School).The residential zones are generally located in the Linthicum and Ferndale communities north and east of the Airport.

SOCIOECONOMIC CONTEXT

Community Profile

A study area was defined for the purpose of assessing potential impacts of the proposed project on the neighboring community. The study area encompasses the following 1990 US Census tracts: 7504, 7505, 7506, 7507, and 7508.01. This is the same geographic area which Anne Arundel County utilizes when it considers the BWI and Linthicum region in its own planning efforts. **Exhibit III-5** shows the locations of study area census tracts in relation to BWI. Communities within these census tracts include Harmans, Hanover, Linthicum, Ferndale and Glen Burnie and communities to the south.

Table III-5 presents population trends for Anne Arundel County and the State of Maryland. As shown in the table, County population has grown 15 percent from 1980 to 1990 and is projected to increase by an additional 19.5 percent by 2015. In contrast, State population has increased by about 13 percent between 1980 and 1990 and is projected to grow by an additional 23.8 percent by 2015.

The study area consists of 12,440 acres spread over 19.4 miles within Anne Arundel County. This acreage represents almost 5 percent of the total acreage of the County. The number of people living within the study area has remained fairly stable between 1980 and 1990. According to the County, study area population is projected to increase slightly (2 percent) for the next 25 years. **Table III-6** illustrates this trend, while **Table III-7** shows the distribution of 1990 population by study area census tract. According to these data, census tracts 7504 and

LEGEND

Code	Description
7506	CENSUS TRACT NUMBER
	CENSUS TRACT BOUNDARY

7505
7504
7506
7507
7508.01
7508.02
7510
7509
7304
7401.04
7401.01
7402.02
7402.01

BALTIMORE WASHINGTON INTERNATIONAL AIRPORT

BWI COMMUTER STATION

BWI FOREIGN TRADE ZONE

MARYLAND DEPARTMENT OF TRANSPORTATION

MD. DEPT. OF NATURAL RESOURCES

MC PHERSON INTERNATIONAL TRADE CENTER

SHA TRAFFIC AND SAFETY

BWI COMM. PARK CAPOVER

OBSERVATION AREA

ANDOVER GARDENS CEM.

ANDOVER REC. AREA

NORTH COUNTY HS

NORTH GLEN ES

ANDOVER SHOPPING CTR.

WOODLAWN HTS

FERNDALE

GARLAND PARK

WESTDALE PARK

FERNDALE BUSINESS PARK

AT THE AIRPORT

HILLTOP CHURCH

ALL SAINTS CHURCH

HOLY TRINITY SCH.

HERITAGE

PLEASANTVILLE

CROMWELL DING CTR.

NORTH GLEN RECREATION AREAS

FERNGLEN MANOR

GLEN BURNIE INDUSTRIAL PARK

SAW MILL CREEK PARK

MEADOW BROOK

WILLOWDALE

GLENBROOK

CORKRAN J.H.S.

BENTWOODS

BALTIMORE COMMONS BUSINESS PARK

ROBINHOOD DELL TRAILER PARK

HANOVER P.O.

COMMONS CORP. CTR.

SHIPLEY CORNER

SANDALWOOD

HARMONS PARK

JOE CANNON STADIUM

CHESAPEAKE TRAILER PARK

TIMBER RIDGE

BUCKINGHAM

FRIENDSHIP

BULLEYTOWN

QUEENSTOWN PARK

STONEY RUN

SAWMILL CREEK

FUTURE 100

BWI BALTIMORE / WASHINGTON INTERNATIONAL AIRPORT	MARYLAND DEPARTMENT OF TRANSPORTATION MARYLAND AVIATION ADMINISTRATION OFFICE OF PLANNING AND ENGINEERING

STUDY AREA CENSUS TRACTS

URS Greiner Timonium, Maryland	Scale 1"=2000'	Exhibit No. III-5
	Date MAY 1997	

TABLE III-5

STATE/COUNTY POPULATION TRENDS

Year	Anne Arundel County	% Change	Maryland	% Change
1980	370,775	--	4,216,933	--
1990	427,239	+15.2	4,781,468	+13.4
2000	468,200	+9.6	5,300,000	+10.8
2010	499,200	+6.6	5,720,900	+7.9
2015	510,400	+2.2	5,920,050	+3.5
Total % Change 1990-2015		19.5		23.8

SOURCE: Maryland Office of State Planning, 1994.

TABLE III-6

STUDY AREA POPULATION TRENDS

Year	Study Area Population	Percent of County Population
1990	15,607	3.65%
1995	15,810	3.44%
2020	16,097	3.03%

SOURCE: Anne Arundel County Planning and Code Enforcement, 1995.

TABLE III-7

STUDY AREA POPULATION BY CENSUS TRACT (1990)

Census Tract Number	Population	% of Study Area Total
7504	4,518	29.0
7505	3,216	20.6
7506	1,193	7.6
7507	1,000	6.4
7508.1	5,674	36.4

SOURCE: Anne Arundel County Planning and Code Enforcement, 1995.

7508.1, located in the northern and eastern sectors surrounding the Airport, accommodate approximately 65 percent of the study area's population. While it is expected that the combined population of the study area census tracts will experience a slight population increase in the future (growth projections by the County were not developed by census tract), population growth in the neighborhoods in close proximity to the Airport will remain restricted due to continuation of zoning controls and the limitations of the Airport's noise zone.

Average population densities for the census tracts within the study area are shown on **Table III-8**. Based on these figures, the census tracts south and west of the Airport (7507, 7506) are the most sparsely populated, while tract 7504 is the most densely populated.

Table III-9 provides a profile of standard demographic characteristics for each census tract within the study area. This table indicates that the estimated median household income ranges from $35,057 to $50,606. The area's annual median income of $44,177 is slightly less than the County average of $45,147 but almost $5,000 higher than the Statewide median household income. The population in the study area is predominately white (91 percent), although census tracts 7506 and 7507 contain significant minority populations. The average household size within the study area is 2.7 persons per household which is slightly lower than the County's average of 2.8 persons per household in 1990.

Economic Characteristics

The study area is considered a major employment center for Anne Arundel County with 41,453 jobs located within the area. This figure represents almost 17 percent of the County's employment base. Large employers in the region include: Northrop Grumman (Westinghouse), USAirways, Host Marriott International, Continental Airlines, Cadmus Journal Services and several hotels. BWI is also an important economic generator to the County and the State of Maryland. According to the 1990 Maryland Statewide Airport Economic Impact Study, the Airport generates an estimated $2.5 billion in annual economic activity, an estimated $843 million in wages annually, and 48,000 jobs for Maryland residents.

TABLE III-8

POPULATION DENSITY BY CENSUS TRACT

Tract No.	Total Acres	Persons per Acre
7504	768	5.9
7505	2752	1.2
7506	3520	.34
7507	4160	.24
7508.1	1280	4.4

SOURCE: Anne Arundel County Planning and Code Enforcement, 1995.

TABLE III-9

COMMUNITY DEMOGRAPHICS

Tract No.	Median Household Income	Percent of Non-White Persons	Average Household Size
7504	$50,606	4.6%	2.78
7505	$42,893	2.2%	2.63
7506	$35,057	14.5%	2.77
7507	$41,923	17.7%	2.96
7508.1	$41,976	4.1%	2.75

SOURCE: Anne Arundel County Planning and Code Enforcement, 1995.

Community Services

There are numerous community facilities located within the study area (see **Exhibit III-6**). These facilities include: schools, the Amtrak and MARC commuter rail station located in the northwest quadrant of the study area off of Aviation Boulevard, fire protection facilities, police facilities, and places of worship.

Schools

There are public and private school facilities in the study area. **Table III-10** indicates the school facilities, their status and 1995 student enrollment.

Police

A State Police Facility is located in the eastern quadrant of the study area along Aviation Boulevard. Police protection in the study area is provided by the Maryland Transportation Authority for the Airport property, the State Police for the interstate highways (±195, ±295), and the Anne Arundel County Police Department for the communities surrounding the Airport. The County's Northern District Police, with approximately 12 officers, is responsible for police protection in the area.

Fire Protection

The Airport has one existing Aircraft Rescue and Firefighting Station (ARFF) which will be vacated when the new ARFF (under construction) is completed in 1997. In addition, a portion of Cargo Building B is used as office and warehouse space for Fire Rescue Services at BWI. County fire protection to the surrounding areas is provided by the Glen Burnie Company No.33 located in the southeastern quadrant of the study area; Company No. 21 in the Shipley's Corner area (southwest quadrant); and Ferndale Company No. 34 in the northeastern study area quadrant.

LEGEND

SYMBOL	DESCRIPTION
★	Historic Site
■	School
■	Place of Worship
★	Fire Station
★	Police Station
■	Existing ARFF Facility
■	New ARFF Facility (Under Construction)

BALTIMORE WASHINGTON INTERNATIONAL AIRPORT

BWI
BALTIMORE / WASHINGTON INTERNATIONAL AIRPORT

MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION
OFFICE OF PLANNING AND ENGINEERING

COMMUNITY FACILITIES

URS Greiner
Timonium, Maryland

Scale 1"=2000'

Date MAY 1997

Exhibit No. III-6

TABLE III-10

SCHOOL FACILITIES WITHIN THE STUDY AREA

School	Status	1995 Enrollment
Harman Elementary	Public	568
Corkran Middle	Public	861
Richard Lee Elementary	Public	568
George Cromwell Elementary	Public	259
Hilltop Elementary	Public	618
Saint Phillip Neri	Private	566
Linthicum Elementary	Public	619
Arthur Slade Elementary	Private	862
Brooklyn Park	Public	443
Ferndale Elementary	Public	193

SOURCE: Anne Arundel County Public Schools, 1996.
Conversations with the Private School Administrators, May 17,1996.

EXISTING AIR QUALITY

The U.S. Environmental Protection Agency (EPA) and Maryland Department of the Environment (MDE) share responsibility for managing air quality in the Baltimore area. The Clean Air Act (CAA) is the principal means by which this is accomplished.

Attainment and Non-Attainment Designations

The CAA requires States to designate all areas within their borders with respect to the compliance, or degree of non-compliance, with the National Ambient Air Quality Standards (NAAQS). NAAQS's have been established for carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (0_3), particulate matter (PM) and lead. In general terms, areas that meet the NAAQS are designated as "attainment" areas. In contrast, areas that do not meet the NAAQS are designated from marginal to extreme "non-attainment" areas.

The EPA has subdivided the United States into 261 Air Quality Control Regions (AQCR). Located in Anne Arundel County, BWI is within the Metropolitan Baltimore Intrastate AQCR which also includes Baltimore City, Baltimore County, Carroll County, Harford County and Howard County. As shown in **Table III-11**, the region in which BWI is located is currently designated by EPA as an attainment area for CO, SO_2, NO_2, PM, and lead.

However, because of past violations of the NAAQS, the Baltimore region is designated as a "severe" non-attainment area for O_3. Therefore, in accordance with the CAA, a revised State Implementation Plan (SIP) has been developed by the MDE demonstrating attainment of the NAAQS for O_3 by the year 2005. Failure to comply with this requirement may reclassify the Baltimore area to an "extreme" non-attainment designation; the highest degree of non-compliance.

TABLE III-11

BALTIMORE AREA ATTAINMENT/ NON-ATTAINMENT DESIGNATIONS*

Pollutant	Status
Carbon Monoxide (CO)	Attainment
Nitrogen Dioxide (NO_x)	Attainment
Ozone (O_3)	Non-Attainment/Severe
Sulfur Dioxide (SO_2)	Attainment
Particulate Matter (PM-10)	Attainment
Lead	Attainment

* For the Metropolitan Baltimore Intrastate Air Quality Control Region.

SOURCE: Maryland Air Quality Data Report, 1993.

Air Monitoring Data

Air monitoring is currently the most reliable means of determining ambient air quality conditions. As part of their State-wide air monitoring network, MDE has three permanent stations located in the general area of BWI.

A synopsis of the most recent available monitoring data obtainable from these stations (1994) is presented in **Table III-12**. This information is summarized in terms of monitoring station name, distance and direction from BWI, pollutant measured, and maximum recorded concentrations. Comparison of these data with the NAAQS is also made.

As shown, PM-10 levels (Station No. 6 - Glen Burnie) and SO_x levels (Station No. 9 - Riviera Beach) are well within the NAAQS for these pollutants. In contrast, O_3 levels (Station 8 - Fort Meade) exceed the NAAQS. There are no permanent CO and NO_x monitoring stations located in the BWI area. The closest monitors are located in downtown Baltimore and in this case would not be considered representative of the BWI area. Past studies indicate that CO_2 and NO_x are within NAAQS in the areas adjacent to the Airport.

Based on available air monitoring data and the regional non-attainment status, O_3 is the air pollutant of primary concern in the BWI area. The formation of O_3 is a long-term photochemical reaction involving solar radiation, nitrogen oxides (NO_x) and select reactive hydrocarbons (HC) known as volatile organic carbons (VOCs). In general terms, NO_x and HC are emitted into the atmosphere in the urban areas and air currents transport the O_3 oxidants to the outlying areas. As such, violations of the NAAQS for O_3 are generally considered regional in nature and extend throughout the Baltimore/Washington airshed.

Air Quality Plan

As a means of identifying and assessing air emissions associated with BWI, the MAA commissioned an Air Quality Plan in 1994. This Plan addresses aircraft, ground service vehicles, motor vehicles, fuel facility and other smaller sources of air emissions at BWI. The results, contained in a report entitled, "BWI Air Quality Plan," serve as a basis for evaluating

TABLE III-12

AIR QUALITY MONITORING DATA

MDB Station No.	Station Location	Distance and Direction from BWI	Pollutant Measured	Maximum Recorded Concentration[a] (1994)	Air Quality Standard[b]	Duration	Exceeds Standard
6	Glen Burnie	2.8 Miles, E	PM-10	68 $\mu g/m^3$	150 $\mu g/m^3$	24-Hours Maximum	No
				27 $\mu g/m^3$	50 $\mu g/m^3$	Annual Arith Mean	No
8	Fort Meade	5.4 Miles, SW	0_3	320 $\mu g/m^3$	235 $\mu g/m^3$	1 Hour Maximum	Yes
9	Riviera Beach	7.3 Miles, E	SO_x	21 $\mu g/m^3$	80 $\mu g/m^3$	Annual Arith. Average	No
				77 $\mu g/m^3$	365 $\mu g/m^3$	24-Hour Maximum	No
				162 $\mu g/m^3$	1,300 $\mu g/m^3$	3-Hour Maximum	No

---

[a] Maryland Air Quality Data Report, 1994.

[b] National Ambient Air Quality Standards, established by EPA.

PM-10 = Inhalable Particulates

O_3 = Ozone

SOx = Sulfur Oxides

μ/m^3 = micrograms/cubic meter

SOURCE: Greiner, Inc., 1994.

existing and future air quality impacts and control measures in connection with BWI and its development.

Section IV of this EA (Environmental Consequences) further discusses the proposed Air Cargo Facility Expansion Project in the context of the Air Quality Plan.

WATER QUALITY

Surface Water

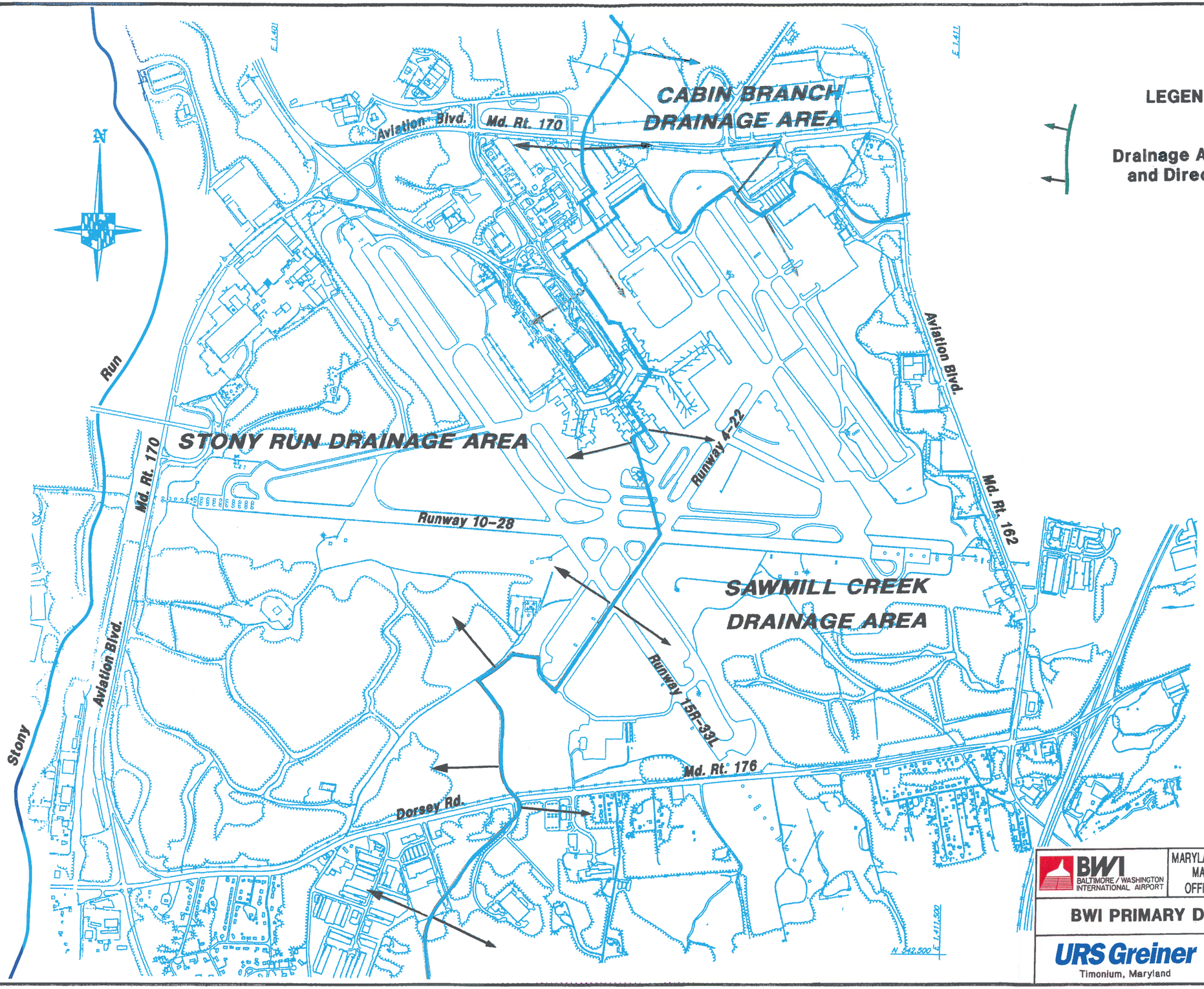
BWI is divided into three primary drainage areas (see **Exhibit III-7**):

- the northeastern portion of the Airport within the Cabin Branch Drainage Area which flows to the north, then east into Curtis Bay, and ultimately into the Patapsco River;

- the southeastern portion of the Airport within the Sawmill Creek Drainage Area which flows east into Furnace Branch, then into Curtis Creek, and ultimately into the Patapsco River; and

- the entire western portion of the Airport within the Stony Run Drainage Area which flows north directly into the Patapsco River.

Each of the drainage areas on BWI property is included in the State of Maryland Water Quality Standards (COMAR 26.08.02.08C). Stony Run and its tributaries are classified as Use IV-Recreational Trout Waters. This classification is considered capable of holding or supporting an adult trout population for put and take fishing and is managed as a special fishery by periodic stocking and seasonal catching. Sawmill Creek, Cabin Branch, and their tributaries are classified as Use IV-P-Recreational Trout Waters and Public Water Supply. This classification includes all uses identified with Use IV waters in addition to use as a public water supply. **Table III-13** summarizes the specific water quality criteria for Use IV and Use IV-P



LEGEND

Drainage Area Boundary and Direction of Flow

BWI BALTIMORE / WASHINGTON INTERNATIONAL AIRPORT

MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION
OFFICE OF PLANNING AND ENGINEERING

BWI PRIMARY DRAINAGE AREAS

URS Greiner
Timonium, Maryland

Scale 1"=1500'

Date MAY 1997

Exhibit No. III-7

TABLE III-13

WATER QUALITY CLASSIFICATION CRITERIA FOR USE IV AND USE IV-P STREAMS

Element	Use IV	Use IV-P
Description:	Recreational Trout Waters	Recreational Trout Waters and Public Water Supply
Bacteriological:	There may not be any source of pathogenic or harmful organisms in sufficient quantities to constitute a public health hazard.	Same as Use IV
Dissolved Oxygen:	≥5.0 milligrams per liter	Same as Use IV
In-Stream Work Limits:	March 1 to June 15	Same as Use IV
pH:	6.5 ≤ normal pH values ≤ 8.5	Same as Use IV
Temperature:	≤75 degrees F (23 degrees C) or the ambient temperature of the surface water, whichever is greater.	Same as Use IV
Turbidity:	May not exceed levels detrimental to aquatic life. ≤150 units at any time or ≤50 units as a monthly average	Same as Use IV

waters. Recreational uses of the drainage areas and periodic stocking are not currently practiced on Airport property.

In accordance with the National Pollution Discharge Elimination System (NPDES) permit for BWI, the Maryland Department of the Environment (MDE) requires water quality monitoring in specific areas of all three drainage areas. Sawmill Creek has been targeted by the Maryland Department of Natural Resources for a Watershed Project which involves the restoration and maintenance of water quality and habitat values for the living resources within the watershed. The Sawmill Creek Targeted Watershed Project involves both public and private efforts, of which the MAA has been a very active participant. The MAA has targeted and improved stormwater management techniques, deicing facilities, and other point sources of pollution on BWI property within the watershed. MAA has also applied the improvement techniques to facilities in the Stony Run Watershed and the Cabin Branch Watershed. MAA is continually working with State and private agencies to improve the water quality and habitat in the three drainage areas.

Groundwater

Information from the 1986 and 1995 Maryland Department of Natural Resources, Maryland Geological Survey shows that BWI is located in the Potomac Group of Anne Arundel County which comprises three separate and distinct aquifers: the Patuxent; the lower Patapsco; and the upper Patapsco. These aquifers are underlain by a bedrock layer that functions as a confining bed and appears to separate each aquifer from the other, except in the outcrop areas where water table conditions exist. BWI is located over the Patapsco Aquifer. This aquifer is recharged by surface infiltration of precipitation which has not immediately run off into streams or been removed by evapotranspiration. Groundwater in the upper Patapsco Aquifer flows from the northwest to the southeast. Groundwater also flows vertically between the lower and upper Patapsco Aquifers. The Geological Survey indicates that groundwater recharge which occurs on Airport property does not provide baseflow to Stony Run, which lies to the west of the Airport.

The lower Patapsco Aquifers are utilized as a drinking water supply in Anne Arundel County. Data obtained by the Maryland Geological Society from monitoring well AA-Ac11,

which is on Airport property, show groundwater levels in the Patapsco Formation decreasing from 91.59 feet below land surface in 1959 to 118.53 feet below land surface in 1993. Groundwater levels in 1948, at the beginning of construction of BWI (then called Friendship Airport), were at 90.00 feet below land surface. The steady decline in the water level from 1959 to 1986 (122.11 feet below land surface in 1986) is attributed to the rapid increase in land development in the area and the increase in number and depth of the wells which supply the Glen Burnie area. Between 1986 and 1993 the aquifer level decreased from 122.11 feet below land surface in 1986 to 188.53 feet below land surface in 1993.

The majority of BWI is underlain by a well-drained sand and gravel material. Such areas are considered recharge areas for groundwater. A portion of BWI from the center of the Airport (just west of the terminal) towards Aviation Boulevard (south of Runway 10-28) is underlain by clay. This material is considered impermeable and impedes drainage.

Subsurface soils investigations show consistent water table elevations in the vicinity of the Cabin Branch and Phelps Branch Drainage Areas. Other groundwater is encountered at varying elevations indicating perched water tables.

BIOTIC COMMUNITIES

Grasslands and woodlands are the predominant vegetative communities on BWI property (see **Exhibit III-8**). As shown on the 1976 Vegetation Map of Maryland, BWI is located in the Tulip Poplar Association which is dominated by hardwoods such as red maple (*Acer rubrum*), oak species (*Quercus* sp.), black gum (*Nyssa sylvatica*), and hickory (*Carya* sp.). Today, BWI is dominated by pine and oak woodlands which are adapted for the predominantly sandy soil and are typically not over 50 to 60 years old. The change in vegetative communities is due to development of the Airport and in Anne Arundel County in recent history.

To determine the vegetative composition of the woodlands on BWI property, a comprehensive property-wide Forest Stand Delineation (FSD) for BWI was completed in December 1994 and approved by the Maryland Department of Natural Resources (DNR) in

N

SIGNAL BRANCH

KIDDEN BRANCH

HAWKINS BRANCH

CLARK BRANCH

THREES BRANCH

FORK BRANCH

LEGEND

G MOWED FIELDS

D DECIDUOUS FOREST

M MIXED FOREST

P PINE FOREST

WETLANDS

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OFFICE OF PLANNING AND ENGINEERING

EXISTING VEGETATIVE COMMUNITIES

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Scale 1"=1000'

Date MAY 1997

Exhibit No. III-8

April 1995. The FSD was required by the 1991 Forest Conservation Act and inventoried the tree species, sizes, and general forest composition of all wooded areas over one acre in size. This inventory enables MAA to better plan and evaluate the impacts associated with future development projects at BWI.

The forested areas in the northern portion of BWI are predominantly small, fragmented hardwood and pine stands that are on the boundaries of the property. The southeastern quadrant of the Airport is dominated by contiguous forests that are predominantly red oak (*Quercus falcata*) and Virginia pine (*Pinus virginiana*) stands. These forest stands range in size from 0.5 acres to 23.0 acres. The southwestern quadrant of the Airport is dominated by the largest tracts of contiguous forests on BWI property. The forest is predominantly pines and mixed hardwoods and the stands range in size from 0.9 acres to 53.7 acres.

The grassed areas within Airport property are regularly mowed and maintained by Airport Maintenance personnel.

There are no wildlife or waterfowl refuges within the immediate vicinity of the Airport and the Airport does not encompass any large open water areas, which are considered prime habitat for migrating waterfowl. There are small ponded areas; however, no migrating waterfowl were observed during numerous field visits to BWI.

The diversity of species common to Maryland woods are similar to those at BWI and include such examples as: white-tailed deer (*Odocoileus virginianus*), groundhogs (*Marmota monax*), rabbits (*Sylvilagus floridanus*), and squirrels (*Sciurus carolinensis*), American crow (*Corvus brachyrhynchos*), blue jay (*Cyanocitta cristata*), and Carolina chickadee (*Parus carolinensis*). The majority of the wildlife population, excluding bird species, is concentrated in the southern half of the Airport. These areas supply sufficient cover and forage for common woodland species. There are no known comprehensive wildlife inventories of BWI.

ENDANGERED AND THREATENED SPECIES

Coordination with the U.S. Fish and Wildlife Service (FWS) (see Appendix A) verified the presence of the Federally threatened species, swamp pink (*Helonias bullata*), in the Stony Run watershed, part of which is on Airport property. However, the FWS is concerned with impacts to water quality from silt load and has previously requested that construction impacts downstream be thoroughly evaluated and, if there are any potential impacts, mitigation measures be developed and the issue be coordinated with the FWS and the Maryland Natural Heritage Program.

In correspondence dated October 7, 1996, the MDNR-Forest, Wildlife and Heritage Service recommended that the forested- and scrub/shrub-dominated wetland in the vicinity of the proposed project be surveyed for the presence of the following three State Threatened Species:

Common Name	Scientific Name	State Status
Giant Cane	*Arundinaria gigantea*	Threatened
Swamp Pink	*Helonias bullata*	Endangered (also Federal-Threatened)
Bog Fern	*Thelypteris simulata*	Threatened

On October 21, 1996, a thorough search of the vegetated wetland along Signal Branch found none of the listed species to be present or potentially impacted by the proposed project.

Except for the occasional transient individual, there are no Federally listed threatened or endangered species on Airport property. The FWS has determined that there is no Biological Assessment nor further Section 7 Consultation necessary.

WETLANDS

In July 1995, a Wetlands Management Plan was prepared for the Airport. The Plan included an inventory of all of the wetland systems on BWI property. The Cabin Branch wetland system is the only one on Airport property that is within the Cabin Branch drainage area. The Muddy Bridge Branch, Phelps Branch, and Fork Branch wetland systems are all in the Sawmill Creek drainage area. The Sachs Branch, Kitten Branch, Signal Branch, Hawkins Branch, and Clark Branch wetland systems are within the Stony Run drainage area.

In the previous Section of this EA, several air cargo development alternatives were identified and discussed. The following discussions present the general characteristics of each wetland system that is located within or near a proposed alternative. **Table III-14** presents a summary of each wetland system's dominant vegetation and classification (Cowardin et. al., 1979). **Table III-15** lists the wetland functions that each wetland system may perform, based on observed conditions and best professional judgement, while **Exhibit III-9** shows the locations of all of the wetland systems within the study area on Airport property for this project.

The Phelps Branch wetland system totals 1.1 acres on BWI property and is dominated by an intermittent stream which originates from the surrounding forested areas. The wetland system is supported by surface water runoff and groundwater and appears to originate from a seep. The headwaters of Phelps Branch are a wide vegetated area which progresses downstream to a narrow channel. It is predominantly comprised of scrub-shrub vegetation with areas where the vegetation is confined to the streambanks.

Clark Branch is a perennial stream system which begins as a drainage swale near the security fence along Dorsey Road. The wetland area broadens out to include several small tributaries and drainage ditches along Dorsey Road. Clark Branch eventually converges with Hawkins Branch between Camp Meade Road and the Airport security fence. The wetland system converges with Stony Run west of the AMTRAK line. Clark Branch totals 25.1 acres and is fed by surface runoff from the surrounding forest.

TABLE III-14

DOMINANT VEGETATION AND CLASSIFICATION OF EXISTING STUDY AREA WETLANDS

Wetland System	Dominant Vegetation		Indicator Status	Wetland Classification
	Common Name	Scientific Name		
Phelps Branch	sweet pepperbush sycamore common spicebush red maple black gum common winterberry arrowwood sweetbay magnolia	*Clethra alnifolia* *Platanus occidentalis* *Lindera benzoin* *Acer rubrum* *Nyssa sylvatica* *Ilex verticillata* *Viburnum dentatum* *Magnolia virginiana*	FAC+ FACW- FACW- FAC FAC FACW+ FAC FACW+	PSS1A
Clark Branch	red maple black gum sweet pepperbush sycamore pin oak	*Acer rubrum* *Nyssa sylvatica* *Clethra alnifolia* *Platanus occidentalis* *Quercus palustris*	FAC FAC FAC+ FACW- FAC	PFO1A
	black willow sweet pepperbush highbush blueberry speckled alder	*Salix nigra* *Clethra alnifolia* *Vaccinium corymbosum* *Alnus rugosa*	FACW+ FAC+ FACW- FACW+	PSS1A
	soft rush sedge species slender rush	*Juncus effusus* *Carex sp.* *Juncus tenuis*	FACW+ --------- FAC-	PEM1A
Hawkins Branch	red maple black gum loblolly pine sweetbay magnolia slippery elm	*Acer rubrum* *Nyssa sylvatica* *Pinus taeda* *Magnolia virginiana* *Ulmus rubra*	FAC FAC FAC- FACW+ FAC	PFO1A
	soft rush sensitive fern slender rush arrow-leaved tearthumb broad-leaved cattail	*Juncus effusus* *Onoclea sensibilis* *Juncus tenuis* *Polygonum sagittatum* *Typha latifolia*	FACW+ FACW FAC- OBL OBL	PEM1E

TABLE III-14--Continued

Wetland System	Dominant Vegetation		Indicator Status	Wetland Classification
	Common Name	Scientific Name		
Signal Branch	red maple box elder maple black gum pin oak	*Acer rubrum* *Acer negundo* *Nyssa sylvatica* *Quercus palustris*	FAC FAC+ FAC FAC	PFO1E
	black willow highbush blueberry speckled alder red maple arrowwood	*Salix nigra* *Vaccinium corymbosum* *Alnus rugosa* *Acer rubrum* *Viburnum dentatum*	FACW+ FAC- FACW+ FAC FAC	PSS1E
	sensitive fern marsh fern halberd-leaved tearthumb	*Onoclea sensibilis* *Thelypteris thelypteroides* *Polygonum arifolium*	FACW FACW+ OBL	PEM1E
Kitten Branch	red maple black gum arrowwood sycamore	*Acer rubrum* *Nyssa sylvatica* *Virburnum dentatum* *Platanus occidentalis*	FAC FAC FAC FACW-	PFO1A
	common spicebush red maple arrowwood Virginia creeper	*Lindera benzoin* *Acer rubrum* *Virburnum dentatum* *Parthenociccus quinguefolia*	FACW- FAC FAC FACU	PSSIA
	red maple soft rush arrrow-leaved tearthumb black willow common reed	*Acer rubrum* *Juncus effusus* *Polygonum sagittatum* *Salix nigra* *Phragmites australis*	FAC FACW+ OBL FACW+ FACW	PEM1A

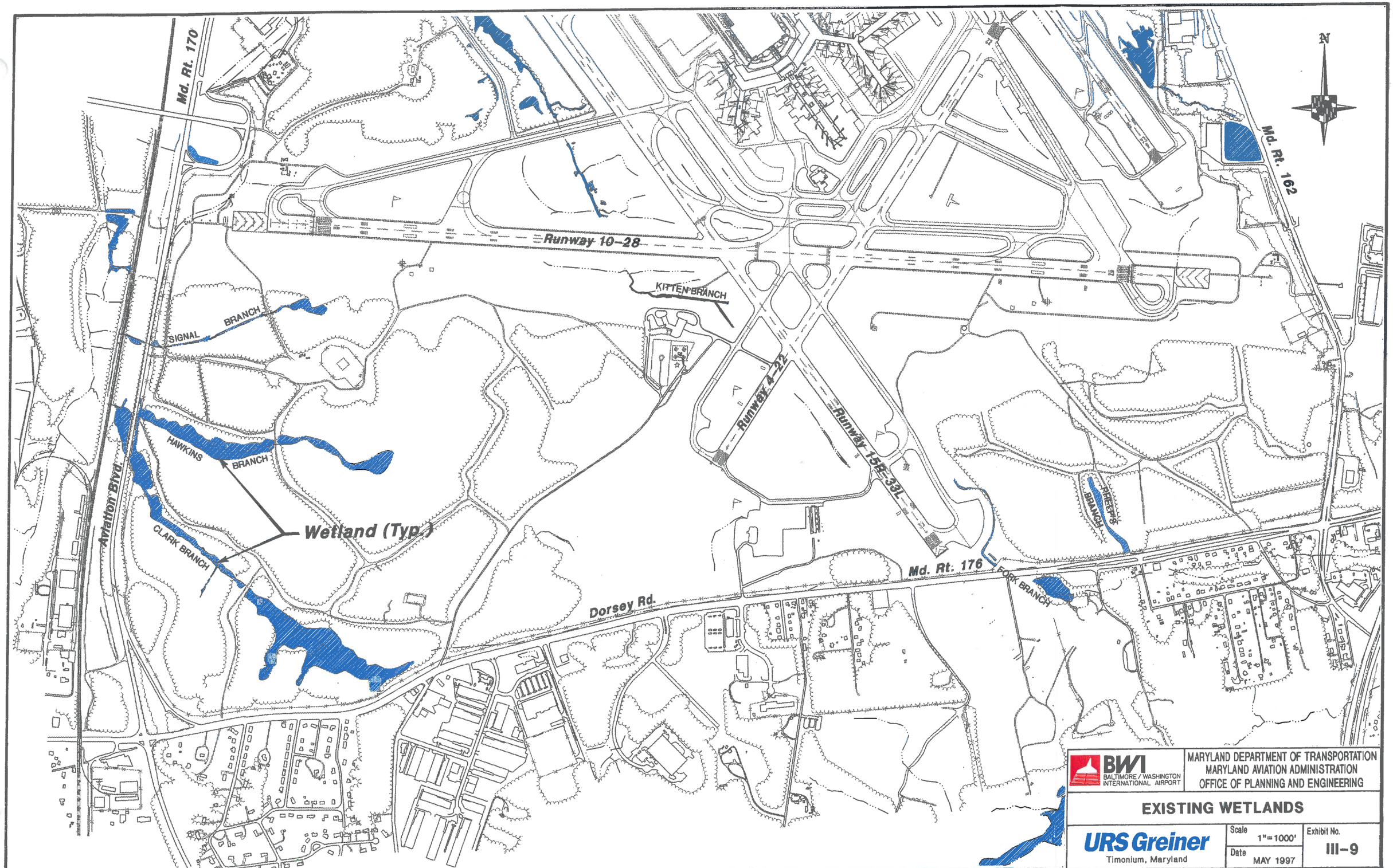
SOURCE: Greiner, Inc., BWI Wetlands Management Plan, 1995.

TABLE III-15

POTENTIAL FUNCTIONS OF EXISTING WETLANDS

Wetland Function	Phelps Branch Wetland System	Clark Branch Wetland System	Hawkins Branch Wetland System	Signal Branch Wetland System	Kitten Branch Wetland System
Ground Water Recharge	No	Yes	No	No	No
Ground Water Discharge	Yes	No	No	No	Yes
Floodflow Alteration	No	Yes	Yes	No	No
Sediment Stabilization	No	Yes	No	No	No
Sediment/Toxicant Retention	Yes	Yes	Yes	Yes	Yes
Nutrient Removal/Transformation	Yes	Yes	Yes	Yes	Yes
Production Export	Yes	Yes	Yes	Yes	Yes
Aquatic Diversity/Abundance	Yes	Yes	Yes	Yes	Yes
Wildlife Diversity/Abundance for Breeding	Yes	Yes	Yes	Yes	Yes
Wildlife Diversity/Abundance for Migration and Wintering	No	No	No	No	No
Recreation and Uniqueness/Heritage	No	No	No	No	No

SOURCE: BWI Wetlands Management Plan, Greiner, Inc., 1995.



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EXISTING WETLANDS

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Scale 1"= 1000'

Date MAY 1997

Exhibit No. III–9

The Hawkins Branch wetland system totals 9.0 acres and is supported by surface runoff from the surrounding forest. The system begins as a broad, forested area which turns into an intermittent stream. Hawkins Branch converges with Clark Branch between the Airport security fence and Camp Meade Road.

The Signal Branch wetland system begins as a broad, forested area. It then becomes an intermittent stream which flows west under Camp Meade Road to its confluence with Stony Run. Signal Branch totals 1.7 acres and is supported by surface runoff from the surrounding forest.

Kitten Branch is the largest drainage basin on Airport property in the Stony Run drainage area. This perennial stream system originates west of the intersection of Taxiway E and Runway 15R-33L and generally flows in a northwest direction paralleling Runway 15R-33L. After passing under Aviation Boulevard, Kitten Branch converges with the Stony Run. Kitten Branch drains the central portion of the Airport including most of the main terminal and parking garage, other parking facilities, taxiways and runways. There are 307 acres of existing impervious surface in the 700-acre drainage basin.

FLOODPLAINS

Executive Order 11988 defines floodplain as the "lowland and relatively flat areas adjoining inland and coastal waters including flood prone areas of offshore islands, including, at a minimum, the area subject to a one percent or greater chance of flooding in a given year."

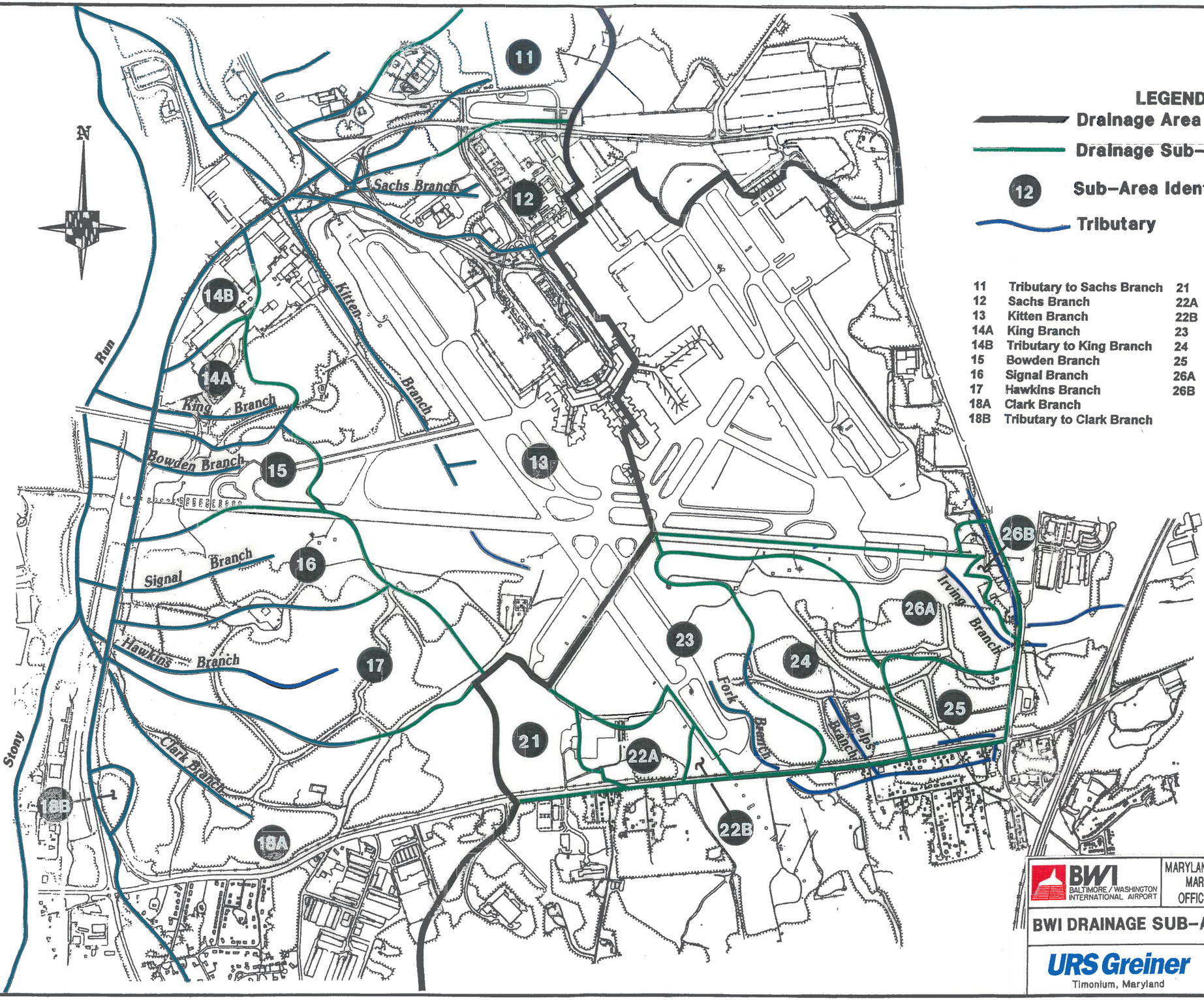
According to the 1983 Federal Emergency Management Agency (FEMA) Mapping, there is one Zone A (100-year floodplain) located on Airport property. This floodplain follows Kitten Branch and extends north of Runway 10-28 to its junction with Stony Run, which is off of Airport property. The 100-year floodplain of Kitten Branch will not be impacted by Alternatives 1 through 4. A portion of Alternative 4R would be constructed in the Kitten Branch floodplain.

A second Zone A is associated with Stony Run and is located off of Airport property, west of Aviation Boulevard. The remainder of the Airport is classified as Zone C, which is an area of minimal flooding.

A Comprehensive Stormwater Management Plan was developed for the Airport in 1993 which established drainage areas to each outfall leaving the Airport. Three of the proposed air cargo facility expansion alternatives are located in the Stony Run Drainage Area, the BWI portion of which is divided into eight subareas (see **Exhibit III-10**). Of these areas, the proposed air cargo facility alternatives will be located in only the Kitten Branch, Signal Branch, Hawkins Branch, and Clark Branch subbasins. The remaining concept (Alternative 2) is located within the Phelps Branch and Irving Branch subbasins within the Sawmill Creek Drainage Area.

As stated previously, the Kitten Branch floodplain boundaries were established by FEMA, effective May 1, 1983 (Anne Arundel County, Maryland; Community-Panel Number 240008 0005 C). Since peak flows are anticipated to be managed within the project area, the FEMA floodplain boundary will not be impacted by any "Build" alternative.

Floodplain boundaries for Signal, Hawkins and Clark Branches were recently computed in April 1996 by Greiner, Inc (see **Exhibit III-11**). The 100-year limits were computed through use of Version 1.1 of the HEC-RAS computer model developed by the Hydrologic Engineering Center of the U.S. Army Corps of Engineers. Study results show an existing floodplain of approximately 3.8 acres in Signal Branch. The floodplain boundaries of Hawkins and Clark Branches converge near their outfalls along Aviation Boulevard. The Hawkins Branch floodplain is approximately 13.0 acres in size, while the Clark Branch floodplain covers about 18.2 acres. The total floodplain boundary area for the three Stony Run drainage areas is 35.0 acres (for a description of the stream channels, refer to the Wetlands subsection).



LEGEND

- Drainage Area Boundary
- Drainage Sub-Area Boundary
- 12 Sub-Area Identification No.
- Tributary

11	Tributary to Sachs Branch	21	Tributary (S. of RW 4)
12	Sachs Branch	22A	Tributary (S. of RW 33L)
13	Kitten Branch	22B	Tributary (S. of RW 33L)
14A	King Branch	23	Fork Branch
14B	Tributary to King Branch	24	Phelps Branch
15	Bowden Branch	25	SE Corner
16	Signal Branch	26A	Irving Branch
17	Hawkins Branch	26B	Tributary to Irving Branch
18A	Clark Branch		
18B	Tributary to Clark Branch		

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BWI DRAINAGE SUB-AREAS BOUNDARIES

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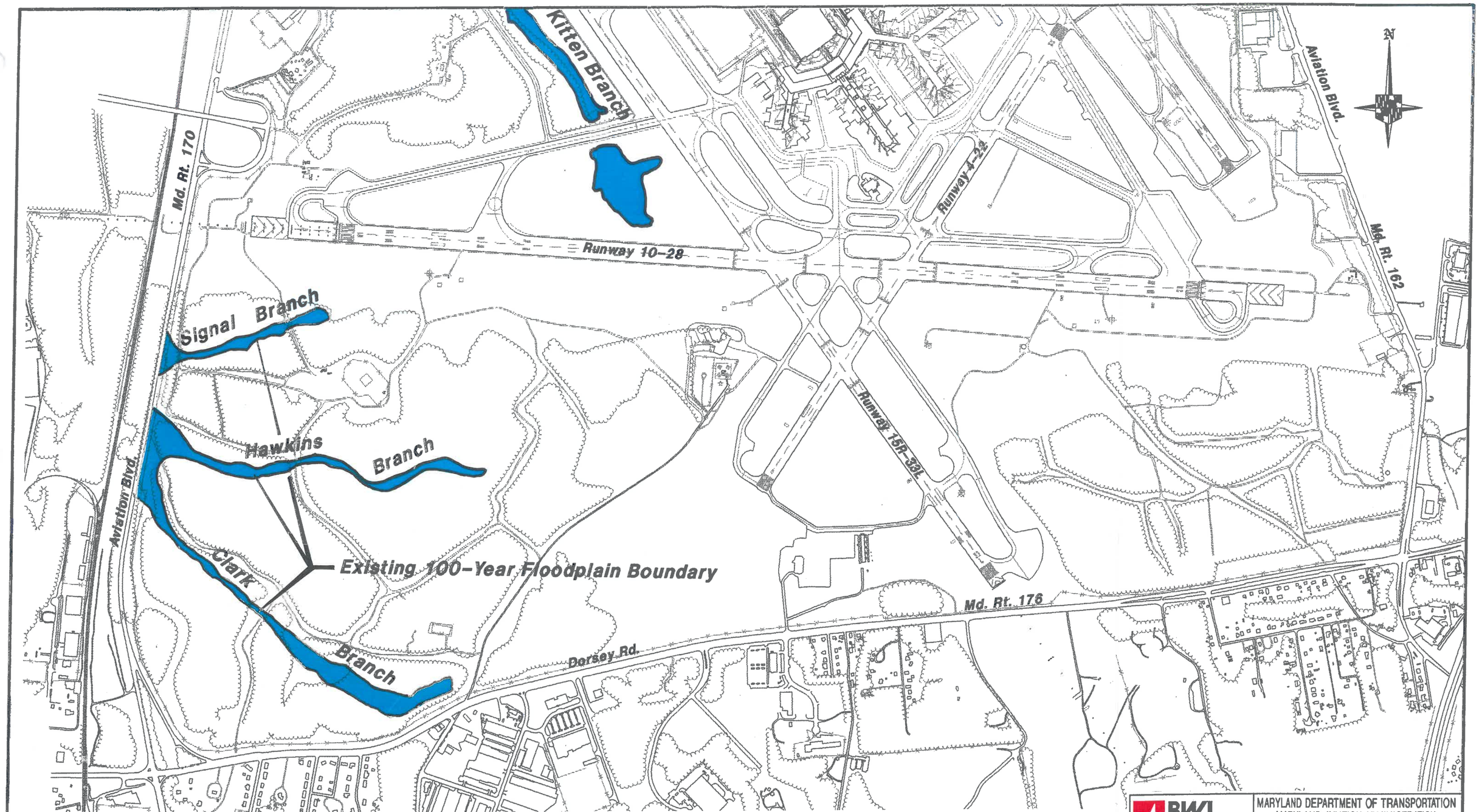
Scale 1"=1500'
Date MAY 1997
Exhibit No. III-10



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STUDY AREA FLOODPLAIN BOUNDARIES

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Timonium, Maryland

Scale 1"=1000'

Date MAY 1997

Exhibit No. III-11

COASTAL ZONE MANAGEMENT PROGRAM

BWI is located within the Maryland Coastal Zone, as defined by the Maryland Coastal Zone Management Program. The MAA is required to comply with the regulations as set forth in the Maryland Coastal Zone Management Program. These regulations focus on land and water use and protection of water and historic resources within the Maryland Coastal Zone. A determination of the project's consistency with the goals and objectives of Maryland's Coastal Zone Management Program will be conducted by the Maryland Department of Natural Resources as part of its review of this document and subsequent permit applications.

COASTAL BARRIERS

BWI is not located in the Coastal Barrier Resources System, as outlined in the Coastal Barriers Act of 1982.

WILD AND SCENIC RIVERS

There are no current or eligible Wild and Scenic Rivers, as established by the Wild and Scenic Rivers Act and the Maryland Wild and Scenic Rivers Program, on Airport property.

SECTION 4(f) LANDS

Section 4(f) of the Department of Transportation Act of 1966 provides protection to publicly-owned recreational resources such as parks and recreation areas. The Act specifies that the U.S. DOT Secretary shall not approve any project which requires the use of any publicly-owned land from a park, recreation area, or wildlife or waterfowl refuge of national, State, or local significance or land of an historic site of national, State, or local significance as determined by the officials having jurisdiction thereof, unless there is no feasible or prudent alternative to

the use of such land and such project includes all possible planning to minimize harm resulting from the use.

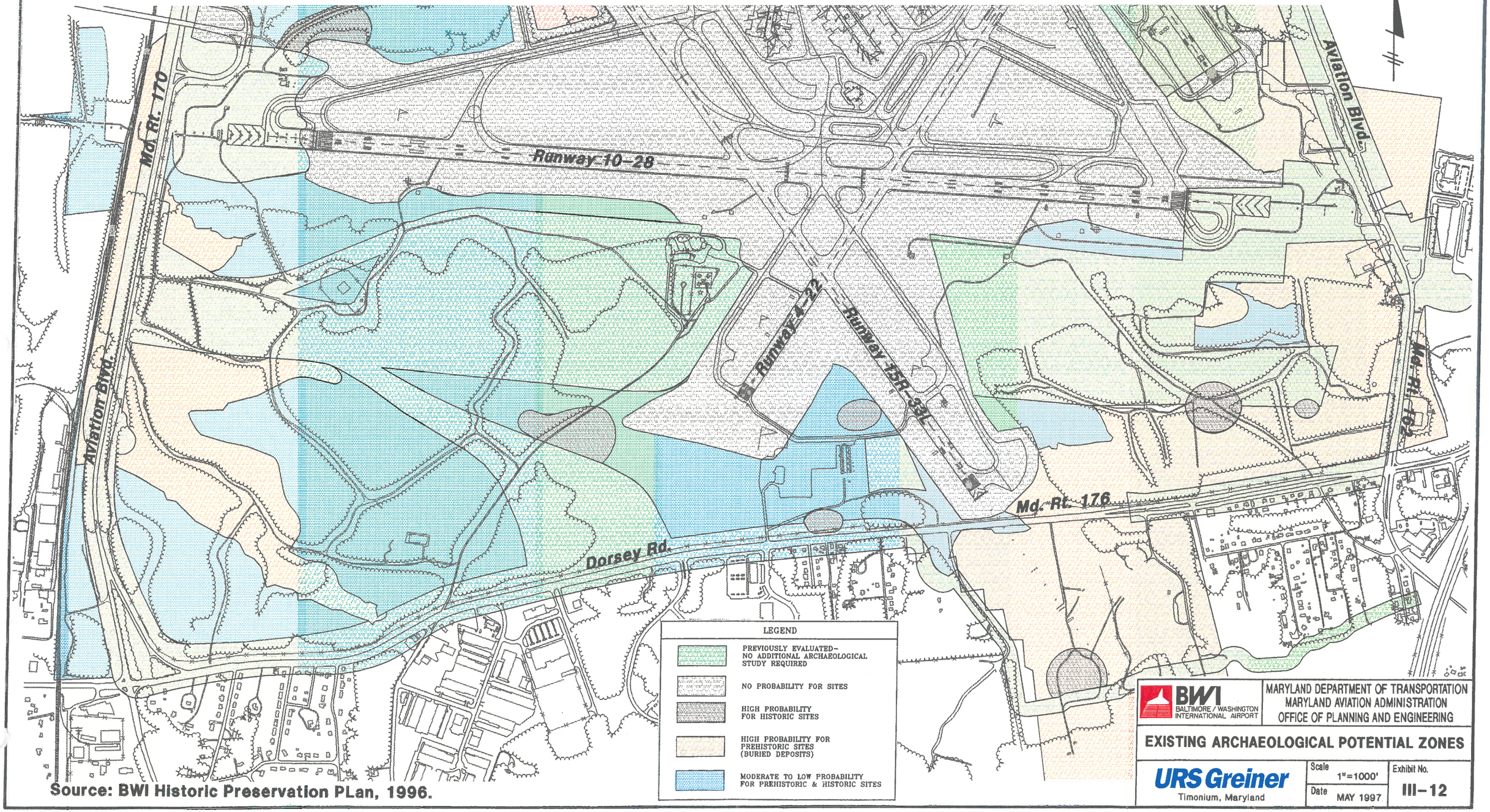
There are no parks or wildlife or waterfowl refuges of national, State, or local significance on BWI property. Coordination with the Anne Arundel County Department of Planning and Code Enforcement has shown that the portion of the pedestrian and bicycle path located on BWI property, which is partially completed, is not considered a park or recreation area but is designated as a transportation corridor. The path is intended to function as an intermodal link, allowing pedestrians and bicyclists to access Airport facilities, the Amtrak station, and the Light Rail station (currently under construction) in a safer manner than current conditions allow. Although air cargo expansion Alternatives 4 and 4R will cross a small portion of the trail, the trail is not considered publicly owned parkland and is therefore not regulated by Section 4(f) of the DOT Act.

HISTORICAL AND ARCHAEOLOGICAL RESOURCES

The National Historic Preservation Act (NHPA) of 1966 stipulates that all Federally-funded actions must consider the potential effects of such actions on historic and archaeological resources eligible for or included in the National Register of Historic Places. Coordination under NHPA is to be performed with the Office of the State Historic Preservation Officer which, in Maryland, is known as the Maryland Historical Trust (MHT).

In 1994, the MAA undertook the preparation of a comprehensive Historic Preservation Plan (HPP) for the entire BWI property in order to assist in NHPA compliance for future development projects that would involve Federal participation such as this proposed project. The studies for the HPP included intensive coordination with MHT, archival research, and extensive field work, predominantly to quantify the archaeological potential of the undeveloped portions of the Airport.

Exhibit III-12 depicts the results of these efforts within the air cargo study area. While no historical standing structures exist within the project area, there is an early 20th



Source: BWI Historic Preservation PLan, 1996.

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EXISTING ARCHAEOLOGICAL POTENTIAL ZONES

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Date MAY 1997
Exhibit No. III-12

Century burial ground known as Friendship Cemetery which was studied in detail during the planning process to construct the new Aircraft Rescue and Firefighting (ARFF) Building south of Runway 10-28.

The archaeological potential of each of the proposed alternatives for the midfield cargo facilities was evaluated and compared using the information presented in the HPP. This evaluation and comparison provided data on the potential impact each alternative may have on significant archaeological resources. Actual archaeological field investigations were performed of the selected alternative.

The area of potential effect (APE) for archaeological resources is defined as all locations associated with the proposed undertaking that will result in the alteration and disturbance of surface and subsurface soils that contain or has the potential to contain archaeological sites. Therefore, the APE for the proposed air cargo project includes all lands within the proposed limits of disturbance.

FARMLANDS

There are no prime and unique farmlands, as defined in the Farmland Protection Policy Act of 1984, on Airport property.

SECTION IV

ENVIRONMENTAL CONSEQUENCES

SECTION IV: ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

Quantification of the environmental impacts associated with alternatives is an important element in the overall decision-making process. Specifically, this section addresses these impacts as they relate to the regulatory framework for each environmental discipline.

As mentioned in Section III of this EA, only those potential environmental effects created by any of the alternatives will be addressed. In addition, it should be noted that several of the impact categories (e.g., noise, land use) will have identical levels of impact for each Build alternative; in these cases, the discussions will focus on the differences between the No-Build alternative and the Build "scenario," regardless of which specific Build alternative would be implemented.

This section also contains a description of the potential cumulative impacts associated with other airfield development projects in the area of potential cargo development.

NOISE

This section discusses the noise impact assessment methodology, provides an evaluation of the resultant noise effects associated with various noise scenarios, and summarizes noise effects conclusions.

Impact Analysis Methodology

The noise effects of the proposed new air cargo facility are examined here by comparison of computed Ldn contours values and comparison of Ldn levels for specific locations, and by examination of projected operations. First, annual average Ldn contours are used to show the overall changes in noise exposure that are expected to result from expanding the air cargo facilities at BWI. Second, presentation of the noise exposure at specific locations

around the Airport further quantifies the potential noise impacts (changes in Ldn). Third, the changes anticipated for the cargo facility are also discussed in terms of the small changes in the number of operations that are expected to result. Finally, the changes in numbers of people and land areas located within the various Ldn contours are presented.

The primary comparison for this assessment is the comparison between a "Build" scenario for a given year, and a "No-Build" scenario for that same year. This comparison is found to be the most effective way to identify the potential noise impacts that would result from the proposed expanded air cargo facilities.

Changes in Annual Average Ldn Contours

Seven sets of Ldn contours were computed for eight scenarios in this analysis. (Two scenarios were identical within the accuracy of the operational forecasts used in this study—1999 Build with Expected Growth, and 1999 Build with High Growth. Thus, only one 1999 Build contour was developed.) **Table IV-1** summarizes the eight scenarios developed.

It should be noted that the noise contours presented herein were developed for specific study years unique to this analysis and should not be compared to the BWI Airport Noise Zone contours, which are a composite of several existing and future scenarios.

As with the 1995 contours described in Section III, four categories of information were needed to compute the contours for the various scenarios:

- Daily Aircraft Operations
- Runway Use
- Flight Track Locations
- Flight Track Use

Appendix D contains tables that provide the operations modeled for each of the future years, and the corresponding runway uses. Flight track locations are those used previously for 1995 contours and for the BWI Noise Zone Map, as documented in a previous MAA report.[1]

---

[1] "FAR Part 150 Documentation. Supplemental," Maryland Aviation Administration, Volume V, December 1994.

TABLE IV-1

DESCRIPTION OF NOISE ANALYSIS SCENARIOS

Scenario	Description
1995 Base Year	The current runway configuration with 1995 operations as described in Section III.
1999 No-Build	Current runways with projected 1999 operations if no new cargo facilities are constructed.
1999 Build - Expected Growth	Current runways with "Expected Growth" operations if the cargo facility is constructed.
1999 Build - High Growth	Current runways with "High Growth" operations if the cargo facility is constructed.
2015 No-Build	Current runways with projected 2015 operations if no cargo facility is constructed.
2015 Build - Expected Growth	Current runways with operations increased by the cargo facility to an average level.
2015 Build - High Growth	Current runways with operations increased by the cargo facility to the highest expected level.
2015 Build - High Growth, with Proposed Parallel 10-28 Runway (Cumulative Impact Scenario, see Page IV-49)	Same operations as with the 2015 Build-Increased Use, but with a parallel Runway 10-28 constructed.

The resultant Ldn contours depict the potential noise effects of the proposed cargo facility, regardless of which Build alternative is selected. **Exhibit IV-1** compares the 1995 Base Year contour with the 1999 No-Build contour. Some decrease in exposure (about ½ dB to 1 dB) is apparent. This decrease occurs despite increasing overall operations, due primarily to the fact that the increase in operations is produced by quieter Stage 3 aircraft. **Exhibit IV-2** shows the 1999 No-Build and Build contours. Virtually no change in sound exposure is detectable; in fact, levels are computed to increase by at most 0.1 dB. **Exhibit IV-3** presents the contours for the Year 2015 with the current runway configuration. This exhibit shows the No-Build, the Build-Expected Growth and the Build-High Growth contours. There is virtually no difference between the No-Build and Build-Expected Growth contours, the increase in levels being computed to be between 0.1 and 0.4 dB. The Build-High Growth contour is somewhat larger, being between 0.2 and 0.5 dB larger than the No-Build contour.[2]

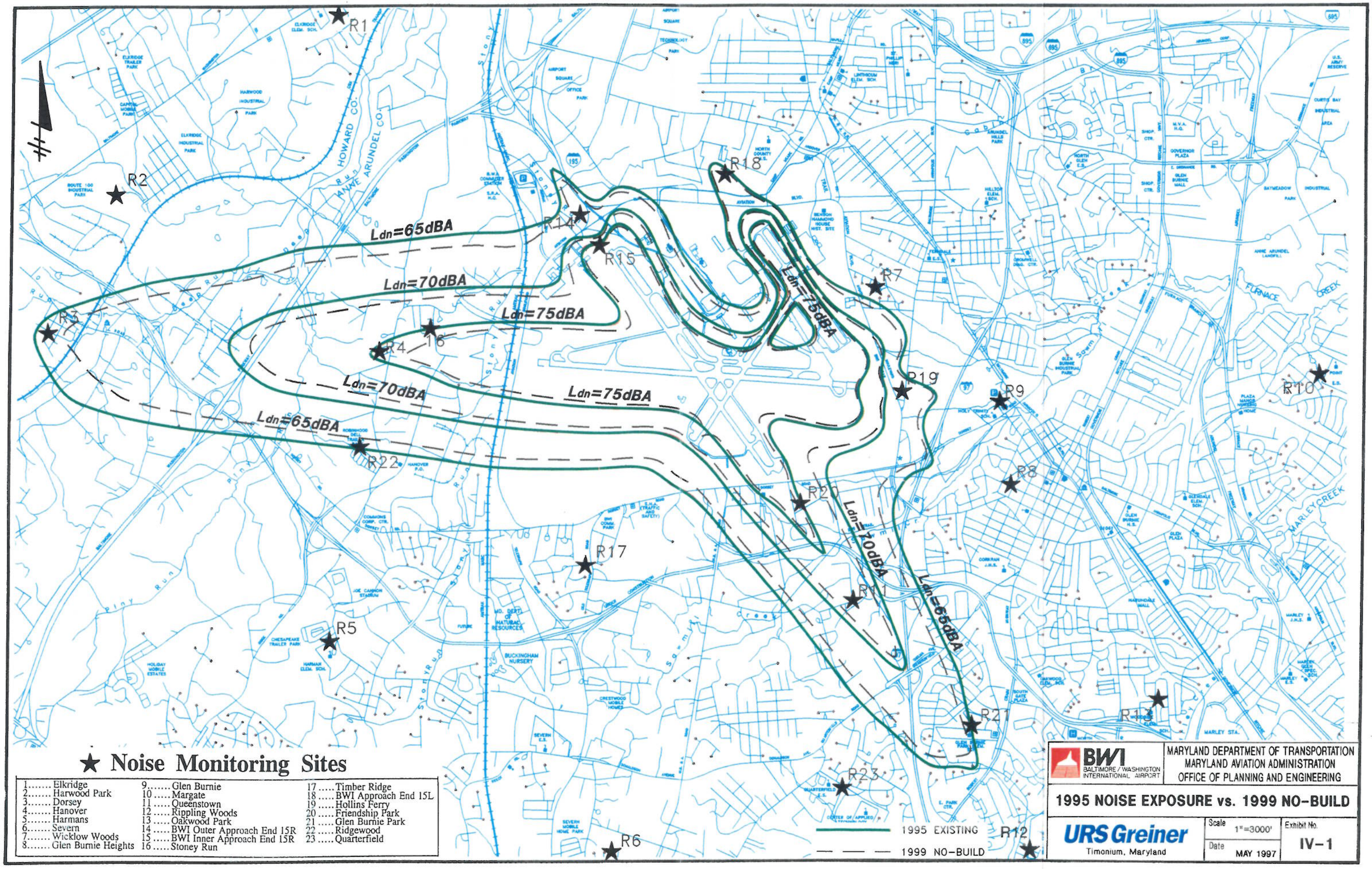
Changes in Annual Average Ldn Values at Specific Locations

An alternative approach that helps quantify the expected changes in noise exposure is examination of the computed levels at specific locations around the Airport. The 23 Permanent Monitoring Locations operated by the MAA were chosen for this examination, and the following three tables compare levels computed for the various No-Build and Build scenarios.

Table IV-2 compares 1995 computed Ldn values with those computed for the 1999 No-Build scenario. In spite of the slight increase in operations, the results show decreases in Ldn exposure at all locations of generally ½ dB to 1 dB. These decreases result from the increasing use of quieter Stage 3 aircraft, as the older, louder jets are phased out as mandated by the FAA.

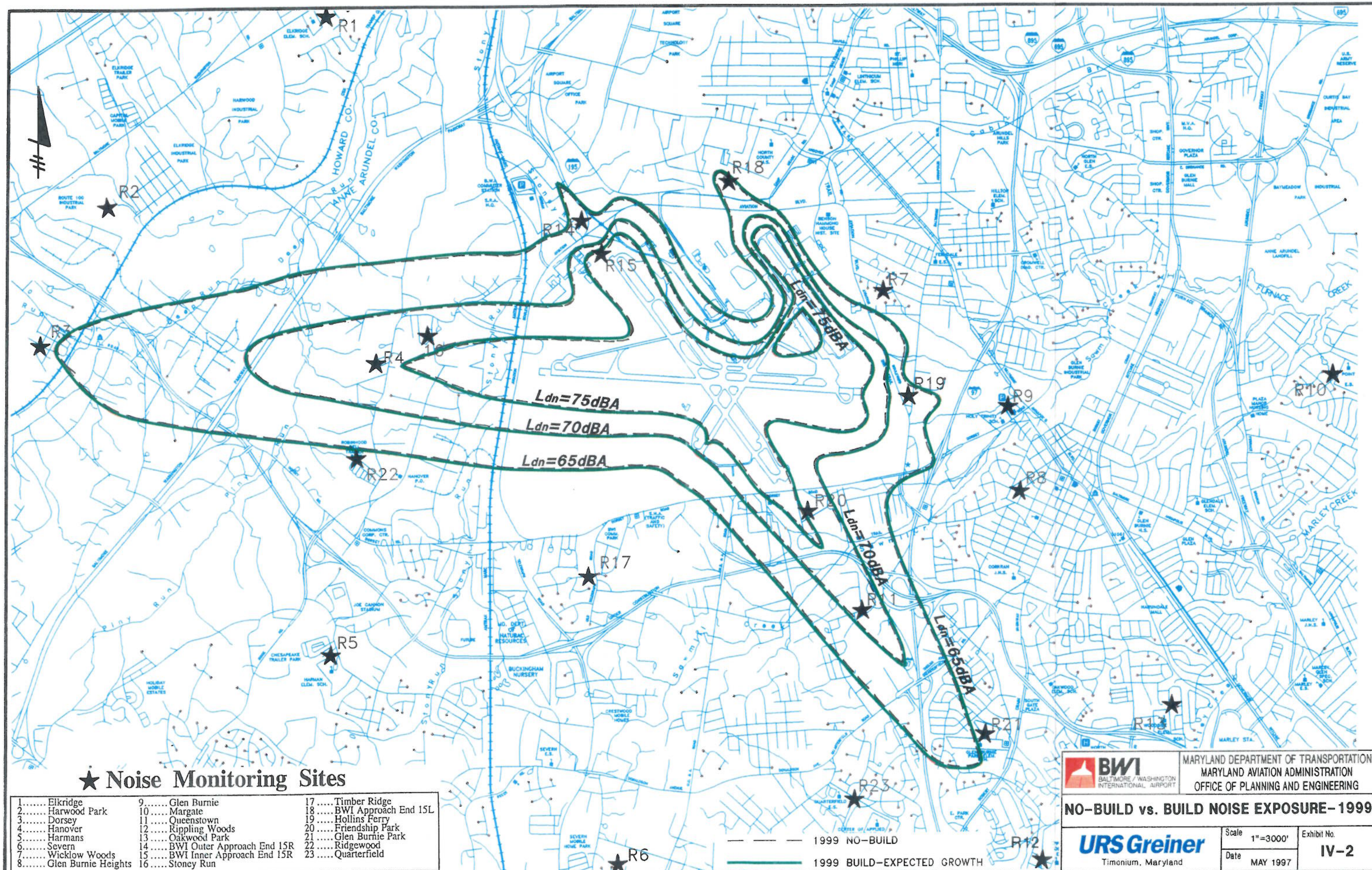
Table IV-3 compares the No-Build and Build scenarios for 1999. As indicated by the contour comparison of **Exhibit IV-2**, increases in Ldn with the Expected Growth forecasts

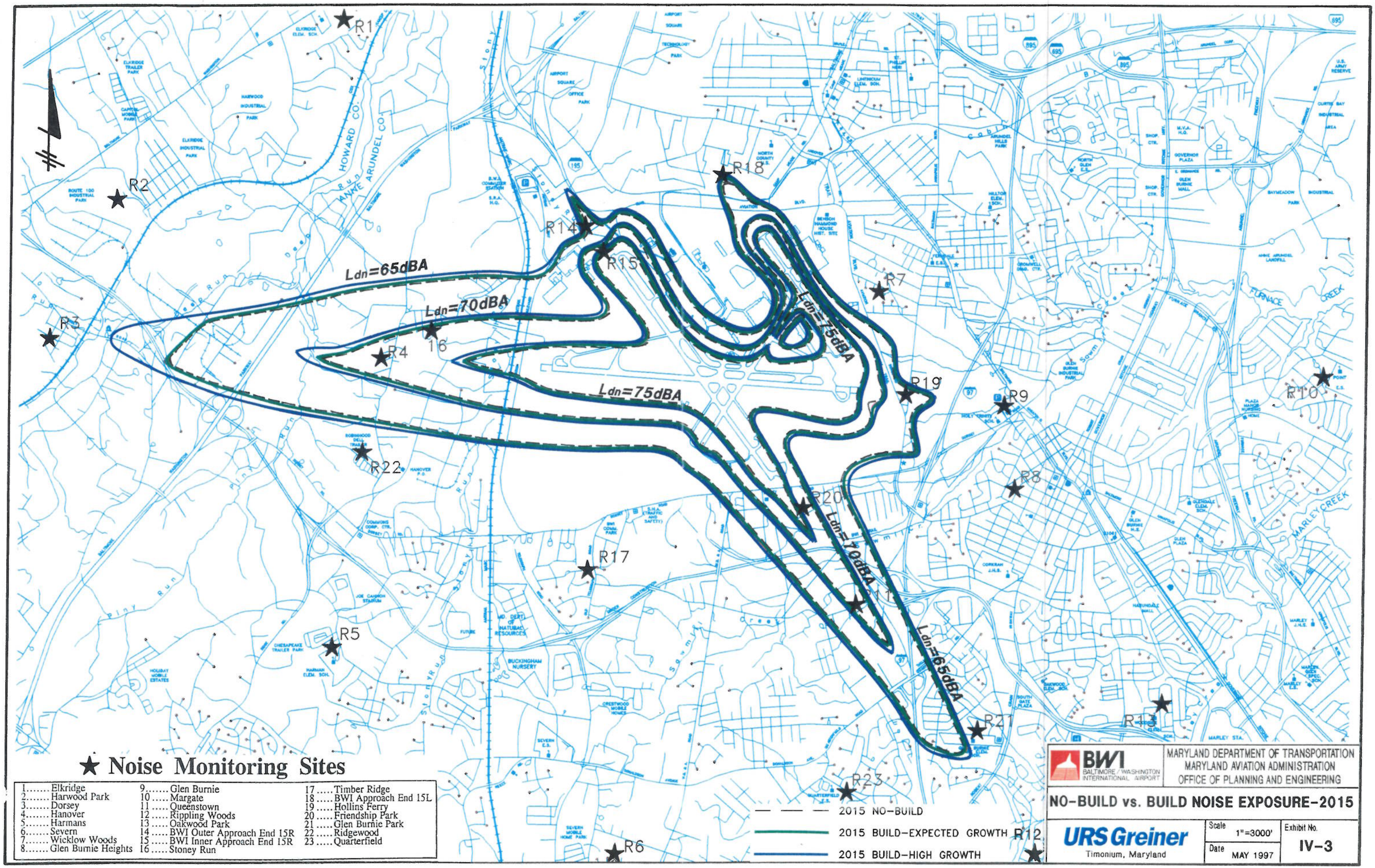
[2] The larger apparent difference between the No-Build and Build-High Growth contours to the west on Exhibit IV-3 is due to the nature of the INM and the contour plotting software. In fact, the No-Build contour should show a smoother lobe here and not the angular end that is plotted. That is, the sound exposures to the west are less different than they appear in this exhibit.



★ Noise Monitoring Sites

1..... Elkridge	9..... Glen Burnie	17 ..... Timber Ridge
2..... Harwood Park	10 ..... Margate	18 ..... BWI Approach End 15L
3..... Dorsey	11 ..... Queenstown	19 ..... Hollins Ferry
4..... Hanover	12 ..... Rippling Woods	20 ..... Friendship Park
5..... Harmans	13 ..... Oakwood Park	21 ..... Glen Burnie Park
6..... Severn	14 ..... BWI Outer Approach End 15R	22 ..... Ridgewood
7..... Wicklow Woods	15 ..... BWI Inner Approach End 15R	23 ..... Quarterfield
8..... Glen Burnie Heights	16 ..... Stoney Run	


Ldn=75dBA
Ldn=70dBA
Ldn=65dBA
★ Noise Monitoring Sites
1....... Elkridge
2....... Harwood Park
3....... Dorsey
4....... Hanover
5....... Harmans
6....... Severn
7....... Wicklow Woods
8....... Glen Burnie Heights
9....... Glen Burnie
10..... Margate
11..... Queenstown
12..... Rippling Woods
13..... Oakwood Park
14..... BWI Outer Approach End 15R
15..... BWI Inner Approach End 15R
16..... Stoney Run
17..... Timber Ridge
18..... BWI Approach End 15L
19..... Hollins Ferry
20..... Friendship Park
21..... Glen Burnie Park
22..... Ridgewood
23..... Quarterfield
1999 NO-BUILD
1999 BUILD-EXPECTED GROWTH
BWI BALTIMORE / WASHINGTON INTERNATIONAL AIRPORT
MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION
OFFICE OF PLANNING AND ENGINEERING
NO-BUILD vs. BUILD NOISE EXPOSURE-1999
URS Greiner
Timonium, Maryland
Scale 1"=3000'
Date MAY 1997
Exhibit No. IV-2



★ Noise Monitoring Sites

1..... Elkridge	9..... Glen Burnie	17 ..... Timber Ridge
2..... Harwood Park	10 ..... Margate	18 ..... BWI Approach End 15L
3..... Dorsey	11 ..... Queenstown	19 ..... Hollins Ferry
4..... Hanover	12 ..... Rippling Woods	20 ..... Friendship Park
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7..... Wicklow Woods	15 ..... BWI Inner Approach End 15R	23 ..... Quarterfield
8..... Glen Burnie Heights	16 ..... Stoney Run	

— — — 2015 NO-BUILD

2015 BUILD-EXPECTED GROWTH

2015 BUILD-HIGH GROWTH

BWI BALTIMORE / WASHINGTON INTERNATIONAL AIRPORT

MARYLAND DEPARTMENT OF TRANSPORTATION
MARYLAND AVIATION ADMINISTRATION
OFFICE OF PLANNING AND ENGINEERING

NO-BUILD vs. BUILD NOISE EXPOSURE-2015

URS Greiner
Timonium, Maryland

Scale 1"=3000'

Date MAY 1997

Exhibit No. IV-3

TABLE IV-2

Ldn AT PERMANENT MONITORING LOCATIONS
1995 AND 1999 NO-BUILD

Site	1995 Computed	1999 No-Build	Change Since 1995 (in dB)
R1	54.8	54.3	-0.5
R2	60.5	59.6	-0.9
R3	65.4	64.7	-0.7
R4	75.5	74.4	-1.1
R5	54.0	52.9	-1.1
R6	55.6	54.6	-1.0
R7	63.4	62.3	-1.1
R8	60.8	60.5	-0.3
R9	62.1	61.7	-0.4
R10	50.5	50.2	-0.3
R11	72.7	72.1	-0.6
R12	62.5	62.3	-0.2
R13	54.3	53.3	-1.0
R14	66.7	66.0	-0.7
R15	82.7	81.5	-1.2
R16	76.1	75.0	-1.1
R17	57.4	56.4	-1.0
R18	66.5	66.1	-0.4
R19	68.6	68.3	-0.3
R20	75.4	74.5	-0.9
R21	64.7	64.0	-0.7
R22	65.2	64.1	-1.1
R23	60.0	59.0	-1.0

TABLE IV-3

COMPUTED Ldn AT PERMANENT MONITORING LOCATIONS 1999 NO-BUILD AND 1999 EXPECTED GROWTH

Site	1999 No-Build Ldn (dB)	1999 Build Ldn (dB)	Difference (1999 Build - NB) (dB)
R1	54.3	54.4	0.1
R2	59.6	59.6	0.0
R3	64.7	64.8	0.1
R4	74.4	74.4	0.0
R5	52.9	53.0	0.1
R6	54.6	54.5	0.1
R7	62.3	62.3	0.0
R8	60.5	60.5	0.0
R9	61.7	61.8	0.1
R10	50.2	50.2	0.0
R11	72.1	72.1	0.0
R12	62.3	62.4	0.1
R13	53.3	53.3	0.0
R14	66.0	66.1	0.1
R15	81.5	81.6	0.1
R16	75.0	74.9	0.1
R17	56.4	56.5	0.1
R18	66.1	66.2	0.1
R19	68.3	68.4	0.1
R20	74.5	74.5	0.0
R21	64.0	64.0	0.0
R22	64.1	64.1	0.0
R23	59.0	59.0	0.0

are computed to be very small. The cargo operations numbers (discussed below) confirm this very small change since the number of cargo aircraft operations is expected to increase from 3 daytime departures to 4, and from 9 nighttime departures to 11.

Table IV-4 compares the computed Ldn values for the various 2015 scenarios, giving differences in dB of each Build alternative from the No-Build case. The Expected Growth scenario shows increases of 0.0 to 0.2 dB, while the High Growth scenario yields increases in Ldn of 0.2 to 0.5 dB.

Changes in Numbers of Operations

To understand the small changes in Ldn that result from operation of the proposed cargo facility, **Table IV-5** summarizes the numbers of daily jet and large propeller aircraft departures for the various years and alternatives (operations are rounded to the nearest whole number). Only cargo operations are affected by the build alternatives. As shown, current cargo departures number 3 during the daytime (7 am to 10 pm) and 9 at night. In 1999, these increase to 4 in the day and 11 at night if the facility is built. At most, in 2015, daytime cargo departures increase from 3 to 8, and nighttime from 9 to 15, when compared to current levels. Though these increases may be sizeable in terms of cargo operations since the departures roughly double, these changes are relatively small compared with total large aircraft departures. Hence, at most, in 2015, instead of having 271 daytime departures, the cargo facility would increase these to 276 departures, and in that year, nighttime departures are projected to increase from 30 to 36 operations. Such changes in the overall picture of BWI operations represent a relatively small increase in noise exposure. These increases are not expected to occur if the expanded air cargo facilities are not built.

Ground Noise

Aircraft ground operations associated with a proposed midfield cargo facility (aircraft taxiing to and from the facility, including maneuvering at the facility, engine start-up, and use of aircraft auxiliary power units under Alternatives 1, 4, and 4R) are not expected to cause any significant noise impacts in the closest residential areas to the south of the Airport. Increases caused by cargo ground operations in the overall aircraft produced day-night sound level at these

TABLE IV-4

COMPUTED Ldn AT PERMANENT MONITORING LOCATIONS 2015 NO-BUILD AND 2015 BUILD SCENARIOS

Site	No-Build Scenario DNL (dB)	Build Scenario, Expected Growth DNL (dB)	Difference (Expected Growth-NB) (dB)	Build Scenario, High Growth DNL (dB)	Difference (High Growth - NB) (dB)
R1	53.0	53.2	0.2	53.4	0.4
R2	57.3	57.4	0.1	57.8	0.5
R3	63.4	63.4	0.0	63.8	0.4
R4	72.1	72.1	0.0	72.6	0.5
R5	50.6	50.6	0.0	51.1	0.5
R6	52.2	52.3	0.1	52.7	0.5
R7	59.3	59.4	0.1	59.8	0.5
R8	59.6	59.7	0.1	59.8	0.2
R9	61.5	61.6	0.1	61.7	0.2
R10	49.8	49.9	0.1	50.0	0.2
R11	71.3	71.4	0.1	71.6	0.3
R12	62.3	62.3	0.0	62.5	0.2
R13	50.9	50.9	0.0	51.3	0.4
R14	64.6	64.7	0.1	65.1	0.5
R15	79.2	79.2	0.0	79.5	0.3
R16	72.3	72.2	-0.1	72.7	0.4
R17	54.3	54.4	0.1	54.7	0.4
R18	65.2	65.6	0.4	65.6	0.4
R19	67.9	68.1	0.2	68.2	0.3
R20	73.1	73.1	0.0	73.4	0.3
R21	62.8	62.9	0.1	63.1	0.3
R22	61.6	61.6	0.0	62.1	0.5
R23	56.4	56.4	0.0	56.8	0.4

TABLE IV-5

DAILY DEPARTURES

Type of Operation	1995		1999 No- Build		1999 Build - Expected Growth		2015 No-Build		2015 Expected Growth		2015 Build - High Growth	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
Domestic	168	13	186	15	186	15	241	19	241	19	241	19
International	16	1	17	1	17	1	21	1	21	1	21	1
Charter	4	1	5	1	5	1	6	1	6	1	6	1
Subtotal	188	15	208	17	208	17	268	21	268	21	268	21
Cargo	4	9	3	9	4	11	3	9	5	13	8	15
TOTAL	192	24	211	26	212	28	271	30	273	34	276	36

locations will be well below the FAA's identified increases for significance (1½ or 3 dB, depending on existing sound level) and should be unnoticeable. Single events, such as aircraft taxiing, may be audible at times, particularly at night when background noise levels are lowest. Although the loudest single events could occasionally cause some outdoor speech interference at the closest residences, no indoor speech interference or sleep interference is expected to be caused by aircraft ground operations at the facility.

Impact Summary

In conclusion, the noise effects of the proposed cargo facility are considered not to be significant. The noise contours, as well as the noise levels at specific locations around BWI (which, worst case, would increase by 0.2 to 0.5 dBA), confirm that any potential changes in noise exposure would be well below the significance threshold of a 1.5 dBA increase for noise-sensitive areas within Ldn 65 as established by the FAA.

LAND USE IMPACTS

This section focuses on the potential impacts the proposed project would have on existing and planned land uses in the surroundings of Baltimore/Washington International Airport. Since the project would be entirely contained on Airport property, there would be no direct impacts to land uses adjacent to the Airport. The proposed project is consistent with Anne Arundel County's General Development Plan. This Plan serves as the County's guide for future growth and development, and identifies the Airport and its immediate vicinity as a regional industrial and office center. The proposed project will enhance the Airport area's position as a regional industrial center in the Baltimore metropolitan region and is likely to stimulate additional economic activity around the Airport.

No-Build Alternative

Under the No-Build Alternative, development at and near the Airport will continue to be consistent with existing and planned land uses and policies advocated in the County's General Development Plan. Based on the Anne Arundel County Zoning Ordinance and Map,

the area adjacent to BWI will continue to develop as light industrial and park industrial uses with limited residential development and planned open space.

Build Alternatives

Construction of the proposed project will not require property acquisition nor easements since construction will be confined to existing Maryland Aviation Administration property. Since the proposed project does not require arrival and departure patterns to be altered, there are no new runway obstructions which will necessitate property acquisitions or easements.

Alternatives 1, 3, 4 and 4R will impact on-site wetlands. While on-site wetland mitigation is part of the required regulatory review process for such impacts, it is likely that mitigation for these four alternatives will need to occur off-site which may require property acquisition and easements. Any off-site replacement of impacted wetlands is not anticipated to have adverse effects on the land uses in the area.

Each of the Build alternatives will impact existing forested areas situated on the Airport property. The Maryland Aviation Administration has prepared a Forest Conservation Plan which identifies reforestation requirements resulting from planned Airport improvements, including the proposed project. It is likely that some of the required reforestation associated with the proposed project will occur off-site. However, MAA has already acquired property along Stony Run Road that will be used to address all necessary reforestation for the proposed project. Therefore, off-site replacement is not expected to have adverse impacts on land uses in the area.

Given the relatively small increase in noise resulting from this proposed project, no significant increase in non-compatible off-Airport land use is expected.

SOCIAL IMPACTS

The analysis of potential social impacts performed as part of the Environmental Assessment is intended to determine whether the proposed project will affect economic growth, employment opportunities, the need for public services, community cohesion, and traffic circulation near the Airport. The expansion of cargo facilities at BWI will have a positive impact on the economic growth in the Airport vicinity and the Baltimore metropolitan region. Additional employment will be created by the proposed project, regardless of the Build alternative selected.

Since all of the Build alternatives considered would be built entirely on existing Airport property, the proposed project is not anticipated to divide or disrupt any of the established communities within the area. While the proposed project will increase traffic volumes on the adjacent roadways, particularly Aviation Boulevard, Maryland Route 100, Dorsey Road, and I-95, the area roadway network has sufficient capacity to accommodate the increased post-construction traffic volumes.

According to the Maryland State Highway Administration, 1994 Average Daily Traffic volumes at the MD Route 170 and MD Route 176 intersection were 14,350 vehicles and 27,075 vehicles at the MD Route 170 and I-95 intersection. By applying an annual growth rate of 2 percent (this rate is consistent with previous traffic projections conducted for Airport activities), a preliminary Year 2000 traffic volume projection for the MD Route 170 and MD Route 176 intersection is 16,200 vehicles and 30,213 vehicles at the MD Route 170 and I-95 intersection. The proposed project is not likely to increase average annual traffic volumes at either intersection in the future by more than the 2 percent growth rate used for the Year 2000 projections. As such, the project is not anticipated to generate a need for additional roadway or intersection improvements in the short-term, with the exception of possible turning lanes at the facility entrance. However, as the activity at the new cargo facility increases over time, the impact on the local transportation network will need to be monitored by the Airport. There will also be no adverse impact on existing public services since the proposed project will be served by internal (MAA) service providers. In addition, the proposed project will not affect the projected population growth in the area or result in a greater need for public services.

No-Build Alternative

The No-Build Alternative will not result in significant social impacts, although this alternative will restrict the level of economic growth and employment in the Airport vicinity. The No-Build Alternative does not require any property acquisition, easements, or relocation of residences; in addition, no established or planned community development will be disrupted by the No-Build Alternative. This alternative also does not further the County's long- term goal of establishing the Airport area as a regional industrial and office center.

The No-Build Alternative will result in an increase in the air cargo capacity at BWI of only 56,000 square feet (Building F currently under construction). This increase will accommodate approximately 22 percent of the projected future air cargo demand at BWI. The No-Build Alternative will limit the ability of BWI to address the long-term air cargo needs of the region. As a result, the air cargo needs are likely to be filled outside the BWI region, causing a potential loss in revenue and employment opportunities for the region. In addition, the limited air cargo capability may adversely effect BWI's position in attracting aviation and non-aviation related businesses. This may result in businesses selecting other locations to locate or expand their businesses, causing an additional loss of employment opportunities and revenue for the region.

Build Alternatives

Each of the Build Alternatives would satisfy the purpose and need of the project, meeting the future air cargo needs of the region. These alternatives will have positive impacts in terms of economic and employment growth.

The Build Alternatives will not have any direct negative socioeconomic impacts on the surrounding community. There will be no division or disruption of established or planned community development nor direct changes in public service demands with any of the Build Alternatives.

An economic impact analysis for BWI, conducted in 1990 revealed that the Airport creates:

- $ 2.5 billion in economic activity;
- $ 843 million in wages annually for Maryland residents;
- 48,000 jobs for Maryland residents.[3]

This analysis indicated that BWI activities have direct, indirect, and induced impacts to the Baltimore Metropolitan area and the State of Maryland. Direct impacts are defined as those impacts occurring as a result of providing a service at the Airport. Indirect impacts occur as a result of the use of the service and can occur on or off Airport property. Induced impacts are the most difficult to quantify and are intended to represent the real value in terms of dollars circulated through the region as a result of the service being provided at the Airport. "The real value is derived through the use of economic multipliers which indicate that as money is used over and over again, many people and businesses benefit, even if they do not use or directly serve the Airport facility."[4]

By providing additional air cargo facilities at BWI, positive direct, indirect, and induced impacts will be created by any of the Build Alternatives. In terms of direct impacts, the cargo facilities will bring in new cargo carriers and allow existing cargo carriers to expand at the Airport. The impact will be the creation of new employment opportunities and increased tax revenues to the County and State from the cargo providers. In addition, the construction of these new facilities will generate revenues and jobs for the construction related industries, aircraft refueling, cleaning and maintenance and repairs, freight forwarding, air traffic control, airways equipment, maintenance and customs clearance activities. While actual tenants for the new air cargo facilities have not been identified, a preliminary estimate of the jobs that will be created by the additional air cargo carriers ranges from 200 to 600.

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[3] Maryland Statewide Airport Impact Study, Wilbur Smith Associates, 1990.

[4] Ibid.

INDUCED SOCIOECONOMIC IMPACTS

No-Build Alternative

The No-Build Alternative is anticipated to result in an overall negative economic impact in the local region, as the Airport's inability to provide for ever-increasing air cargo demand will also likely result in keeping airport-related jobs and businesses from expanding and growing. In fact, under the No-Build scenario, a high potential would exist for relocation of air cargo demand to other airports (e.g., Washington-Dulles International Airport). This circumstance is addressed in greater detail in Section II: Alternatives (see Page II-2).

Build Alternatives

Indirect impacts of the Build Alternatives will include an increase in the number of businesses within the air cargo industry or industries that are directly impacted by the increase in air cargo capacity at BWI. The trucking industry and international commerce businesses are some of the indirect beneficiaries of the proposed project. Along with an anticipated increase in new or expanded business activity comes additional revenue in the form of taxes to the region and State and additional employment opportunities.

While direct and indirect impacts reflect increases in demand categories, such as employment and revenue, they do not reflect the total economic value attributable to a new or expanded service. To fully account for the total economic impact of the proposed project, a multiplier must be included in the calculation of total economic impact. In 1990, the induced impacts of BWI activities was calculated at $1.1 Billion.

These induced impacts were determined through the use of the U.S. Department of Commerce Regional Input-Output Modeling System (RIMS-II). Statewide the multiplier used to calculate induced impacts in 1990 was $1.86. This number means that for each $1 spent on an aviation project, an additional impact of $.86 is generated in induced impact. **Table IV-6** shows a general relationship between the cost of the proposed project and induced impacts from each Build Alternative extrapolating the 1990 statewide multiplier.

TABLE IV-6

POTENTIAL INDUCED IMPACTS OF A NEW BWI AIR CARGO FACILITY

Alternative	Estimated Cost	Induced Impact
1 - ALP Proposal	$68 Million	$133 Million
2 - Southeast Quadrant	$74 Million	$137 Million
3 - Southwest Quadrant	$72 Million	$130 Million
4 - Midfield	$58 Million	$106 Million
4R - Revised Midfield (Proposed Action)	$69 Million	$133 Million

SOURCE: Greiner, Inc., 1996.

It should be noted that the induced impacts are based on the 1990 statewide multiplier and reflect an order of magnitude for comparison of Build Alternatives.

AIR QUALITY

As discussed previously in Section III, the MAA has developed an Air Quality Plan for BWI. Essentially, this plan (1) identifies and describes all air emission sources associated with BWI; (2) quantifies existing emissions from these sources; (3) provides emissions estimates for future years; and (4) evaluates air emissions reduction measures.

The purpose of this Plan is to help ensure that existing activity and future growth at BWI is consistent with the SIP goals to return the Baltimore region to an attainment area by the Year 2005. It is also intended that by following this Plan, all new Airport improvement projects will comply with the 1990 Clean Air Act (CAA) General Conformity Rule requirements.

The Air Quality Planning Division of the Maryland Department of the Environment (MDE) has reviewed the BWI Air Quality Plan and found it to be consistent with their SIP development methodologies. As a result, MDE will use the Air Quality Plan to expedite its review of development projects at BWI. The FAA Eastern Region has also endorsed the Plan and will use it for review of all future projects at BWI.

The impacts to air quality associated with the proposed air cargo facility expansion are discussed below in the context of the Air Quality Plan. Appendix F presents appropriate supplemental excerpts from this Plan.

Air Quality Impact Assessment

FAA environmental orders and the CAA General Conformity Rule utilize projections of increased enplanements (or operations) and emissions associated with the project to establish the necessity, and determine the level, of an air quality impact assessment. In both cases, emission inventory results serve as the basis for evaluating the acceptability of the proposed project.

As shown in **Table IV-7**, the most recent forecasted operational levels associated with any of the Build scenarios are well within the levels used in support of the BWI Air Quality Plan. This pattern is consistent through the Year 2015, for both the No-Build and Build scenarios.

Based on this comparison, air emissions attributable to BWI, with or without the proposed air cargo facility expansion project, are expected to be less than, or equal to, the computed amounts in the Air Quality Plan emission inventories. **Table IV-8** contains a summary of these Air Quality Plan emission inventory results.

Evaluation of Build Alternatives

In the previous section, it was demonstrated that total air emissions at BWI with the proposed air cargo facility expansion are expected to be less than, or equal to, the levels contained in the BWI Air Quality Plan through the Year 2015. This conclusion is based on the comparison of forecasted operational levels developed in support of this EA and the Air Quality Plan.

Given that the operational levels are the same among the four Build Alternatives, aircraft taxi-in and taxi-out times are the only remaining variables that could affect air emissions. The basis for this comparison is that shorter taxi distances between the runways and the alternative sites for the proposed air cargo facility expansion result in less emissions than longer taxi distances.

From this application, Build Alternatives 1, 4 and 4R, all located in the midfield area of BWI, will operate less taxi-related emissions compared to Build Alternatives 2 and 3, which are located in the southeast and southwest quadrants, respectively.

NEPA Consistency and General Conformity

FAA environmental orders identify the NEPA requirements for demonstrating that federally funded projects must be consistent with the provisions of the CAA and conform to an SIP in designated non-attainment areas. As a means of expediting this determination process,

TABLE IV-7

COMPARISON OF ANNUAL AIRCRAFT OPERATIONS[a] PROPOSED AIR CARGO FACILITY EXPANSION VS. THE CURRENT BWI AIR QUALITY PLAN

Description	1990	1995	1996	1999	2006	2015
Current Forecast[b]	-	289,664	-	311,623	-	376,904
BWI Air Quality Plan[c]	302,220	-	318,451	-	376,695	-

[a] Annual aircraft operations (one operation equals a landing or a takeoff).
[b] MAA, May 1996.
[c] BWI Air Quality Plan, 1994.

(-) - No data developed for the selected year.

SOURCE: Greiner, Inc. 1996.

TABLE IV-8

BWI EMISSIONS INVENTORY[a]
(Tons/Year)

Year	Volatile Organic Carbon[b]	Carbon Monoxide[b]	Nitrogen Oxides[b]	Sulfur Oxides[b]	Particulate Matter[b]
1990[c]	599	1,842	855	372	158
1996[d]	580	1,885	1,005	380	139
2006 No-Build[e]	563	2,037	1,307	450	147
2006 Build[f]	569	2,059	1,321	455	149

[a] BWI Air Quality Plan, September 1994.
[b] Combined totals for aircraft, service vehicles, fuel storage, space heating and on-site motor vehicle emissions.
[c] Based on 302,220 operations per year.
[d] Based on 318,451 operations per year.
[e] Based on 372,680 operations per year.
[f] Based on 376,695 operations per year.

SOURCE: Greiner, Inc. 1996.

the MAA Air Quality Plan provides a means to ensure that development projects and future growth at BWI are consistent with the SIP goals to return the Baltimore region to an attainment area by the Year 2005. Both MDE and FAA-Eastern Region have endorsed this Plan, and MDE will use it in their SIP development process.

Because forecasted operations at BWI with the proposed air cargo facility expansion are consistent with those used to develop the air emission inventories contained in the Air Quality Plan, it follows that the project conforms to the SIP. In this way, FAA and MAA can assure that the goals of the SIP will not be delayed nor compromised by this proposed project.

WATER QUALITY

No-Build Alternative

The No-Build Alternative will have no effect on existing water quality conditions.

Alternative 1

Alternative 1 involves the reconstruction of the existing cargo facilities and construction of a midfield cargo area in the southwestern quadrant (see Section II, Exhibits II-2 and II-3). This alternative would not increase the amount of impervious surface or future stormwater runoff in the area of existing facilities since the site is currently paved. There would, however, need to be a degree of retrofitting of the stormwater management facilities for this area to mitigate for the increased pollutant load resulting from increased operations and traffic.

The construction of the new midfield cargo area south of Runway 10 would have the greatest impact on Kitten Branch by adding 46 acres of impervious area to its watershed. The drainage area itself would increase as a result of changing drainage patterns. Development of the support area would add approximately 20 acres of impervious area to the Signal Branch drainage area. Both Kitten Branch and Signal Branch would require new stormwater management facilities to treat runoff from these additional impervious areas. Development of this alternative would result in drainage area diversions and land use changes in Kitten Branch,

Signal Branch, Hawkins Branch, and Clark Branch as a result of the air cargo expansion and the associated access road and stockpile areas as shown on Exhibit II-3.

Extensive study was undertaken to locate the stockpiles which would need to be created for excess material generated by Alternative 1 construction. The results of this study showed that there was no single, nonwooded site of sufficient size for placement of the excavated material on Airport property, due to aviation safety requirements. Because of this, it has been determined that the main stockpile area would be placed outside of the floodplain boundaries between Clark and Hawkins Branches in an existing wooded area. Peak flow would be managed by the outlet structures on the sediment basin at the base of the stockpile. The sediment basin would therefore serve as a temporary stormwater management facility. The smaller area, where some of the excess material will be used to adjust grades in the approach to Runway 4 west of the South Ramp area, would have no significant impact to existing stormwater management facilities, as the stockpile would have a vegetative cover and remain pervious.

Alternative 2

Alternative 2 locates the proposed air cargo facilities in the southeastern quadrant of the Airport in the Sawmill Creek drainage area (see Section II, Exhibit II-4). This location would increase the impervious surface in the Phelps Branch and Irving Branch drainage basins.

The recently completed Runway 10-28 extension resulted in the Phelps Branch drainage basin being decreased from 124 acres to 99 acres. This drainage basin is predominantly forested or grassed with only 1.6 acres of impervious surface and no existing stormwater management facilities. Construction in this basin would add 33 acres of impervious surface and require the establishment of extensive new stormwater management facilities.

Previously, the Irving Branch drainage basin was increased from 103 acres to 161 acres when Runway 10-28 was extended. This increased the impervious surface from 9.0 to 45.9 acres. At this time it has been determined that no additional stormwater management facilities would be anticipated to be required for either quality or quantity control at this site. Runoff which enters the area, located southeast of Runway 28, either infiltrates into the ground or flows

to a former gravel pit located in the wooded area just upstream of the outfall from the Airport. Field investigations showed only minimal runoff exiting the existing outfall pipe in this location.

With proper maintenance of these areas during the development of the new facilities, it may be possible to utilize them for management of runoff. However, should the existing drainage patterns be drastically modified, stormwater management retrofits would have to be provided for quality and quantity management of both the completed Runway 10-28 Extension Project as well as the new Air Cargo Facility Project. An additional 30 acres of impervious surface in this drainage basin would require upgrading the existing stormwater management facilities.

Alternative 3

Alternative 3 (see Section II, Exhibit II-5) locates the proposed new air cargo facility in the extreme southwestern quadrant of the Airport in both the Clark Branch and Hawkins Branch drainage basins.

There is currently only 15.5 acres of impervious area in the Clark Branch drainage basin. The other 531.5 acres is wooded or grassed areas; there are no existing stormwater management facilities on BWI property in this drainage basin. There are several facilities off of Airport property south of Dorsey Road, which handle the stormwater runoff from the adjacent residential and commercial area. Construction of Alternative 3 would add 70 acres of impervious surface to the drainage basin. Development of this alternative would require the addition of stormwater management facilities on BWI property, including floodplain management, to control the quantity and quality of the stormwater runoff flowing out of Clark Branch and into Stony Run.

This alternative would also impact Hawkins Branch. The taxiway that would be required to connect the new cargo complex to Runway 10-28 would cut north-south through the headwaters area of Hawkins Branch. Construction of this alternative would also require the clearing of additional trees within this drainage area to clear the line-of-sight from the Air Traffic Control Tower to the new cargo complex. The areas of trees which are cleared for line-of-sight purposes only and not paved for taxiways and apron areas would be replanted with

appropriate upland vegetation such as grasses and meadow species. These plantings would assist with controlling stormwater runoff in this area.

Alternative 4

Alternative 4 is also located in the southwest quadrant of the Airport in the midfield area (see Section II, Exhibit II-6) directly south of Runway 10-28 and west of the new Aircraft Rescue and Firefighting (ARFF) Station. Development of this alternative will result in drainage area diversions and land use changes in Kitten Branch, Signal Branch, Hawkins Branch, and Clark Branch as a result of the new air cargo complex and the associated access road and stockpile areas.

Kitten Branch is the largest drainage basin on Airport property in the Stony Run drainage area. It drains the central portion of the Airport including most of the main terminal and parking garage, the Daily and ESP parking facilities, Piers A, B, and part of C, most of Runway 15R-33L, and parts of Runways 10-28 and 4-22. There are 307.7 acres of existing impervious surface in the 700-acre drainage basin; the remainder of the ground cover in the drainage basin is maintained grass.

The majority of the cargo complex that would be in the Kitten Branch drainage basin will be on areas that are currently grassed, adjacent to existing development. It is estimated that the Kitten Branch drainage area would increase by 16.5 acres with the development of this project and there would be an additional 50 acres of new impervious area. Runoff would be directed into a new stormwater management basin designed to handle the increased flow. Most of the Kitten Branch drainage basin has been developed and the majority of the stormwater flow has been channelized to ditches and culverts.

The Signal Branch Drainage Area, comprising approximately 114 acres, is largely undeveloped consisting mostly of grass and wooded areas. Development of this alternative would create major changes in land use and drainage patterns. The overall drainage area would be reduced by approximately 4.5 acres from diversions to both the Kitten Branch and the Hawkins Branch Drainage Areas. Grading for the new cargo complex and associated facilities in this alternative would result in Signal Branch being filled, including 3.8 acres of floodplain area and

1.7 acres of existing wetlands. Ultimate conditions would cause most of this area to be commercial land use. Open channel flow would be utilized to the extent possible. Stormwater management facilities would provide peak flow attenuation and water quality assurance.

Extensive study was undertaken to locate the stockpile areas for the 1.8 million cubic yards of excess material. The results of this study showed that there was no single, nonwooded site of sufficient size for placement of the excavated material on Airport property, due to FAR Part 77 obstruction clearance requirements. Because of this, it has been determined that the main stockpile area (1.7 million cubic yards) would be placed outside of the floodplain boundaries between Clark and Hawkins Branches in an existing wooded area. Peak flow would be managed by the outlet structures on the sediment basin at the base of the stockpile. The sediment basin would therefore serve as a temporary stormwater management facility. The smaller area (100,000 cubic yards), where material will be used to grade the approach to Runway 4 west of the South Ramp, would have no significant impact to stormwater management as the stockpile would have a vegetative cover and remain pervious.

Alternative 4R

Similar to Alternative 4, Alternative 4R is located in the southwest quadrant of the Airport in the midfield area (see Section II, Exhibit II-7) directly south of Runway 10-28 and west of the new ARFF Station. Development of this alternative would result in drainage area diversions and land use changes similar to Alternative 4.

Further refinements in stormwater management planning indicate that the Kitten Branch drainage basin would increase by 10.2 acres with the development of this project and that there would be an additional 50 acres of new impervious area. Runoff from the midfield site would be directed into a new stormwater management infiltration basin designed to handle the increased flow in the entire drainage basin. Additional stormwater management facilities would include the installation of infiltration trenches. Where feasible, these facilities would be equipped with level spreading devices which would help reduce peak flow by lengthening the flow path in the area. Also, grassed areas would be encouraged to develop into meadow areas to further increase infiltration and decrease peak flows. The infield area bounded by the proposed north parallel taxiway, Runway 15R-33L, Taxiway G, and Taxiway F would be allowed to pond to help

manage peak flows exiting under Taxiway F. The use of open channel flow has been maximized as an additional flow path modification method to reduce the volume of storage required for stormwater management.

The Signal Branch drainage basin would be modified by the construction of Alternative 4R. The drainage area would decrease by approximately 10.7 acres from diversions to both the Kitten Branch and Hawkins Branch drainage areas. The impervious area will increase by about 49 acres. Underdrain would be provided in the existing wetland area to promote baseflow into the new headwaters of Signal Branch. An infiltration basin would be constructed north of Signal Branch and would outlet into the upland portion of the stream. Open channel flow and additional infiltration facilities would be used to the extent possible.

The cargo support area located south of the access road would impact the Hawkins Branch drainage area. Stormwater management would likely be provided at the southwest corner of the development site. Actual locations and sizes would be estimated as the planning process progresses. The use of open channel flow and stone check dams would likely be useful management facilities in this area.

The stockpile volume remains largely unchanged between Alternative 4 and Alternative 4R. In general, the 2.4 million cubic yards of material would be stockpiled between the Clark Branch and Hawkins Branch wetland areas, maintaining a minimum of a 200-foot buffer and avoiding the previously mentioned archaeological site. Peak flows would be managed by the conversion of sediment basins to stormwater management basins.

Permits Required

Permits are required related to water resources issues. Pursuant to Section 404 of the Clean Water Act and the Maryland Nontidal Wetlands Protection Act, a Joint Federal and State Permit Application for the Alteration of any Floodplain, Waterway, Tidal or Nontidal Wetland in Maryland has been obtained from the U.S. Army Corps of Engineers and the Maryland Department of the Environment (MDE) (see **Appendix A**).

Approval by the MDE will be necessary for erosion and sediment control and stormwater management plans. A Water Quality Certification (WQC) has been obtained from the MDE (see **Appendix A**) in accordance with Section 401 of the Clean Water Act. BWI has a National Pollutant Discharge Elimination System (NPDES) permit for its point discharges and no revisions are expected to be required relative to this project or until the permit is renewed. However, the NPDES Program may also require a separate construction activities permit associated with non-point land disturbance activities affecting a total of five or more acres.

Coordination with the Maryland Department of Natural Resources, Maryland Department of the Environment, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and citizens groups regarding water quality will continue during the development and implementation of the project.

Potential Mitigation Measures

The BWI Comprehensive Stormwater Management Plan developed in 1993 provides detailed information on measures that can be implemented to enhance the overall water quality of the Airport by reducing runoff, enhancing infiltration, minimizing potential for soil erosion, and minimizing potential changes to hydrology. The Maryland Aviation Administration has implemented a plan that controls the quantity and quality of all anticipated runoff on BWI property. This plan attempts to not increase the net quantity of post-construction runoff from a specific project and also maintain the quality of the runoff. As a condition of the WQC, it is anticipated that the first ½ inch of runoff from new impervious surfaces will be controlled by water quality structures prior to discharge to receiving water courses.

HISTORIC AND ARCHAEOLOGICAL RESOURCES

No-Build Alternative

The No-Build Alternative will result in no impacts to archaeological and historic architectural resources that are listed in or eligible for listing in the State and National Registers of Historic Places.

Alternative 1

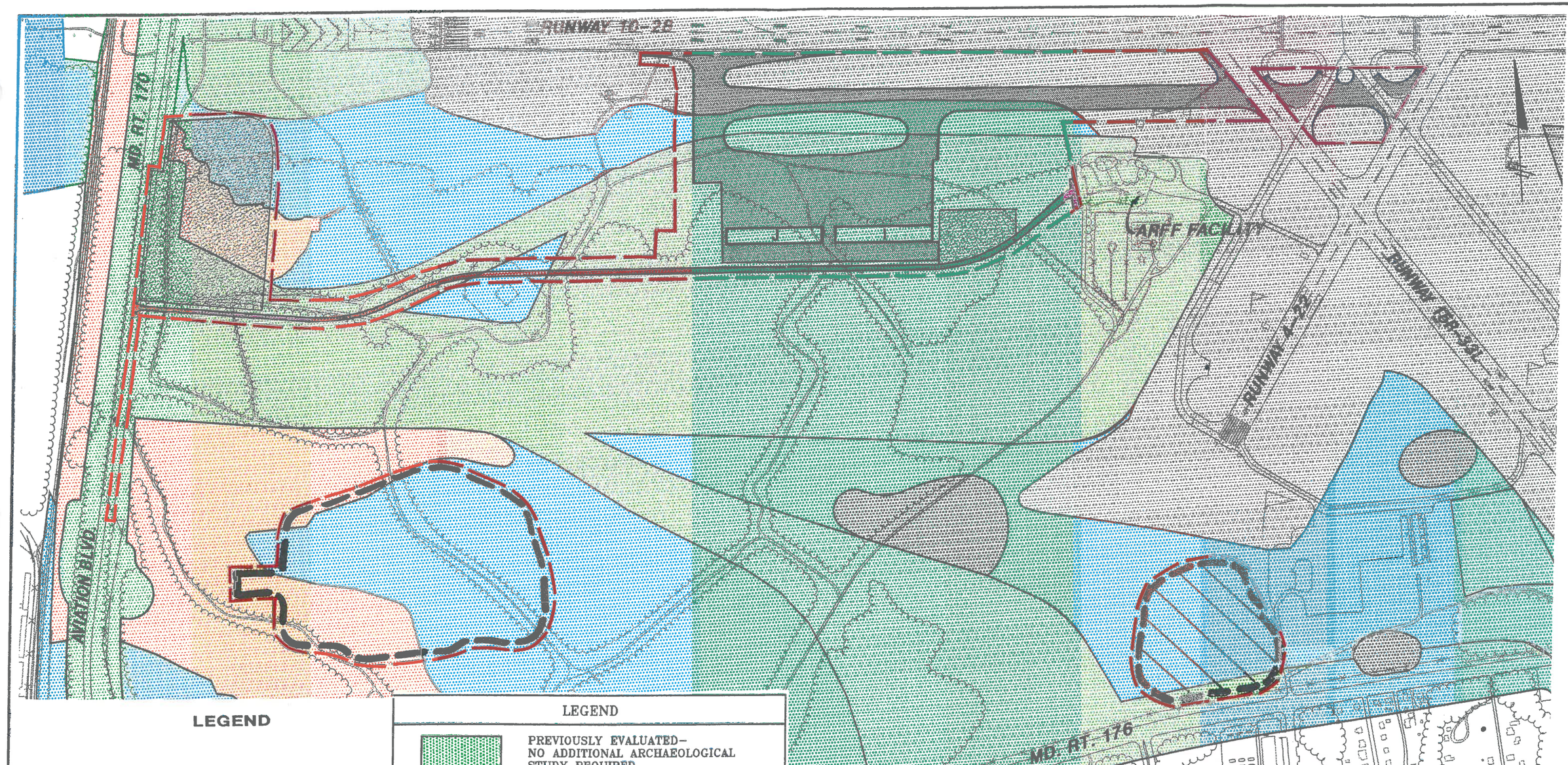
Development of the midfield air cargo facilities for Alternative 1 would impact some areas with archaeological potential. However, approximately 48.7 acres have moderate to low probability for prehistoric sites, 34.2± acres of area have no probability for historic sites, and 67.3± acres have been previously evaluated and require no additional study. Approximately 17.3± acres have high probability for prehistoric sites. As shown on **Exhibit IV-4**, these areas are to the east of Aviation Boulevard (MD 170) and within the potential stockpile area. It is also important to note that as part of Alternative 1, Maryland Route 170 will need to be widened to allow for a new center left-turn lane. Widening entirely on the eastern side of the roadway would totally avoid the high-potential archaeological zone west of MD 170 known as the Harmans A Site (18AN29A), which has been determined eligible for inclusion in the National Register of Historic Places.

Alternative 2

Alternative 2 proposes expansion of air cargo facilities within the southeastern quadrant of Airport property. Approximately 6.8± acres of development have moderate to low probability for prehistoric and historic sites, 77.2± acres require no additional archaeological study, and less than one acre has no probability for historic sites. However, 2.5± acres have high probability for historic sites and 16.1± acres have high probability for prehistoric sites (see **Exhibit IV-5**).

Alternative 3

Alternative 3 would impact 31.2± acres of area containing high probability for historic and prehistoric sites (see **Exhibit IV-6**). The remaining area would impact 146.6± acres of land with moderate to low probability for historic and prehistoric sites, and 167.6± acres contain either land with no probability or land that has been previously evaluated and requires no additional study.



LEGEND

- Taxiway and Apron Pavement
- Cargo Handling Building (600'x100')
- Vehicular Access Road
- Air Cargo Support Facilities
- Stockpile Area
- Area to be Graded
- Limit of Disturbance

LEGEND

- PREVIOUSLY EVALUATED– NO ADDITIONAL ARCHAEOLOGICAL STUDY REQUIRED
- NO PROBABILITY FOR SITES
- HIGH PROBABILITY FOR HISTORIC SITES
- HIGH PROBABILITY FOR PREHISTORIC SITES (BURIED DEPOSITS)
- MODERATE TO LOW PROBABILITY FOR PREHISTORIC & HISTORIC SITES

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OFFICE OF PLANNING AND ENGINEERING

ALTERNATIVE 1-ARCHAEOLOGICAL IMPACTS

URS Greiner
Timonium, Maryland

Scale 1"=600'
Date MAY 1997
Exhibit No. IV-4

LEGEND

- PREVIOUSLY EVALUATED– NO ADDITIONAL ARCHAEOLOGICAL STUDY REQUIRED
- NO PROBABILITY FOR SITES
- HIGH PROBABILITY FOR HISTORIC SITES
- HIGH PROBABILITY FOR PREHISTORIC SITES (BURIED DEPOSITS)
- MODERATE TO LOW PROBABILITY FOR PREHISTORIC & HISTORIC SITES

- 1,000' VORTAC Critical Area
- Taxiway and Apron Pavement
- Cargo Handling Building (600'x100')
- Vehicular Access Road
- Air Cargo Support Facilities
- Limit of Disturbance

RUNWAY 10-28

RUNWAY 4-22

RUNWAY 15R-33L

AVIATION BLVD.

MD. RT. 176

DORSEY RD.

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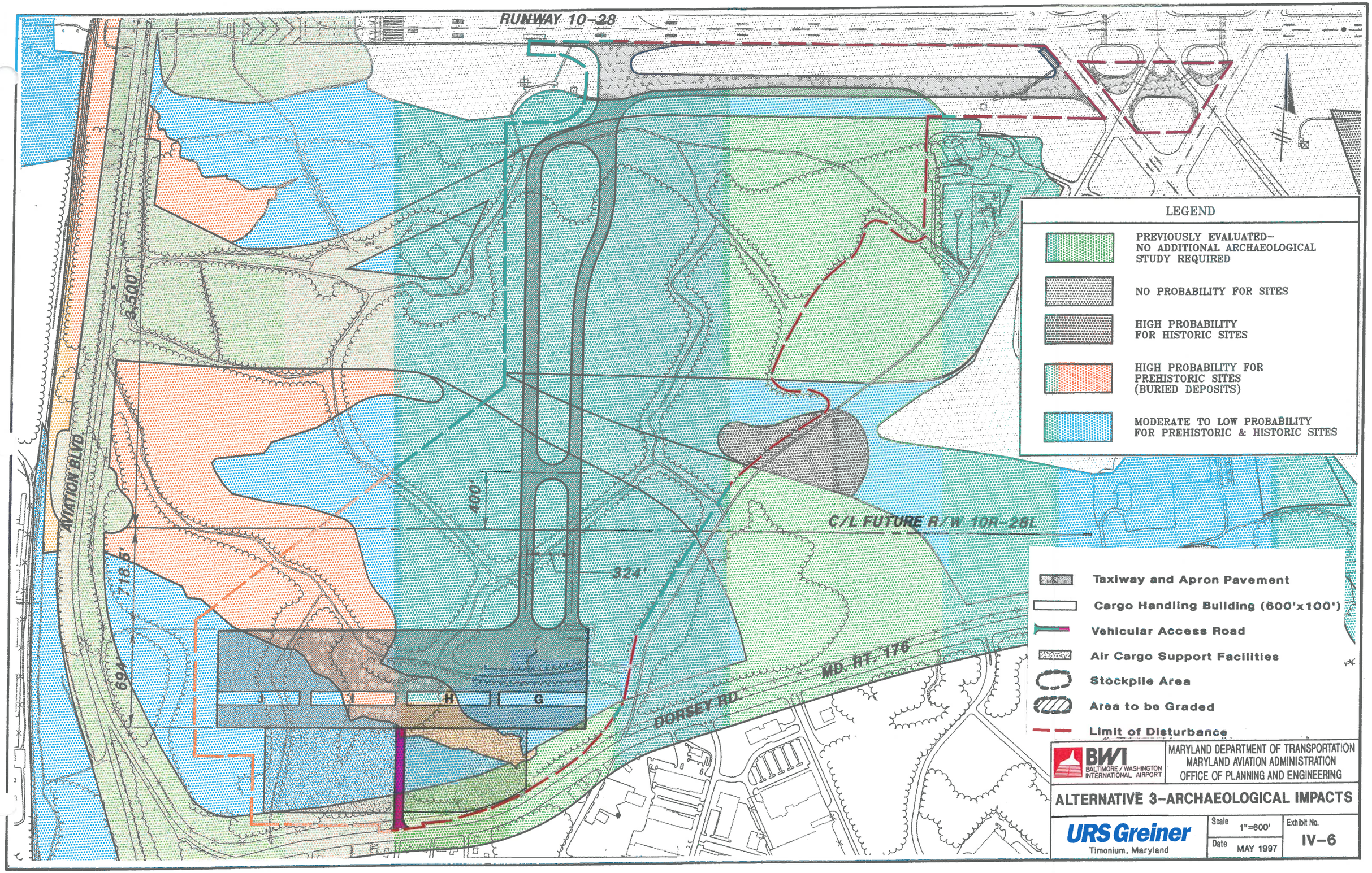
ALTERNATIVE 2–ARCHAEOLOGICAL IMPACTS

URS Greiner
Timonium, Maryland

Scale 1"=600'

Date MAY 1997

Exhibit No. IV–5



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ALTERNATIVE 3-ARCHAEOLOGICAL IMPACTS

URS Greiner
Timonium, Maryland

Scale 1"=600'
Date MAY 1997
Exhibit No. IV-6

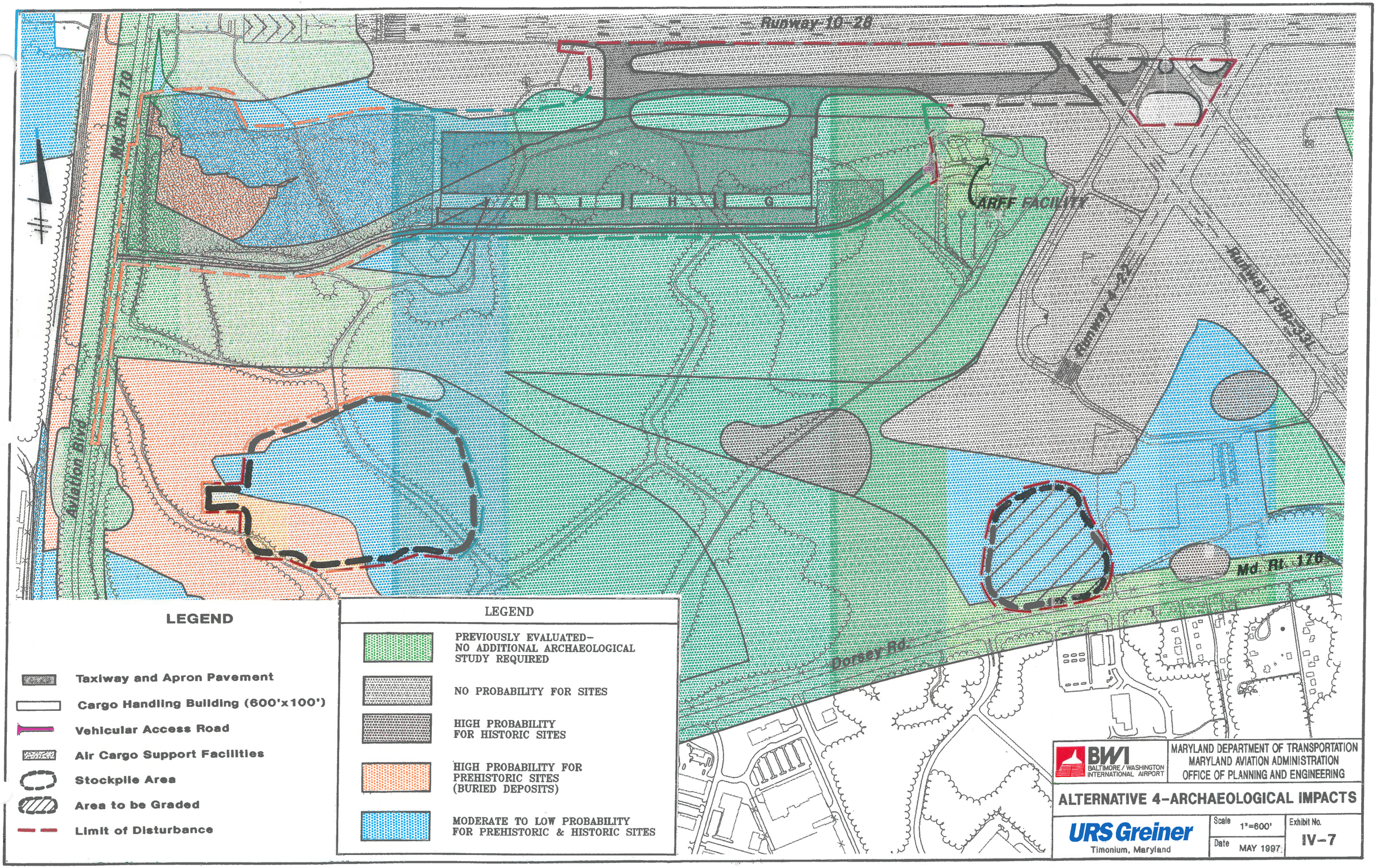
Alternative 4

As depicted on **Exhibit IV-7**, approximately 210 acres of the proposed air cargo development for Alternative 4 is comprised of areas which contain no archaeological potential, moderate to low potential, or previously surveyed areas requiring no further studies. The remaining 7.9± acres is in an area immediately east of Maryland Route 170 which has been identified as having a high probability for prehistoric sites. The proposed excess material stockpile areas are mostly in zones of medium to low archaeological potential, though approximately 10.7 acres of the primary stockpile area is in a zone with a high probability for prehistoric sites. Maryland Route 170 will also need to be widened to allow for a new center left-turn lane as with Alternative 1. Again, widening on the eastern side of the roadway would avoid the Harmans A Site.

Alternative 4R

Based on input received from the MHT on the original preferred alternative identified in the Draft EA (Alternative 4), and the subsequent design changes made to slightly reconfigure this alternative, a Phase I and Phase II archaeological survey was performed within the area of potential effect (APE) associated with the proposed Alternative 4R. Five archaeological sites were identified during this survey: 18AN362, 18AN1048, 18AN1049, 18AN1050, and 18AN1051. Site 18AN362 had been previously recorded during an earlier survey (see Brown, Herbert, and Klein 1995). The findings of this study determined that Sites 18AN362, 18AN1048, 18AN1049, and 18AN1050 are not eligible for listing in the National Register of Historic Places, given that these sites are all small lithic scatters restricted to plowzone contexts, and therefore do not have the potential to yield information important in prehistory (i.e., meeting National Register Criterion D). The FAA has received a letter from the MHT on June 9, 1997, which states that, as currently proposed, Alternative 4R will have no effect on these sensitive resources (see Appendix A).

The survey results also determined that site 18AN1051 is eligible for listing in the National Register. This site is a mid- to late 19th century farmstead that has the potential to provide information important in history, and therefore meets National Register Criterion D. The June 9, 1997 letter from MHT confirms this status for Site 18AN1051 and further states that the current stockpile configuration developed for Alternative 4R will have no effect on this site.



LEGEND

- Taxiway and Apron Pavement
- Cargo Handling Building (600'x100')
- Vehicular Access Road
- Air Cargo Support Facilities
- Stockpile Area
- Area to be Graded
- Limit of Disturbance

LEGEND

- PREVIOUSLY EVALUATED– NO ADDITIONAL ARCHAEOLOGICAL STUDY REQUIRED
- NO PROBABILITY FOR SITES
- HIGH PROBABILITY FOR HISTORIC SITES
- HIGH PROBABILITY FOR PREHISTORIC SITES (BURIED DEPOSITS)
- MODERATE TO LOW PROBABILITY FOR PREHISTORIC & HISTORIC SITES

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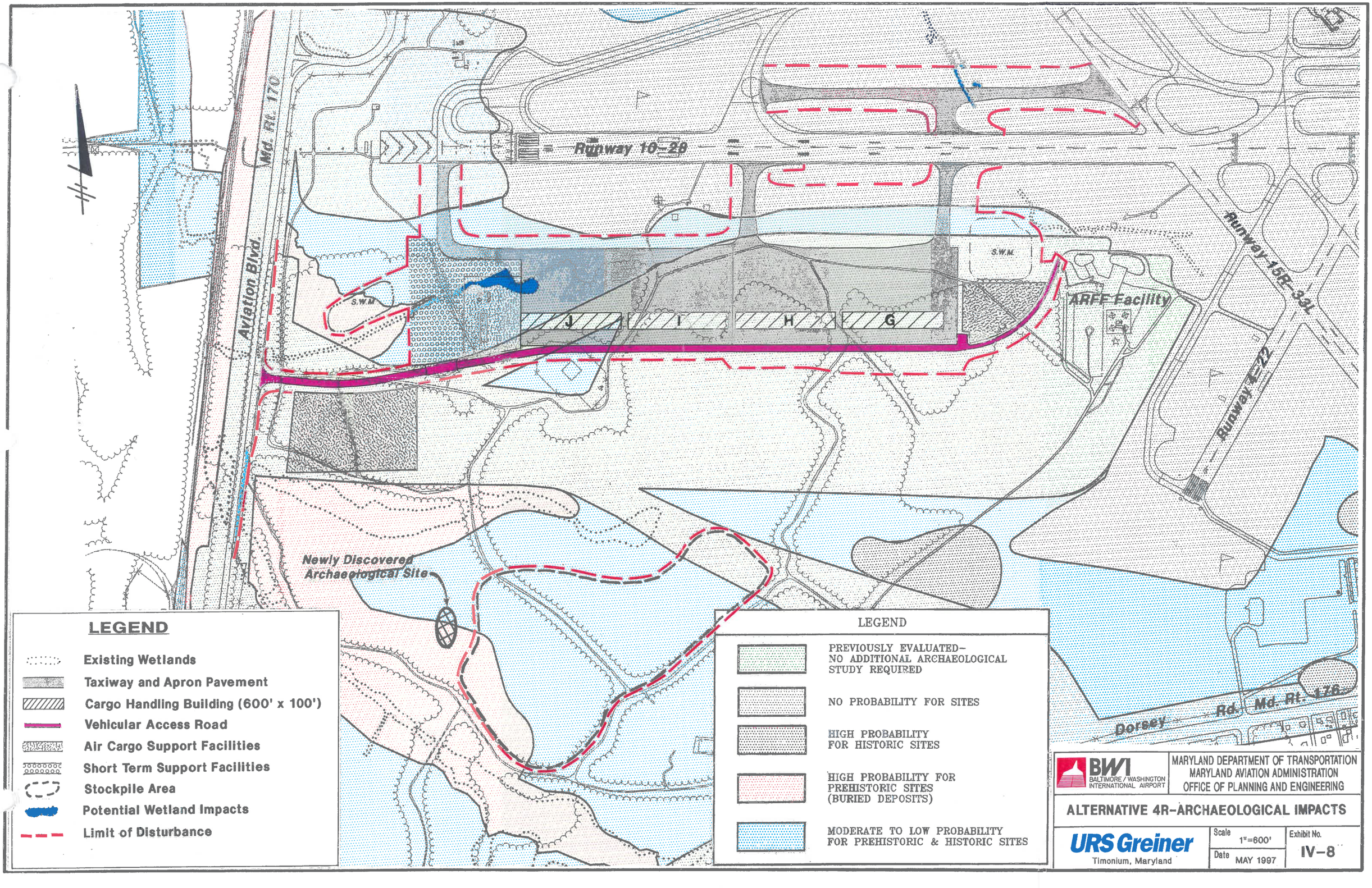
ALTERNATIVE 4–ARCHAEOLOGICAL IMPACTS

URS Greiner
Timonium, Maryland

Scale 1"=600'
Date MAY 1997

Exhibit No. IV–7



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ALTERNATIVE 4R-ARCHAEOLOGICAL IMPACTS

URS Greiner
Timonium, Maryland

Scale 1"=600'

Date MAY 1997

Exhibit No. IV-8

Development of Alternative 4R as planned will not affect Site 18AN1051. The spoil area in the vicinity of this site has been reconfigured to avoid the site, and a permanent fence will be placed around the boundaries of this site to protect the site during and after construction of the facilities (see **Exhibit IV-8**). There are no other National Register-listed or eligible archaeological or historic resources within the alternative's APE. Further, the National Register-eligible Site 18AN29A (the Harmans A Site) is located to the west of the project area and will not be affected by the proposed project.

The FAA is consulting with the MHT to obtain concurrence that the proposed project will have no effect on properties listed or eligible for listing in the National Register of Historic Places.

BIOTIC COMMUNITIES

No-Build Alternative

The No-Build Alternative will have no effect on existing biotic communities conditions.

Alternative 1

Expansion of the existing facilities for Alternative 1 would have no effect on terrestrial biotic communities. Construction of the additional midfield facility for this alternative would impact 81.0± acres of forest and 89.6± acres of mowed grassland, as shown on **Exhibit IV-9**. The main stockpile area would be 34.7± acres of the forest impact. The secondary stockpile area located west of the South Ramp area would be 12.5± acres of the mowed grassland impact. The secondary stockpile would also require the removal of 0.8± acres of trees that had been planted for reforestation credit, pursuant to the 1991 Forest Conservation Act, for other projects at BWI. If any reduction in the total disturbed area can be achieved during final design, the amount of wooded and grassed land disturbed by these borrow sites would be lessened.

RUNWAY 10-28

KITTEN BRANCH

CARFF FACILITY

RUNWAY 4-22

RUNWAY 15R-33L

AVIATION BLVD (MD RTE 170)

HAWKINS BRANCH

CLARK BRANCH

DORSEY RD. MD. RT. 170

LEGEND

- Taxiway and Apron Pavement
- Cargo Handling Building (600'x100')
- Vehicular Access Road
- Air Cargo Support Facilities
- Stockpile Area
- Area to be Graded
- Limit of Disturbance

- MOWED FIELDS
- FORESTS
- WETLANDS

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ALTERNATIVE 1-FORESTED IMPACTS

URS Greiner
Timonium, Maryland

Scale 1"=600'

Date MAY 1997

Exhibit No. IV-9

Alternative 2

Alternative 2 would impact 80.4± acres of forest and 79.6± acres of mowed grassland in the southeast quadrant. This alternative would also require the removal of 2.6± acres of trees that had been planted for reforestation credit, in accordance with the 1991 Forest Conservation Act, for other projects at BWI. **Exhibit IV-10** depicts the impacts of Alternative 2 on biotic communities.

Alternative 3

Alternative 3 would impact 246.5± acres of forest and 79.6± acres of mowed grassland. The forested impacts are the highest of any Build alternative, which is mostly due to the clearing required for both the long access taxiway (on extensive fill) and the tower visibility maintenance. **Exhibit IV-11** illustrates the biotic community impacts.

Alternative 4

The midfield cargo development alternative would impact 90± acres of forest and 135± acres of mowed grassland (see **Exhibit IV-12**). Approximately 26 acres of the forest impacts would occur as a result of stockpiling most of the 1.8 million cubic yards of excess material generated by the necessary earthwork to construct this alternative. The remainder of the excess material (100,000 cubic yards) would be placed in an area located west of the South Ramp area and would result in 12.5± acres of the mowed grassland impact. This material will be placed and compacted to meet FAA Runway Safety Area requirements. These locations were selected to minimize impacts to floodplains, wetlands, trees, and Federal Aviation Regulations (FAR) Part 77 obstruction clearance requirements associated with the safe operation of the Airport. If any reduction in the total disturbed area can be achieved during final design, the amount of wooded and grassed land disturbed by these stockpile sites would be lessened. The stockpiles themselves will also be graded and seeded to minimize erosion.

MOWED FIELDS
FORESTS
WETLANDS

1,000' VORTAC Critical Area
Taxiway and Apron Pavement
Cargo Handling Building (600'x100')
Vehicular Access Road
Air Cargo Support Facilities
Limit of Disturbance

N

RUNWAY 10–28

RUNWAY 4–22

RUNWAY 15R–33L

AVIATION BLVD.

MD. RT. 162

MD. RT. 176

KITTEN BRANCH

PHELPS BRANCH

PORK BRANCH

DORSEY RD.

H

G

J

A

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ALTERNATIVE 2–FORESTED IMPACTS

URS Greiner
Timonium, Maryland

Scale 1"=600'
Date MAY 1997

Exhibit No. IV–10

RUNWAY 10–28

KITTEN BRANCH

SIGNAL BRANCH

AVIATION BLVD (MD RTE. 170)

2,500'

HAWKINS BRANCH

RUNWAY 4–22

RUNWAY 15R–33L

400'

C/L FUTURE R/W 10R–28L

718.5'

694'

CLARK BRANCH

324'

J

H

G

DORSEY RD.

MD. RT. 176

Taxiway and Apron Pavement

Cargo Handling Building (600'x100')

Vehicular Access Road

Air Cargo Support Facilities

Stockpile Area

Area to be Graded

Limit of Disturbance

MOWED FIELDS

FORESTS

WETLANDS

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ALTERNATIVE 3-FORESTED IMPACTS

URS Greiner
Timonium, Maryland

Scale 1"=600'

Date MAY 1997

Exhibit No. IV–11

RUNWAY 10–28

KITTEN BRANCH

SIGNAL BRANCH

AVIATION BLVD (MD RTE. 170)

J I H G

ARFF FACILITY

RUNWAY 4–22

HAWKINS

CLARK BRANCH

MD. RT. 176

DORSEY RD.

LEGEND

- Taxiway and Apron Pavement
- Cargo Handling Building (600'x100')
- Vehicular Access Road
- Air Cargo Support Facilities
- Stockpile Area
- Area to be Graded
- Limit of Disturbance

- MOWED FIELDS
- FORESTS
- WETLANDS

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ALTERNATIVE 4–FORESTED IMPACTS

URS Greiner
Timonium, Maryland

Scale 1"=600'
Date MAY 1997

Exhibit No. IV–12

Alternative 4R

Alternative 4R would impact 105 acres of forest and 115 acres of mowed grassland (see **Exhibit IV-13**). Approximately 48 acres of these impacts result from the proposed stockpiling of 2.4 million cubic yards of excess material generated by the earthwork to construct this alternative. Upon completion of construction, the stockpile area will be seeded and established as grassland in the interim, pending the material usage for other Airport projects.

Potential Mitigation Measures

Following construction, the stockpile sites would be graded and seeded. If a Build alternative is selected, and once the final location of the new air cargo complex has been determined, the impacts will be coordinated with the Maryland Department of Natural Resources (DNR) for compliance with the 1991 Forest Conservation Act (FCA). The Master Reforestation Plan currently being prepared will outline the required replanting and preservation techniques for each project that occurs on BWI. An individual Forest Conservation Plan that presents the impacts and required reforestation has been prepared for the final selected alternative and is under DNR review. The MAA has sufficient reforestation credit at the present time to compensate for the impacts associated with a new air cargo complex and comply with the FCA, regardless of which Build alternative is selected.

ENDANGERED AND THREATENED SPECIES OF FLORA AND FAUNA

No-Build Alternative

There would be no known impact to rare, threatened, or endangered (RTE) species resulting from this alternative. No RTE species are known to occur on any existing or planned developed areas on Airport property.

Alternative 1

Construction of Alternative 1 would have no impact to RTE species of flora or fauna. The portion of Signal Branch that would be graded for the new midfield portion (Buildings I and

Runway 10–28

Md. Rt. 170

Aviation Blvd.

S.W.M.

SIGNAL SERVICE

J

I

H

G

S.W.M.

KITTEN BRANCH

ARFF Facility

Runway 15R–33L

Runway 4–22

HAWKINS BRANCH

Newly Discovered Archaeological Site

Dorsey Rd. Md. Rt. 176

LEGEND

- Existing Wetlands
- Taxiway and Apron Pavement
- Cargo Handling Building (600' x 100')
- Vehicular Access Road
- Air Cargo Support Facilities
- Short Term Support Facilities
- Stockpile Area
- Potential Wetland Impacts
- Limit of Disturbance

MOWED FIELDS

FORESTS

WETLANDS

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ALTERNATIVE 4R-FORESTED IMPACTS

URS Greiner
Timonium, Maryland

Scale 1"=600'

Date MAY 1997

Exhibit No. IV–13

J) is currently a stream channel that would be piped under that portion of the complex. Stormwater management would control the runoff flowing into Stony Run. The Swamp Pink (*Helonias bullata*) is located off of Airport property in the floodplain of Stony Run and would not be impacted.

Alternative 2

Alternative 2 would have no known effect on RTE species.

Alternative 3

The development of the Air Cargo Facility in the southwestern quadrant of the Airport in the Clark Branch and Hawkins Branch Watersheds would have no known effect on RTE species. The only known Federally threatened species in the vicinity of this alternative is the swamp pink in the Stony Run Watershed which is located downstream of the convergence of Clark Branch and Stony Run, off Airport property. Possible downstream construction impacts to the swamp pink habitat, such as silt load and peak flows, would be minimized. As stated previously, Clark Branch and Hawkins Branch do not provide groundwater recharge to Stony Run. Installation of proper sedimentation control devices and stormwater management facilities should ensure minimal effect on the habitat of the Swamp Pink.

Alternatives 4 and 4R

There are no known RTE species on any existing or planned developed areas on Airport property. Therefore, the location of the Air Cargo Facility in the southwestern quadrant of the Airport in the Signal Branch and Kitten Branch Watersheds would have no known effect on existing RTE conditions on Airport property. The only known Federally threatened species in the vicinity of this alternative is the Swamp Pink in the Stony Run Watershed located downstream of the convergence of Signal Branch and Stony Run, off Airport property. Downstream construction impacts to the Swamp Pink habitat, such as silt load and peak flows, would be minimized. As stated previously, Signal Branch does not provide groundwater recharge to Stony Run. Installation of proper sedimentation control devices and stormwater management facilities should ensure minimal effect on the habitat of the swamp pink.

WETLANDS

No-Build Alternative

The No-Build Alternative will have no effect on existing wetlands.

Alternative 1

Expansion of the existing facility would have no impact on wetlands (see **Exhibit IV-14**). The 970± linear feet of Signal Branch west of the new midfield location of the cargo complex that would be graded is designated as a riverine system ("waters of the U.S.") and will be routed under or around the proposed facility to maintain the flow to Stony Run. As a result, the wetland portion of the Signal Branch tributary will not be affected. Approximately 860 linear feet of impact to Kitten Branch will be incurred by the proposed parallel taxiway. Additional minor impacts to Signal, Clark, and Hawkins Branches will result from the MD 170 widening and access road construction. Stream impacts are summarized in **Table IV-9**.

The stockpile areas would not be located in any wetlands or 25-foot buffers. The main stockpile area would be located between the Hawkins Branch and Clark Branch systems.

Alternative 2

Alternative 2 would not impact any wetlands or 25-foot buffers on Airport property.

Alternative 3

The construction of the cargo complex and support facilities in Alternative 3 would impact 15.0± acres of wetlands and 3.8± acres of buffer in the Clark Branch wetland system. This alternative would also impact 1.6± acres of wetlands and 0.6± acres of buffer in the Hawkins Branch wetland system (see **Exhibit IV-15**) with fill needed to raise the elevation of the connector taxiway. Approximately 860 linear feet of Kitten Branch stream channel would be affected by the parallel taxiway.

RUNWAY 10-28

MD. RT. 170

AVIATION BLVD.

ARFF FACILITY

RUNWAY 15R-33L

RUNWAY 4-22

DORSEY RD.

MD. RT. 176

LEGEND

- Existing Wetlands
- Taxiway and Apron Pavement
- Cargo Handling Building (600' x 100')
- Vehicular Access Road
- Air Cargo Support Facilities
- Stockpile Area
- Area to be Graded
- Limit of Disturbance
- Potential Wetland Impacts

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ALTERNATIVE 1-WETLAND IMPACTS

URS Greiner
Timonium, Maryland

Scale 1"=600'

Date MAY 1997

Exhibit No. IV-14

TABLE IV-9

SUMMARY OF ANTICIPATED STREAM IMPACTS

Alternative	Watershed	Stream Impact (Linear Feet)
1	Kitten Branch	860
	Signal Branch	970
	Hawkins Branch	40
3	Kitten Branch	860
	Clark Branch	1,830
4	Kitten Branch	860
	Signal Branch	1,660
	Hawkins Branch	40
4R	Hawkins Branch	25
	Clark Branch	20
	Signal Branch	617
	Kitten Branch	667

RUNWAY 10–28

MD. RT. 170

3,500'

AVIATION BLVD.

718.5'

694'

400'

324'

ARFF FACILITY

RUNWAY 4–22

RUNWAY 15R–33L

C/L FUTURE R/W 10R–28L

DORSEY RD.

MD. RT. 176

J

H

G

LEGEND

- Existing Wetlands
- Taxiway and Apron Pavement
- Cargo Handling Building (600' x 100')
- Vehicular Access Road
- Air Cargo Support Facilities
- Limit of Disturbance
- Potential Wetland Impacts

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ALTERNATIVE 3–WETLAND IMPACTS

URS Greiner
Timonium, Maryland

Scale 1"=600'

Date MAY 1997

Exhibit No. IV–15

Alternative 4

This alternative would impact 1.6± acres of wetlands and 0.6± acres of buffer in the Signal Branch wetland system, which is the entire extent of this tributary on BWI property (see **Exhibit IV-16**). Additional minor impacts to Hawkins Branch will be incurred by the MD 170 widening, and the parallel taxiway will create stream channel and minor wetland impacts within Kitten Branch. As a result, final grading plans for this alternative will need to re-channel surface storm flows in this area to other appropriate outfall locations.

Alternative 4R

Road construction for Alternative 4R would result in impacts to approximately 0.2 acres of wetlands and 45 linear feet of the stream within the Hawkins Branch and Clark Branch wetland systems. Impacts to 0.9 acres of wetlands at the headwaters of Signal Branch and 570 linear feet of stream channel will result from the construction of the proposed fuel farm and support facilities. The proposed taxiway, between Runway 10-28 and Runway 15R-33L, will impact 0.04 acres of wetlands and 620 linear feet of channel within the Kitten Branch wetland system. An additional 47 linear feet of stream will be impacted by each of the stormwater management pond outfalls within Signal Branch and Kitten Branch wetland systems (see **Exhibit IV-17**).

Permits Required

Pursuant to Section 404 of the Clean Water Act and the Maryland Nontidal Wetlands Protection Act, a Joint Federal/State Permit Application for the Alteration of any Floodplain, Waterway, Tidal or Nontidal Wetland in Maryland has been obtained from the U.S. Army Corps of Engineers and the MDE for any impacts to wetlands, 25-foot buffers, or other "waters of the U.S." (see **Appendix A**). On July 1, 1996, the Baltimore District of the U.S. Army Corps of Engineers issued a State Programmatic General Permit (MD SPGP) for activities in coastal and inland waters and wetlands within the State of Maryland. The MD SPGP authorizes the MDE to operate the State regulatory program that protects the aquatic environment, provided that the activities result in no more than minimal adverse impacts on the environment.

RUNWAY 10-28

MD. RT. 170

AVIATION BLVD.

J

I

H

G

ARFF FACILITY

RUNWAY 4-22

RUNWAY 15R-33

DORSEY RD.

MD. RT. 176

LEGEND

- Existing Wetlands
- Taxiway and Apron Pavement
- Cargo Handling Building (600' x 100')
- Vehicular Access Road
- Air Cargo Support Facilities
- Stockpile Area
- Area to be Graded
- Limit of Disturbance
- Potential Wetland Impacts

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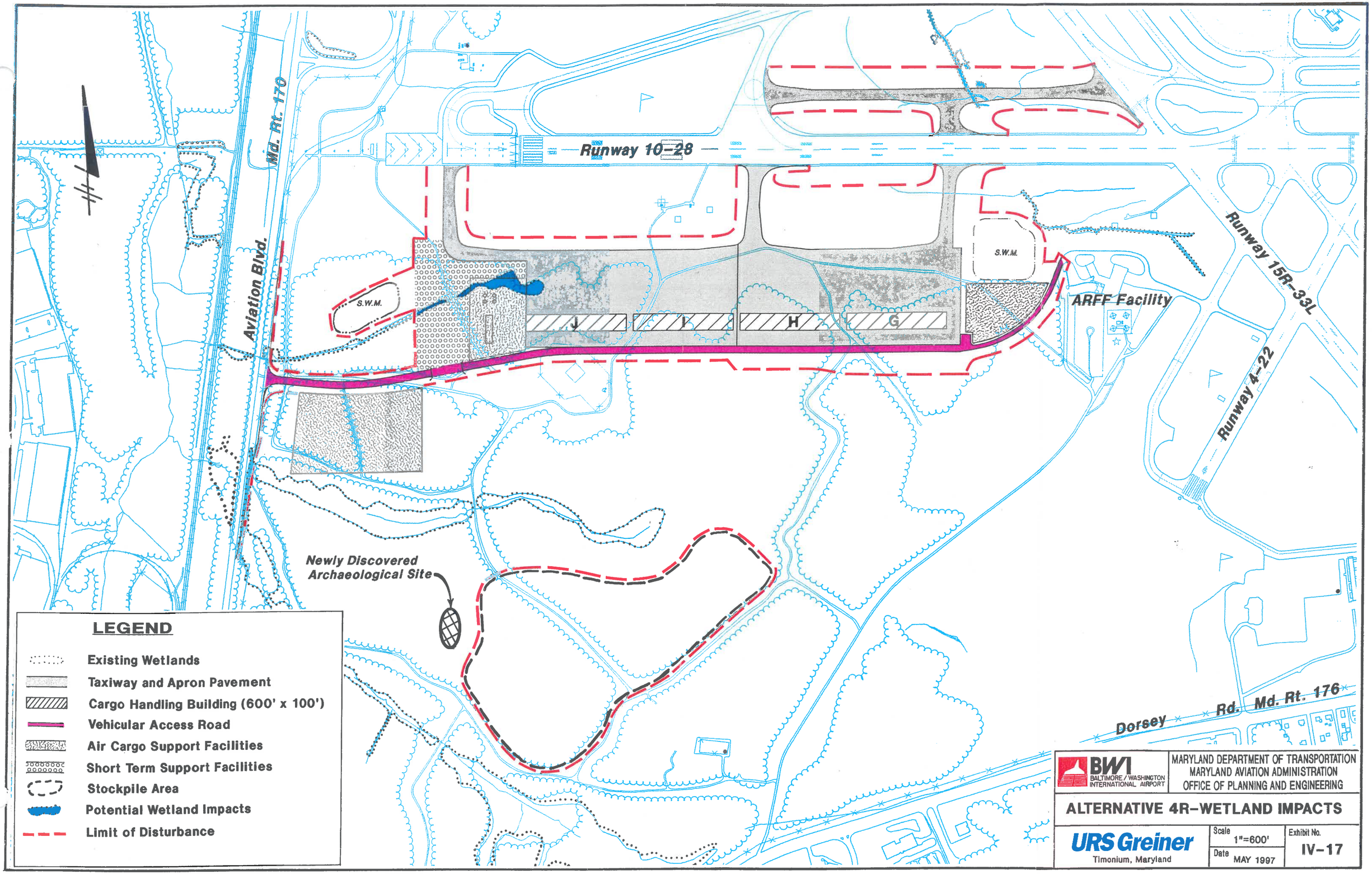
ALTERNATIVE 4-WETLAND IMPACTS

URS Greiner
Timonium, Maryland

Scale 1"=600'

Date MAY 1997

Exhibit No. IV-16



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ALTERNATIVE 4R–WETLAND IMPACTS

URS Greiner
Timonium, Maryland

Scale 1"=600'

Date MAY 1997

Exhibit No. IV–17

Potential Mitigation Measures

A wetland mitigation feasibility study was conducted on MAA-owned property west of the Airport. Selection of this site(s) will involve MAA coordinating with the appropriate agencies to identify and consider any potential site(s). The ultimate determination of mitigation required for impacts will be made by the Corps and MDE. Coordination with the MDE and the Corps determined that there is sufficient acreage, within the proposed wetland mitigation sites presented in the Feasibility Study, to meet the anticipated wetland mitigation acreage required. The Signal, Hawkins, and Clark Branch wetland jurisdictional limits were verified by the Corps on June 11, 1996. **Table IV-10** outlines the impacts by wetland location, the Cowardin classification, and the anticipated mitigation required for each of the three build alternatives.

In general, stormwater management techniques are expected to minimize any indirect impacts to downstream wetlands from the activities at BWI. Potential wetland mitigation sites will need to be located off Airport property. Off-site mitigation is preferred due to the conflict between waterfowl habitat and tree obstructions and aircraft operations. The newly created wetlands will be of the same type and potential functional value as those that are impacted by the selected alternative.

For wetland mitigation to occur, an appropriate site(s) must first be selected. Selection of this site(s) will involve MAA coordinating with the appropriate agencies to identify and consider any potential site(s). Pursuant to recent FAA guidance, potential wetland mitigation sites will need to be located off Airport property due to the potential incompatibility of waterfowl habitat and tree obstructions with aircraft operations. The goal of developing these replacement wetlands will be the establishment of the same type and potential functional value as those that are impacted by the proposed development.

Development of the wetland mitigation site(s) will include the development of a general maintenance and monitoring program to ensure establishment and the survival of the newly created wetland(s). This program will be coordinated with the appropriate agencies.

TABLE IV-10

SUMMARY OF ANTICIPATED WETLAND IMPACTS AND MITIGATION REQUIRED

Alternative Affected	Wetland Classification	Wetland Impact (acres)	25-Foot Buffer Impact (acres)	Mitigation Ratio	Anticipated Mitigation (acres)
Alternative 1					
Hawkins Branch	PFO/SS PEM	0.20		2:1 1:1	0.40
Alternative 3					
Clark Branch	PFO	15.0	3.8	2:1	
Hawkins Branch	PFO	1.6	0.6	2:1	3.2
Alternative 4					
Signal Branch	PFO	1.6	0.2	2:1	3.2
Hawkins Branch	PFO/SS PEM			2:1 1:1	
Alternative 4-R					
Hawkins Branch	PFO/SS PEM	0.11 0.02		2:1 1:1	0.22 0.02
Clark Branch	PFO/SS PEM	0.04 0.02		2:1 1:1	0.07 0.02
Signal Branch	PFO	0.93		2:1	1.86
Kitten Branch	PEM	0.04		1:1	0.04

Wetland Classifications

PFO - Palustrine Forested
PSS - Palustrine Scrub/Shrub
PEM - Palustrine Emergent

FLOODPLAINS

No-Build Alternative

The No-Build Alternative would have no effect on floodplains located on Airport property.

Alternative 1

Peak flows from the expansion of the existing cargo complex will need to be managed as a routine design element through preparation of SWM plans to be reviewed and approved by Anne Arundel County. Peak flows will also be managed for the midfield portion of the cargo facility. Therefore, the FEMA floodplain for Kitten Branch in this area would not be altered by project construction.

The midfield portion of this option involves the location of the stockpiles. The main stockpile would be located outside of the Clark and Hawkins Branch floodplains. Since there would be no changes to the stream channel cross-sections or to the peak flow, the floodplain water surface elevation would not be affected by creation of these stockpiles.

Alternative 2

This alternative would have no impact to the adjacent floodplain (Phelps Branch).

Alternative 3

This alternative would require the implementation of floodplain management techniques to protect the adjacent MD 170 portion of Aviation Boulevard from flooding. Such techniques may involve:

- Construction of a levee along MD 170;

- Installation of reliever pipes under MD 170 at a location other than the existing stream crossing;

- Increasing the capacity of the existing culvert crossings by improving the pipe entrance, headwall, etc.; or

- Replacing the existing culverts with a higher capacity storm drain system.

Each of these potential techniques would require an approval by the County before including it on the SWM plans.

Alternative 4

Peak flows would be managed within the project area, thereby not affecting the FEMA floodplain boundary for Kitten Branch. The main stockpile would be located outside of the Clark and Hawkins Branch floodplains. Since Signal Branch would be filled and the associated floodplain paved or graded, floodplain management techniques would be implemented to control stormflow into Stony Run.

Alternative 4R

Similar to Alternative 4, peak flows would be managed within the project area. Therefore, construction of this alternative would not affect the floodplains located off Airport property.

ENERGY SUPPLY AND NATURAL RESOURCES

Energy requirements associated with projects involving the expansion of airfield and landside facilities normally fall into two categories: those relating to increased consumption from stationary facilities (i.e., additional buildings requiring heating, cooling and other energy consuming systems); and those involving substantial increases in aircraft and ground vehicle movement and their related fuel consumption.

Increases in energy consumption directly and indirectly caused by the proposed expansion of air cargo facilities at BWI will not result in significant impacts to the energy supply or to natural resources because of the following:

- The Baltimore Gas and Electric Company (BGE) has demonstrated sufficient capacity to provide for increased consumption of electric power associated with the proposed addition of air cargo facilities and lighting of airfield facilities that will provide airside access to the cargo complex.

- The proposed project will not involve the use of any unusual natural resources, or those that are in short supply.

Finally, a review of the Airport's master utility plan as well as the utilities that exist adjacent to BWI property revealed that the proposed action will not cause interference with any existing or planned circuits/facilities.

Aviation lighting required for the purposes of security, obstruction lighting, and navigation are the primary sources of light emissions radiating from airports. Analyses are typically conducted when projects include the introduction of new airport lighting facilities that affect residential or other sensitive land uses.

The proposed action under this EA will result in the increase of light emissions from the Airport. However, none of these light sources are expected to significantly increase light emissions to residential areas. Shielding and screening techniques will be considered in the construction of the additional air cargo buildings/apron as well as all associated support facilities to minimize any potential impacts on residential areas.

SOLID WASTE

No-Build Alternative

The No-Build Alternative would have no effect on the amount of solid waste produced on the Airport property.

Build Alternatives

The primary sources of solid waste produced by the construction of the cargo complex and related facilities will be trees and excavated earth. However, Alternative 1 will also generate debris from the demolition of existing buildings that will have to be disposed of off site. The closest operating landfill capable of handling solid wastes generated by the construction of any of the four Build alternatives is the Annapolis Sanitary Landfill which is approximately 12 miles from BWI. It is anticipated that the Contractor clearing the cargo complex site will be required by MAA to reuse or sell as much of the timber on the site as possible. This process has been used successfully on other MAA projects.

In addition to the increased generation of solid waste from construction, it is likely that the development of the air cargo complex will cause an increase in activity of the Airport, and would likely attract new users to the facility. This increased activity will also likely result in an increase in the generation of solid waste at BWI.

Alternative 1

The generation of solid waste by the construction of the Alternative 1 air cargo complex will occur from two major sources. The first source will be the material generated by the demolition of several existing buildings in the existing air cargo complex. According to the previously referenced Air Cargo Complex Evaluation, this alternative would involve the demolition of approximately 3.8 million cubic feet of building area. The solid waste debris generated from this demolition would be hauled to an off-site location such as the Annapolis Sanitary Landfill (approximately 12 miles from the Airport). In addition, an area approximately

30 acres in size which currently is forested would also require clearing under Alternative 1. The removed trees would also require off-site hauling to the landfill.

In addition, approximately 1.8 million cubic yards of waste material will be generated by constructing the midfield cargo facilities. This material would not require off-site hauling, but would be stockpiled on-site for future use/sale.

Alternative 2

The second alternative would not require the demolition of any existing structures, but would require the clearing of approximately 55 acres of land, most of which is currently covered by trees. The removed trees would require off-site hauling to a landfill.

Alternative 3

Alternative 3 also would not require the demolition of any existing structures as under the first alternative, but would require the clearing of approximately 200 acres of land, most of which is currently wooded. The removed trees would require off-site hauling to a landfill.

Alternative 4

Alternative 4 would not require the demolition of any existing structures, but would require the clearing of approximately 225 acres of land, including 40 acres of stockpile area. The removed trees would require off-site hauling to a landfill. In addition to the required disposal of trees, the development of the Alternative 4 air cargo complex would generate approximately 1.8 million cubic yards of excess fill material. However, this material would not require off-site hauling, but would be stockpiled on-site.

Alternative 4R

Solid waste impacts for this alternative are exactly the same from a technical perspective as Alternative 4 above, with the only changes being the clearing of 220 acres of land

including 55 acres of stockpile area and generation of approximately 2.4 million cubic yards of excess fill material.

CONSTRUCTION IMPACTS

No-Build Alternative

This alternative will not involve any new construction; therefore, no impacts will occur.

Build Alternatives

The demolition of existing buildings and certain organic material is involved in the various build alternatives. Mitigation will be addressed by incorporating the provisions of Advisory Circular 150/5370, Change 10 "Standards for Specifying Construction of Airports, Item P-156 Temporary Air and Water Pollution, Soil, Erosion, and Siltation Control," in the project specifications.

All affected utilities will be shut off prior to demolition, with normal short-term demolition effects of noise, dust, and traffic to be controlled by construction contract specifications. In addition, all required permits and variances will be obtained prior to and construction demolition activities.

Construction phasing documents will be developed for the construction of airfield facilities such as taxiways and taxilanes. These will include contractor requirements for working in existing safety areas, and for any necessary closure of existing airfield facilities during construction. These closures would likely be performed during the night or weekends.

During construction, traffic patterns will likely be impacted slightly by the periodic arrival/departure of construction equipment associated the development of the air cargo complex. The arrivals/departures as well as any necessary closures of public roads will occur during off-peak traffic times.

Alternative 1

This alternative includes construction in two separate locations, and would involve different construction impacts to each area. The first location is within the existing cargo area in the area northeast of the Passenger Terminal. Because Alternative 1 would involve the construction of two additional cargo buildings in this area, several existing facilities would require temporary or permanent relocation. These include: cargo handling facilities; a ground support equipment (GSE) maintenance building; an airline commissary building; an aircraft hangar; and several MAA airfield maintenance buildings.

The impact to the existing cargo complex, ground support equipment maintenance, airline commissary, and aircraft hangar will be significant. All of these services will have to temporarily be relocated, cargo ramp areas will have to be reconfigured to allow a variety of aircraft and give proper access for ground crew, and temporary storage will also have to be provided for the buildings being razed.

Construction of the balance of the Alternative 1 facilities (i.e., construction of two cargo buildings, cargo support facilities, parallel taxiway and connector taxiways, and vehicle access road) would take place south of existing Runway 10-28. Impacts to this area would include: the removal of approximately 30 acres of trees; temporary closure of Runways 10-28 and 15R-33L while newly constructed taxiways are being tied into the existing runways; and temporary closure of traffic lanes on Aviation Boulevard. The latter closures would occur during certain specified times to minimize the operational impacts to Airport and traffic operations. Additional traffic impacts would likely occur because of waste material generated by the development of this alternative. As included in the previous subsection, debris from nearly 4 million cubic feet of building area as well as tree removal will require hauling to a landfill that is 12 miles from the Airport. Trips generated by these hauls would likely affect local traffic flow.

Alternative 2

This alternative would locate the new cargo complex in the southeast quadrant of the Airport south of Runway 28. This location is currently wooded and has no existing structures

or facilities that would be impacted. Construction of the Alternative 2 complex would involve approximately 55 acres of tree removal, which is the least of any of the build alternatives. However, this option would require an estimated 2 million cubic yards of fill material to construct because of the existing topography. This material would likely be obtained from off-site locations, which would significantly increase the traffic around the Airport as trucks delivering the fill material would continually be arriving/departing the site for a substantial period of time.

Additional construction impacts include temporary closure of the parallel taxiway serving Runways 10-28 and 15R-33L during the construction of the access taxiways to the cargo complex. Also, temporary closure of one northbound lane of Aviation Boulevard (Maryland Route 162) will be required during construction of the vehicle access road under this alternative.

Alternative 3

Alternative 3 would locate the air cargo complex in the southwest quadrant of the Airport nearly one mile from existing Runway 10-28. Because of the distance from this site to the two main runways requiring the construction of long connecting taxiways, this alternative has the largest limit of disturbance. Approximately 200 acres of clearing and grubbing will be required. An estimated quantity of 2.35 million cubic yards of fill will be needed which can be obtained on-site. This material would be available because of the required tree removal and excavation necessary (northeast of the Alternative 3 complex) to obtain a clear line-of-sight from the Airport Traffic Control Tower.

Other impacts include temporary closure of Runways 10-28 and 15R-33L and portions of the parallel taxiways serving Runways 15R-33L and 4-22 during construction of the connecting taxiways. In addition, a westbound lane on Dorsey Road will have to be closed during construction of the vehicle access road for the Alternative 3 air cargo complex.

Alternative 4

This alternative is similar to Alternative 1, but would involve construction of four cargo buildings in the Airport's midfield area (twice as many as Alternative 1), and would not

involve the demolition/relocation of any existing facilities. Development of this alternative would require removal of approximately 90 acres of trees. Unlike the previous two alternatives, Alternative 4 would not require any fill material for construction, but would generate approximately 1.8 million cubic yards of waste which would be stockpiled. This excess material could be used for other future construction projects associated with BWI, or could be sold for off-site use.

During construction of the taxiways connecting the Alternative 4 complex to the existing airfield facilities, temporary closure of Runways 10-28 and 15R-33L as well as portions of the parallel taxiways serving Runways 15R-33L and 4-22 will be required. Public road impacts for this alternative will include the temporary closure of a northbound lane of the Maryland 170 portion of Aviation Boulevard during construction of the access road to the new complex.

Alternative 4R

Alternative 4R is similar to Alternative 4 except that it will require the removal of 105 acres of trees. Development of the site would generate approximately 2.4 million cubic yards of waste which would be stockpiled on-site.

During construction of the taxiways, temporary closures would occur on Runways 10-28 and 15R-33L as well as Taxiway G. Public road impacts are the same as for Alternative 4.

CUMULATIVE IMPACTS

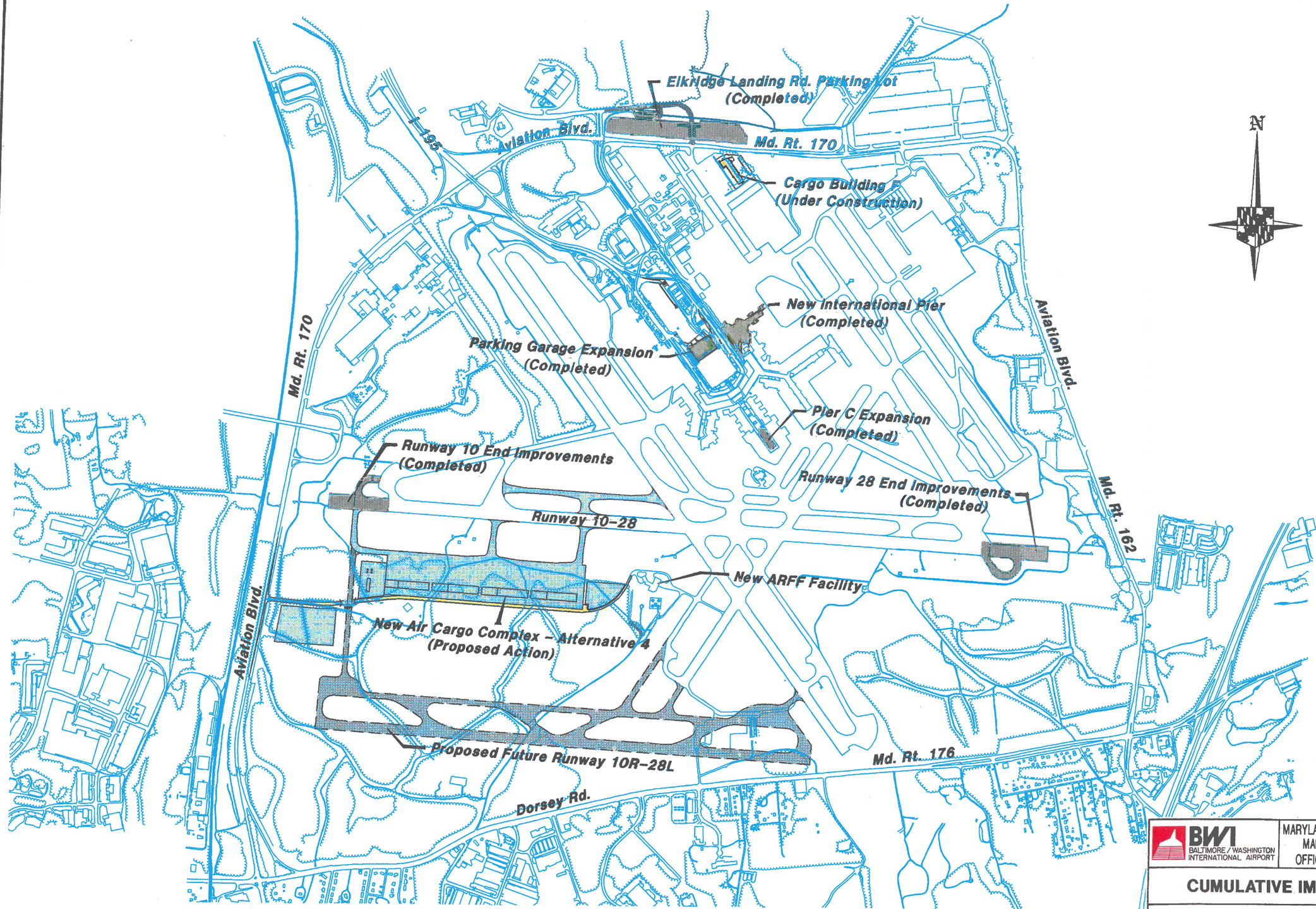
Paragraph 24c. of FAA Order 5050.4A "**Airport Environmental Handbook**," and the Maryland Environmental Protection Act stipulate that when preparing an EA for a proposed airport project, the impact analysis should consider the potential cumulative effect of the proposed action and all other reasonably related actions in terms of time, geography, and probability. This form of consideration is necessary to account for actions which may be individually limited in their extent of environmental impact but cumulatively significant. Such

assessments should involve looking at all present, recent past, and reasonably foreseeable actions.

At this point in time, the proposed expansion of air cargo facilities discussed in this EA constitutes the largest planned development that could occur on previously undisturbed land at BWI. While development of new facilities and restoration or enhancement of existing Airport infrastructure is an ongoing process, most of these actions have and are occurring in previously developed or disturbed areas of the BWI property. Such projects include the extension of Runway 10-28 and the new International Terminal and associated taxiways. Other recent or ongoing projects include the Elkridge Landing Road parking lot and the new ARFF complex currently under construction east of the recommended midfield cargo area. The environmental impacts associated with these projects were subjected to detailed environmental review, and appropriate mitigation measures to comply with agency requirements have been completed.

Other foreseeable projects include the new proposed Airport Traffic Control Tower (ATCT), the location of which is currently being studied. As a result, the specific impacts for this project are unknown at this time, but will be mitigated as appropriate. Also, the current Airport Layout Plan (ALP) identifies a proposed new runway on the south side of the Airport, designated as Runway 10R-28L. As indicated in the current Master Plan Update and the ALP, this new runway is planned to be located 3,500 feet south of existing Runway 10-28 and would be approximately 7,800 feet in length. The final runway separation and corresponding length have not been determined; therefore, for purposes of this cumulative analysis, the ALP configuration was used (see **Exhibit IV-18**).

Though related to the air cargo options in its geography, this runway project is not presently "ripe for decision." At the appropriate time, the runway project would be the subject of its own environmental document. However, for purposes of this EA, discussions of the anticipated cumulative impacts occurring from construction of the new midfield cargo facilities and new parallel Runway 10R-28L are presented below.



Note: Alternative 4 air cargo complex configuration provided for reference purposes in assessing potential cumulative impacts.

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CUMULATIVE IMPACT SCENARIO

URS Greiner
Timonium, Maryland

Scale 1"=1000'

Date MAY 1997

Exhibit No. IV-18

Noise

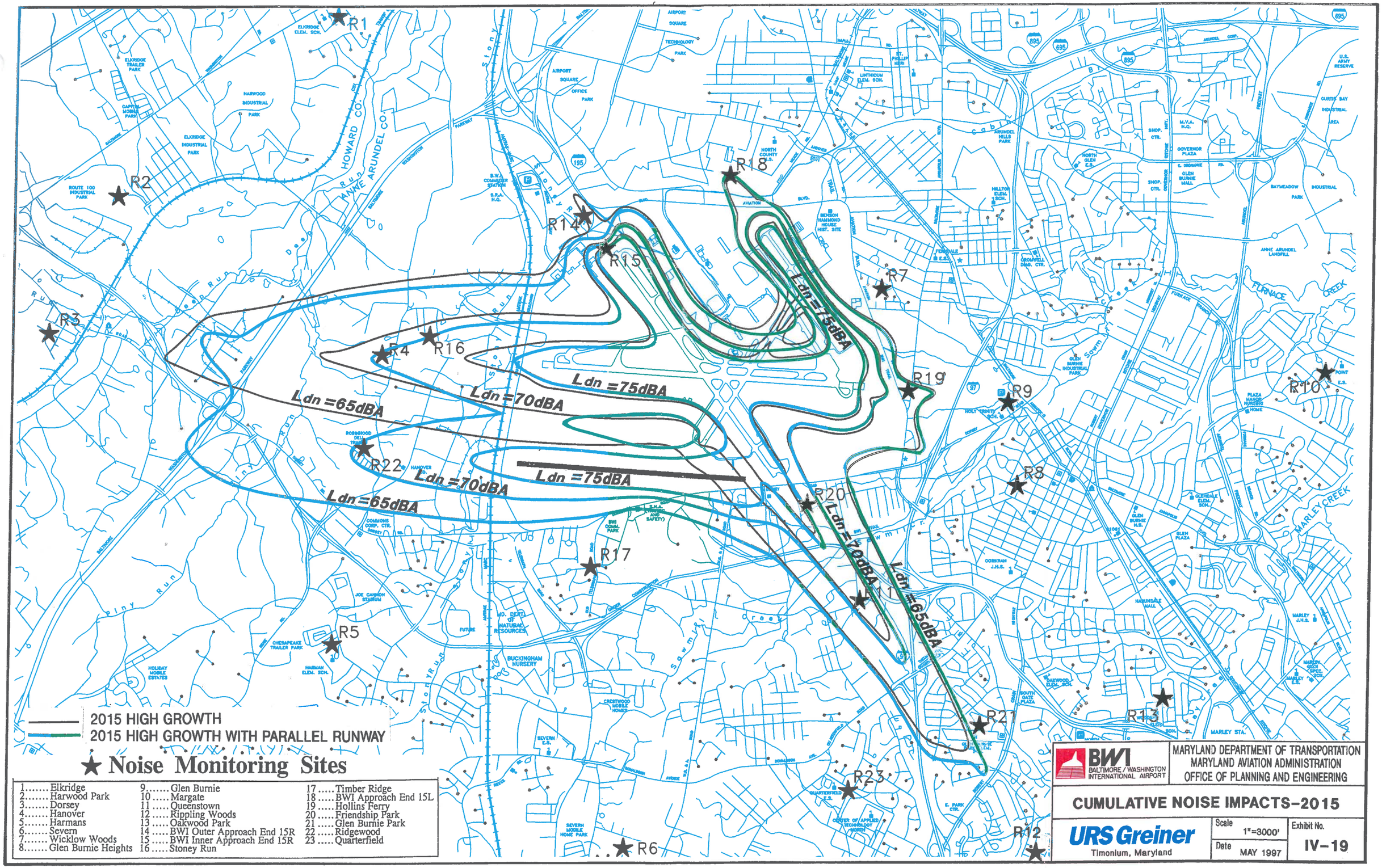
Exhibit IV-19 compares the 2015 No-Build scenario with the 2015 Build scenario with the new parallel runway in full operation. The major differences here are produced by moving operations from the north parallel Runway 10-28 to the new south Runway 10-28. Overall, the land area within the Ldn 75 dB contour will increase by 1.85 square miles, with 1.26 square miles (809 acres) of it occurring off BWI property. Approximately 141 acres of the new off-Airport noise exposure would occur over land uses either currently in or slated for residential use. Most of these areas, as can be expected, are south and west of the new runway. **Table IV-11** indicates the changes in 2015 that can be expected at the fixed locations previously presented. Site R22 immediately west of the proposed new runway centerline will experience the greatest increase (9 dB). As a detailed Environmental Impact Statement will need to be prepared prior to final approval and funding of the new runway, further in-depth noise studies will need to be performed.

From a cumulative impact perspective, it was shown previously that construction of a new air cargo complex will have a minimal effect on off-airport noise exposure. As a result, it can be concluded that the combined projects would cause changes in noise impacts, but that they can all be attributed to the new parallel runway project. This is important in that it is not the individual project contributions which would produce this level of impact, but rather the one project by itself.

The final scenario of High Growth with the proposed parallel runway shows significant increases at Sites 5, 17 and 22 due to the shifting of operations to the proposed parallel Runway 10R-28L.

Land Use, Social, and Induced Socioeconomic Impacts

As indicated above, the construction and operation of the new parallel runway will increase the amount of non-compatible land use in the communities west and south of BWI. Specific impacts with regard to this change with regard to the number of people affected and potential mitigation measures will be addressed under both the Airport's ongoing Part 150 Noise Compatibility Program and the future planning process for the new runway.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Ldn =65dBA
Ldn =70dBA
Ldn =75dBA
Ldn =75dBA
Ldn =70dBA
Ldn =65dBA
2015 HIGH GROWTH
2015 HIGH GROWTH WITH PARALLEL RUNWAY
★ Noise Monitoring Sites
1.....Elkridge
2.....Harwood Park
3.....Dorsey
4.....Hanover
5.....Harmans
6.....Severn
7.....Wicklow Woods
8.....Glen Burnie Heights
9.....Glen Burnie
10.....Margate
11.....Queenstown
12.....Rippling Woods
13.....Oakwood Park
14.....BWI Outer Approach End 15R
15.....BWI Inner Approach End 15R
16.....Stoney Run
17.....Timber Ridge
18.....BWI Approach End 15L
19.....Hollins Ferry
20.....Friendship Park
21.....Glen Burnie Park
22.....Ridgewood
23.....Quarterfield
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CUMULATIVE NOISE IMPACTS–2015
URS Greiner
Timonium, Maryland
Scale 1"=3000'
Date MAY 1997
Exhibit No. IV–19

TABLE IV-11

COMPUTED NOISE EXPOSURE Ldn AT PERMANENT MONITORING LOCATIONS 2015 NO-BUILD AND 2015 BUILD WITH NEW PARALLEL RUNWAY

Site	2015 No-Build Scenario Ldn (dB)	2015 Build Scenario, High Growth and Parallel Runway Ldn (dB)	Difference (Build Minus NB) (dB)
R1	53.0	52.7	-0.3
R2	57.3	57.2	-0.1
R3	63.4	61.9	-1.5
R4	72.1	70.6	-1.5
R5	50.6	52.9	2.3
R6	52.2	52.1	-0.1
R7	59.3	58.4	-0.9
R8	59.6	60.9	1.3
R9	61.5	61.2	-0.3
R10	49.8	50.0	0.2
R11	71.3	72.1	0.8
R12	62.3	63.0	0.7
R13	50.9	50.9	0
R14	64.6	61.4	-3.2
R15	79.2	78.5	-0.7
R16	72.3	70.9	-1.4
R17	54.3	56.6	2.3
R18	65.2	65.7	0.5
R19	67.9	67.8	-0.1
R20	73.1	73.6	0.5
R21	62.8	63.3	0.5
R22	61.6	70.6	9.0
R23	56.4	56.5	0.1

Both social impacts and induced socioeconomic effects from the cumulative scenario will likely be greater only during the construction period for the new runway. Such effects would include increases in construction jobs and spinoff industry revenues.

Air Quality

The 1994 BWI Air Quality Plan previously discussed was prepared to indicate potential future-year emissions using the highest level of development and operations proposed at that time. As discussed earlier in this Section, the operational forecasts used in the Plan are higher than the most recent MAA forecasts developed in 1996. Since the Air Quality Plan predicted no significant future-year air quality concerns, the cumulative impacts for air quality will also be consistent with the Plan.

Water Quality

Runway 10R-28L would be located south of the proposed action and north of Dorsey Road. The majority of the runway (4,950 linear feet) would be located in the Clark and Hawkins Branch sub-areas of the Stony Run drainage area. The remaining 2,850 feet would be located in the sub-areas of three tributaries in the Sawmill Creek drainage area. In all of these sub-areas, drastic modification of the drainage patterns during development of the runway would require stormwater management retrofits for both quality and quantity management of runoff. Areas that would be graded but would not be impervious surface would be seeded with grass and meadow species which would assist with control of stormwater runoff in all of these sub-areas.

Development in the Clark Branch sub-area would require piping of 2,100 feet of the stream flowing through the Clark Branch wetland system and filling of the adjacent wetlands. The amount of impervious surface would not increase substantially (approximately 3,850 feet of runway) but there would be large areas that were forested that would be graded and seeded which would increase stormwater flow.

Development in the Hawkins Branch sub-area would require the filling of the headwaters of the Hawkins Branch wetland system and a portion of the wetlands on the southern

edge. There would be an increase in stormwater flow from the additional 1100 feet of runway that would need to be properly managed.

Development in the three tributaries to Sawmill Creek drainage area would involve an additional 2,850 feet of impervious surface from the runway and large areas being graded and seeded. These three sub-areas are areas that have been graded previously and partially developed. Therefore there would be a negligible change in the type of ground cover.

As discussed previously in regards to groundwater supply to Stony Run, the Clark and Hawkins Branch sub-areas are not a source of groundwater recharge for Stony Run. The subsurface flows are towards the east. The main concern regarding development in these drainage areas is control of surface flow. As a condition of the Water Quality Certification, it is anticipated that the first ½ inch of runoff from any new impervious surfaces will be controlled by water quality structures prior to discharge into a tributary to a major drainage area such as Stony Run or Sawmill Creek.

Sawmill Creek is currently part of a comprehensive watershed restoration effort. The MAA is actively involved in this effort as exemplified in their work on Muddy Bridge Branch. A restoration program has already been implemented on Muddy Bridge Branch which is located east of Runway 28. Part of this restoration effort involved analysis of the existing stormwater management ponds on BWI property as well as other local facilities. Any necessary retrofits were implemented to aid the restoration effort. The effort that has been and is being expended for Muddy Bridge Branch would be utilized for future development in the Sawmill Creek drainage area and also applied to development in the Stony Run drainage area, even though there is no formal restoration effort underway for this watershed. Because of the efforts of all of the participants in the Sawmill Creek Restoration Program and the improvements to SWM and stream restoration projects, Sawmill Creek has seen an increase in fish species richness from 1989 to 1994 (one of the indicators of improving health of the system).

Coordination with the Maryland Department of Natural Resources, Maryland Department of the Environment, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and citizens groups

regarding water quality will continue during the development of the proposed action and Runway 10R-28L.

Biotic Communities (Including Both Flora and Fauna)

Development of Runway 10R-28L would result in an additional 120± acres of forest clearing in addition to the 116± acres of forest clearing required for the proposed action. There would be a net increase in the quantity of grassed areas on the Airport as a result of development of the runway. Most of the areas that would be cleared of forest would be graded and seeded with appropriate upland grass and meadow species.

As with the proposed action, impacts to the forested areas would need to be mitigated accordingly and coordinated with the Maryland Department of Natural Resources for compliance with the 1991 Forest Conservation Act. The Master Reforestation Plan, currently being prepared, will outline the required replanting and preservation techniques for each project that occurs at BWI. An individual Forest Conservation Plan would need to be prepared. With implementation of the reforestation techniques discussed in the detail in the BWI Master Reforestation Plan, MAA will have sufficient reforestation credit for compensation for the impacts associated with development of Runway 10R-28L.

Endangered and Threatened Species of Flora and Fauna

Coordination with the U.S. Fish and Wildlife Service and the Maryland Natural Heritage Program has shown that there are no known RTE species located on any existing or proposed developed areas of Airport property. Therefore, development of Runway 10R-28L would have no effect on RTE species. The only known Federally threatened species is the Swamp Pink located in Stony Run, downstream of the convergence of Signal Branch and Stony Run, and well away from all proposed development areas. Development of Runway 10R-28L would require minimization of downstream construction impacts such as silt load and peak flow. Installation of proper sedimentation control devices and stormwater management facilities would ensure minimal effect on the Swamp Pink habitat.

Wetlands

Development of Runway 10R-28L would require filling of 1.8± acres of Hawkins Branch and 4.8± acres of Clark Branch. It would also impact 1.3± acres of the 25-foot wetland buffer for Hawkins Branch and 2.3± acres of the 25-foot wetland buffer for Clark Branch. As with any project undertaken at BWI, all practicable sediment and erosion control measures would be implemented during and after construction operations and stormwater management facilities would be implemented and maintained after construction. The Hawkins and Clark Branch wetland systems have been field verified by the Corps and are considered jurisdictional wetlands. Therefore, any impacts associated with Runway 10R-28L would require a submission of a Joint Federal/State Permit Application and appropriate mitigation measures would have to be implemented.

Floodplains

Peak flows would be managed within the project area, thereby not affecting the FEMA floodplain boundary for any of the areas downstream of the impacted sections of Clark Branch, Hawkins Branch, and the three tributaries to Sawmill Creek.

Solid Waste

The new parallel runway construction will necessitate the clearing of an additional 120 acres of existing forested area, bringing the combined total of debris created by the Proposed Action and the new runway to 236 acres of debris requiring disposal and/or reuse and sale as described previously. From an earthwork perspective, the parallel runway configuration used in this analysis (7,800 feet in length with 3,500-foot separation) will be essentially a "balanced" project, with 3.2 million yards of cut and 3.3 acres of fill. Any borrow requirements could be easily obtained from one of the stockpiles created by construction of the Proposed Action (Alternative 4R).

SECTION V

LIST OF PREPARERS

SECTION V: LIST OF PREPARERS

The following personnel have had primary responsibilities in the preparation of this document.

URS GREINER, INC.

Personnel	Title	Experience	Project Responsibilities
Michael D. Steer, PE	Project Manager	26 Years	Overall Project Management; Quality Assurance/Quality Control
Washington Bowie, 6th, CEP	Senior Environmental Planner	23 Years	Document Manager; Technical Writing
Wayne B. Schuster, AICP, CM	Senior Airport Planner	16 Years	Alternatives; Purpose and Need
Gary M. Luczak, PE	Airport Planner/ Administrator	16 Years	Alternatives; Contract Administration
Stephen M. Lucchesi, PE	Senior Airport Engineer	16 Years	Alternatives Development
Terry H. Klein, SOPA	Senior Archaeologist	18 Years	Historical/Archaeological
Theodore J. Hogan	Environmental Planner	25 Years	Biotic Communities
Michael A. Kenney, CHMM, QEP	Environmental Planner/ Air Quality/Hazardous Materials Specialist	18 Years	Air Quality
Michael J. Waibel	Airport Planner	8 Years	Document Coordination; Purpose and Need
Jennifer L. Duff	Environmental Planner	2 Years	Wetlands
Gregory N. Fredrickson, EIT	Airport Engineer	3 Years	Alternatives Development
C. Sonja Hardman, EIT	Airport Engineer	4 Years	Floodplains; Water Quality
Veronica Piskor	Environmental Planner	6 Years	Wetlands; Biotic Communities

MARYLAND AVIATION ADMINISTRATION

Lynn S. Bezilla	Director, Office of Planning
Barbara Grey	Manager, Environmental Services