

Appendix A. List of Preparers

An interdisciplinary team consisting of experts and technicians in airport planning, noise assessment, land use planning, air quality, biology, and historic, archaeological, and architectural resources contributed to the analyses discussed in the EA.

A.1 Ricondo & Associates, Inc.

John C. Williams – Senior Vice President; more than 27 years of experience in airport environmental and physical planning, especially preparing and managing environmental assessments and environmental impact statements. Mr. Williams is the study team’s Officer-in-Charge; his responsibilities included overall quality control and NEPA guidance.

James H. Zimmerman – Vice President; more than 40 years of experience in aviation, with particular emphasis on design and operations of airfields. Mr. Zimmermann has managed multiple prior planning assignments for the Authority; he contributed to the development and analysis of the alternatives.

Stephen R. Muench – Director; more than 26 years of experience in airport environmental and physical planning. Mr. Muench recently managed two successful environmental assessments for improvements at Pittsburgh International Airport and has contributed to NEPA documents for airports ranging from large hubs to general aviation airports. He was responsible for overall project management.

Stephen D. Culberson – Director; more than 20 years of experience assessing the environmental impacts of transportation projects, focusing primarily on airports. Mr. Culberson led the development and analysis of alternatives.

Adrian M. Jones – Director; more than 13 years of airport and environmental planning experience, with significant expertise in air quality modeling and airport noise compatibility. Mr. Jones was responsible for the air quality analysis.

Stephen C. Smith – Director; more than 10 years of environmental airport and air traffic experience, with particular expertise in aircraft noise analyses. Mr. Smith directed and reviewed the noise analysis. He has conducted similar noise analyses related to NEPA assignments at airports ranging from large hubs to general aviation airports

Lisa M. Reznar – Managing Consultant; more than 10 years of airport environmental and planning experience. Ms. Reznar managed the public scoping workshop and agency meeting, assembled the affected environment documentation, and completed the documentation of the secondary (induced) impacts, Department of Transportation Act, Section 4(f) lands, natural resources and energy supply, and light emissions and visual impacts for the environmental consequences section.

D. Jackson Sargent – Managing Consultant; more than 11 years of aviation facility and environmental planning experience in both the public and private sectors. He has contributed to the preparation of environmental impact statements for projects at medium- and large-hub airports. Mr. Sargent served as a technical reviewer, with particular focus on the alternatives.

Ronald Reagan Washington National Airport

Chris P. Jones – Senior Consultant; more than 3 years of experience preparing environmental documentation for various aviation, highway, and rail projects. Mr. Jones conducted the noise analysis and contributed to the assessment of impacts on compatible land use.

Audrey Y. Park – Senior Consultant; more than 6 years of airport and environmental planning experience. Ms. Park assisted in the alternatives analysis and in the air quality analysis.

A.2 Straughan Environmental Services, Inc.

Kevin Clarke – Director of Environmental Planning; special expertise in environmental issues related to airport development, both domestically and in South America.

Appendix B. Agency Consultation and Public Coordination

Agency Scoping Meeting Minutes
July 31, 2008



DRAFT AGENCY SCOPING MEETING SUMMARY

Runway 1-19 Runway Safety Area Enhancements Environmental Assessment
Ronald Reagan Washington National Airport

DATE: July 31, 2008

Page 1 of 6

TIME: 10:30 AM Eastern Time

PARTICIPANTS:

Jennifer Mendelsohn, Federal Aviation Administration Washington Airports District Office (by phone)
Brent O'Neill, National Park Service, George Washington Memorial Parkway
Deborah Feldman, National Park Service, George Washington Memorial Parkway
Bryan King, District of Columbia, Department of Environment, Fisheries and Wildlife
Adion Chinkuyu, District of Columbia, Department of Environment, Water Quality
Bill Lebegern, Metropolitan Washington Airports Authority
Charley Baummer, Metropolitan Washington Airports Authority
Renee Bartnik, Parsons Management Consultants
Jim Zimmermann, Ricondo & Associates, Inc.
Stephen Muench, Ricondo & Associates, Inc.
Lisa Reznar, Ricondo & Associates, Inc.
Kevin Clarke, Straughan Environmental Services

PREPARED BY: L. Reznar

Introduction and Opening Comments

Meeting participants introduced themselves.

C. Baummer began a brief presentation to the agency representatives by explaining that the Metropolitan Washington Airports Authority (the Authority) is initiating the preparation of an Environmental Assessment (EA) for proposed enhancements to the Runway 1-19 Runway Safety Area (RSA) and related improvements at the Ronald Reagan Washington National Airport (DCA or the Airport). He also reviewed the purposes of this agency scoping meeting, namely to: a) elicit input from agencies regarding resources in the vicinity of the enhancements and related improvements; b) identify significant environmental issues to be analyzed in greater depth in the EA and those other environmental issues that are either insignificant or have been covered by prior environmental review; c) set temporal and geographic boundaries for impact analysis; d) identify available technical information and additional reasonable alternatives, if any; e) identify necessary permits, licenses, approvals and authorizations; and, f) clarify areas of special expertise. Mr. Baummer closed his opening remarks by noting that the proposed enhancements to the Runway 1-19 RSA will bring the RSA into compliance with Federal Aviation Administration (FAA) requirements by the 2015 FAA deadline.

J. Zimmerman provided a detailed overview of the FAA's RSA program, the standard dimensions for the Runway 1-19 RSA, and the Authority's preferred alternative. He explained how the preferred alternative enables the Authority to bring the Runway 1-19 RSA into full compliance with minimal environmental impacts while maintaining the useable runway length at 6,869 feet.

L. Reznar reviewed the National Environmental Policy Act (NEPA) process and the approximate timeline for completion of the EA. The Authority's current expectations are to complete the EA by May 2009 and to receive the FAA's finding in June 2009. Ms. Reznar indicated that based on



DRAFT AGENCY SCOPING MEETING SUMMARY

Runway 1-19 Runway Safety Area Enhancements Environmental Assessment
Ronald Reagan Washington National Airport

DATE: July 31, 2008

Page 2 of 6

previous studies and preliminary analysis, the environmental impact categories in the vicinity of the areas to be disturbed by the enhancements and related improvements include: coastal resources; fish, wildlife, and plants (listed threatened or endangered species or critical habitat); floodplains; hazardous materials; noise; water quality; wetlands; and, waters of the U.S.

K. Clarke identified where the potentially impacted resources exist in relation to the RSA enhancements and related improvements. He also noted that additional research was underway to determine the existence and extent of certain resources, particularly floodplain, wetlands, and hazardous materials.

A copy of the graphics used in the presentation to the agency representatives is attached to this Summary.

Dialogue

The following is a general summary of questions and comments raised by agency representatives during the meeting and the Authority's responses.

Questions/Comments	Responses
Does the Runway 1-19 RSA comply with current FAA requirements?	The preferred alternative would bring the Runway 1-19 RSA into compliance. The Authority discussed the evolution of the FAA's RSA Program and dimensional standards within the context of the transition from piston/turboprop aircraft to jet aircraft operating at the Airport. The FAA Order outlining the RSA Program was issued in 1999. The FAA released another Order in 2004 to address the financial feasibility and equivalency of RSA improvements. The Authority's preferred alternative represents years of continuous planning to develop an alternative that meets the Authority's and FAA's shared goals to enhance safety and protect the environment.
How much additional pavement will be added with the hold apron project?	Specific information on the additional paved area was not available at the meeting. Depending on aircraft size and parking configuration, the existing hold apron accommodates approximately 3 aircraft and the expanded hold apron would accommodate approximately 5 aircraft. Part of the existing hold apron area would be lost due to the extension of Taxiway J to the end of the relocated Runway 1 threshold. The need for the additional pavement (beyond that lost due to the Taxiway J extension) is independent of the need for the RSA enhancements. Additional hold apron capacity is desired by FAA Airport Traffic Control Tower staff to better manage aircraft flow on the ground.



DRAFT AGENCY SCOPING MEETING SUMMARY

Runway 1-19 Runway Safety Area Enhancements Environmental Assessment
 Ronald Reagan Washington National Airport

DATE: July 31, 2008

Page 3 of 6

Questions/Comments	Responses
What type of materials will be used to construct the new paved areas?	The runway and taxiway extensions and rerouted service road pavements will likely be asphalt; the hold apron pavement will likely be concrete.
Will there be other improvements within the RSA surface area?	The northern (Runway 19) end of the RSA is grass and no improvements are expected at this time. The southern (Runway 1) end may require grading to meet the new elevation of the extended runway pavement at the Runway 1 end, or stabilization to support the weight of rescue and firefighting vehicles, or both. The Authority would evaluate the environmental impacts, if any, associated with such grading and stabilization when adequate design information becomes available.
Will there be any improvements in the Potomac River?	<p>The preferred alternative will not change the shoreline. Three crossbars supporting certain Runway 1 approach lights will be relocated from their onshore positions to new positions in the River. Additional design analysis is needed to determine whether the three relocated crossbars can be supported by timber pilings or caissons. Previous coordination with the Army Corps of Engineers indicates that a Section 404 permit may not be required if timber pilings are used and no dredging occurs; however, a Section 404 permit would be required for caissons due to the excavation required to install the caissons.</p> <p>The wooden approach light pier includes a 6-foot wide walkway supported by timber pilings. Three approach lights will be relocated to existing approach light supports in the River that were part of a previous approach light system. No additional length to the pier is proposed.</p>
Have wetlands been delineated?	The Potomac River is considered a Water of the U.S. Identification and delineation of any onshore wetlands in the vicinity of the preferred alternative will be undertaken as part of this project. The Authority would mitigate impacts consistent with Army Corps of Engineers and Virginia Department of Environmental Quality requirements, where applicable.
The Authority should consider water quality issues if any grading or fill is required.	The Runway 1 end may require some grading or fill. The Authority would select fill materials that would not be expected to impact water quality.



DRAFT AGENCY SCOPING MEETING SUMMARY

Runway 1-19 Runway Safety Area Enhancements Environmental Assessment
 Ronald Reagan Washington National Airport

DATE: July 31, 2008

Page 4 of 6

Questions/Comments	Responses
Is the area south of Runway 1 primarily fill?	The Authority confirmed that the southern area of the Airport was constructed on fill in stages. The last major fill project involved the area between Levee Road and the current shoreline.
Will there be a wall constructed between the end of the RSA for Runway 1 and the shoreline?	There is no anticipated need for such a wall.
How high is the Runway above the Potomac River?	The end of the Runway is approximately 12 feet above the River. However, the River could rise as much as 2 feet due to the tides, making the net elevation difference approximately 10 feet.
Rockfish spawn from February through June, so construction in the River should be avoided during this period. Any sediment containment measures (e.g., fish curtains) could impact the rockfish migration. However, it was noted that the District of Columbia Department of Environment, Fisheries and Wildlife (DCDOE/FW) issues permits for rockfish fishing during a portion of the migration season.	The Authority will continue to consult with DCDOE/FW to avoid impacts to rockfish.
Do any of the agencies have current Submerged Aquatic Vegetation (SAV) mapping?	The current SAV mapping is somewhat dated. The DCDOE typically updates SAV mapping in conjunction with specific projects. DCDOE may update the mapping in the vicinity of the Airport.
Will the runway be lengthened?	Under the preferred alternative, the runway pavement is extended by 300 feet; however, by using declared distances, the useable runway length remains unchanged at 6,869 feet.
With the runway shift, how will aircraft noise impact National Park Service (NPS) facilities at Gravelly Point and Roosevelt Island?	Noise from aircraft landing or departing on Runway 19 (southern flow) will not change as the operation of flights on Runway 19 does not change under the preferred alternative. Aircraft operating on Runway 1 (northern flow) will depart the Runway 300 feet earlier than under existing conditions; however, the incremental vertical gain of aircraft over these NPS facilities will be minor and the resulting reduction in aircraft noise may be impossible for a person to detect.
Will the runway shift result in changes to building height restrictions at Gravelly Point?	The runway shift will not further constrain building heights at Gravelly Point.
<p>Are impacts to endangered and threatened (E&T) species anticipated?</p> <p>The DCDOE/FW representative urged the Authority to contact him for a current species list.</p>	<p>The Authority contacted resource agencies approximately one year ago and collected database lists that included transient observations of E&T species. None of the species is unique to the Airport environment. If the resource agencies</p>



DRAFT AGENCY SCOPING MEETING SUMMARY

Runway 1-19 Runway Safety Area Enhancements Environmental Assessment
Ronald Reagan Washington National Airport

DATE: July 31, 2008

Page 5 of 6

Questions/Comments	Responses
	<p>are aware of any E&T species relevant to the preferred alternative, the Authority requests that those agencies provide that information to the Authority during the scoping process.</p> <p>The Authority agreed to contact DCDOE/FW.</p>
<p>A NPS representative urged the Authority to consider visual impacts of the preferred alternative to Mount Vernon Trail, especially the potential impacts associated with the changes to the approach lights on the existing pier structure.</p>	<p>The Authority agreed to consider the potential visual impacts on the Mount Vernon Trail.</p>
<p>The DCDOE Water Quality (DCDOE/WQ) representative explained how the Army Corps of Engineers and DCDOE/WQ coordinate their respective Section 404 Permit and DC Water Quality Certification processes. He advised the Authority that DCDOE/WQ certification process could be expedited if the Authority submits the same information to the DCDOE/WQ concurrent with the submittal of the Section 404 application to the Corps. The Corps permit would include a requirement for the Authority to receive the Water Quality Certificate from the DCDOE/WQ. The DCDOE/WQ Water Quality Certificate is issued after the Corps issues the Section 404 Permit. Permit.</p>	<p>The Authority appreciated the explanation of this process and DCDOE/WQ's recommendations.</p> <p>Based upon prior coordination with the Corps, the Corps' Baltimore District has agreed to have the Norfolk District take the lead on this EA.</p> <p>The FAA will reference the Corps' permit and District's water quality certification in its finding.</p>
<p>What is the purpose and need of the hold apron expansion?</p>	<p>The hold apron expansion has a separate (independent) purpose and need from the enhancements to the RSA. The EA will include the purpose and need for the expanded hold apron area. In simple terms, the additional hold apron provides the FAA Airport Traffic Control Tower staff enhanced abilities to redirect departing aircraft already in queue on the taxiway off of the taxiway when the departure clearances for those aircraft change unexpectedly. Without the increased area, the time required by departing aircraft to transition to the threshold of the Runway increases, resulting in flight delays and increased aircraft emissions.</p>
<p>What alternatives to the preferred alternative will be considered?</p>	<p>A range of alternatives to the Authority's preferred alternative were considered in previous planning studies and will be documented in the EA. The FAA requires the Authority to first consider meeting the standard RSA dimensional requirements with no modifications to Runway 1-19. The Authority realized that this alternative would impact environmental resources north of Runway 19. The</p>



DRAFT AGENCY SCOPING MEETING SUMMARY

Runway 1-19 Runway Safety Area Enhancements Environmental Assessment
 Ronald Reagan Washington National Airport

DATE: July 31, 2008

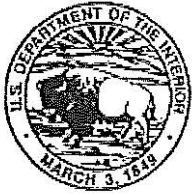
Page 6 of 6

Questions/Comments	Responses
	<p>Authority considered various alternatives and determined that the preferred alternative minimizes environmental impacts, meets the FAA's standard RSA dimensional requirements, and maintains the existing useable length of the Runway. The impracticability of reducing runway length to meet the FAA's RSA dimensional standards was considered previously and will be addressed in the EA.</p> <p>Alternatives to soil stabilization, if needed, will be considered as the design for the RSA enhancements and related improvements progresses.</p>
<p>How do the FAA's RSA requirements affect the other two runways (Runways 4-22 and 15-33, referred to as the crosswind runways)?</p>	<p>Runway 1-19 supports the majority of aircraft operations at the Airport. The Authority's preferred alternative is expected to achieve the FAA's safety goals for approximately 85% of the operations at the Airport with minimal impacts on environmental resources.</p> <p>Planning is underway to identify and evaluate reasonable alternatives for bringing the crosswind runways' RSAs into compliance. The Authority has not identified a preferred alternative for the crosswind runways at this time.</p> <p>Given the limited land available and the environmental resources adjacent to the crosswind runways, addressing the complexities of the potential crosswind runways solutions in the same EA with Runway 1-19 would likely delay realization of the significant benefits of the Runway 1-19 RSA improvements. Therefore, the Authority proposes to implement the preferred alternative for Runway 1-19 in advance of identifying a solution for enhancing the crosswind runways' RSAs.</p>

Closing Comments

Following the presentation and discussion, the Authority and FAA expressed appreciation to the participating agencies for the input they provided during the scoping meeting. C. Baummer reminded the agency representatives that the period to submit written scoping comments is open until 5:00 PM Eastern Standard Time, August 15, 2008.

Agency Comments

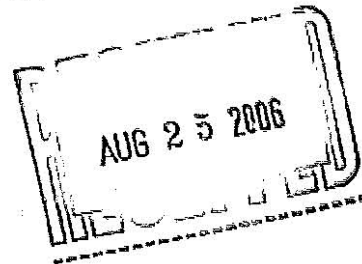


United States Department of the Interior



FISH AND WILDLIFE SERVICE
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401

July 18, 2006



Straughan Environmental Services, Inc.
9135 Guilford Road, Suite 100
Columbia, Maryland 21046-2579

*RE: Runways 15-33 and 4-22 Safety Area Study Ronald Reagan National Airport (DCA)
Alexandria, Virginia and Washington, D.C.*

Dear Matthew L. Rescott

This responds to your letter, received June 9, 2006, requesting information on the presence of species which are federally listed or proposed for listing as endangered or threatened in the above referenced project area. We have reviewed the information you enclosed and are providing comments in accordance with section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

Except for occasional transient individuals, no proposed or federally listed endangered or threatened species are known to exist within the project impact area. Therefore, no Biological Assessment or further section 7 consultation with the U.S. Fish and Wildlife Service is required. Should project plans change, or should additional information on the distribution of listed or proposed species become available, this determination may be reconsidered.

This response relates only to federally protected threatened or endangered species under our jurisdiction. Limited information is currently available regarding the distribution of other rare species in the District of Columbia. However, the Nature Conservancy and National Park Service (NPS) have initiated an inventory of rare species within the District. For further information on such rare species, you should contact Geoff Sanders of the National Park Service at (202) 342-1443 ext. 230.

An additional concern of the Service is wetlands protection. Federal and state partners of the Chesapeake Bay Program have adopted an interim goal of no overall net loss of the Basin's remaining wetlands, and the long term goal of increasing the quality and quantity of the Basin's wetlands resource base. Because of this policy and the functions and values wetlands perform, the Service recommends avoiding wetland impacts. All wetlands within the project area should be identified, and if alterations of wetlands is proposed, the U.S. Army Corps of Engineers, Baltimore District, should be contacted for permit requirements. They can be reached at (410) 962-3670.

We appreciate the opportunity to provide information relative to fish and wildlife issues, and thank you for your interests in these resources. If you have any questions or need further assistance, please contact Devin Ray at (410) 573-4531.

Sincerely,

Mary Ratnaswamy

Mary J. Ratnaswamy, Ph.D.
Program Supervisor, Threatened and Endangered Species



June 27, 2008

Ms. Maria Stanco
FAA Eastern Regional Office
Federal Building #111
John F. Kennedy International Airport
Jamaica, New York 11430

RE: Environmental Assessment, Runway 1-19 Safety Area Improvements and Related Improvements, Ronald Reagan Washington National Airport

Dear Ms. Stanco:

The Metropolitan Washington Airports Authority (the Authority) invites you to participate in the environmental scoping process for proposed Runway Safety Area (RSA) enhancements for Runway 1-19 and other related improvements described below at Ronald Reagan Washington National Airport (DCA or the Airport). The proposed federal actions associated with these improvements, including approval by the Federal Aviation Administration (FAA) of a change in the Airport Layout Plan, approval of construction on a federally obligated airport, and possible federal Airport Improvement Program funding, are subject to the National Environmental Policy Act. The Authority is preparing an Environmental Assessment (EA) of the proposed improvements in accordance with FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, and FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*. The Authority and the FAA have not made a final decision on the content of the EA.

Background

In accordance with FAA Order 5200.8, *Runway Safety Area Program*, an RSA “is intended to provide a measure of safety in the event of an aircraft’s excursion from the runway by significantly reducing the extent of personal injury and aircraft damage during overruns, undershoots and veer-offs.” The dimensions of the current RSA for Runway 1-19 do not meet FAA standards. To comply with FAA Order 5200.8, the Authority proposes to make improvements that would bring the Runway 1-19 RSA into full compliance with the standards. **Exhibit 1** is a map of the area surrounding DCA.

Project Description

The Authority's preferred alternative for would provide standard RSAs (500 feet wide by 1,000 feet long for overruns, and 500 feet wide by 600 feet long for undershoots) at each end of Runway 1-19. Except for the reconfiguring of the approach lights, as described below, all construction would take place on existing land on Airport property. Project elements include:

- Extending the Runway 1-19 and Taxiway J pavement 300 feet to the south.
- Using declared distances to maintain the effective runway length at its current length of 6,869 feet. Declared distances are the distances that the airport operator declares to be available for aircraft takeoff and landing requirements.
- Relocating the approach lights 300 feet to the south. This involves placing pilings in the Potomac River to construct three 100-foot long crossbars, perpendicular to and centered on the existing approach light pier south of the runway, on which some of the relocated approach lights would be mounted.
- Relocating the glide slope antenna.
- Relocating and expanding the existing aircraft hold apron. The extended Taxiway J would traverse an existing apron used for holding aircraft prior to departure, significantly reducing the capacity of the apron. The Authority has not yet selected a preferred layout for the relocated/expanded aircraft hold apron; the ultimate layout of the apron will be determined during preparation of the EA. The apron would be located between Runways 1 and 4. Depending on the size of the aircraft using this apron and the holding configuration, the relocated/expanded apron could accommodate approximately five aircraft compared to the three aircraft that can be accommodated on the existing hold apron.
- Rerouting the existing service road around the Runway 1 RSA.
- Resurfacing Runway 1-19. The resurfacing of the runway is independent of the preferred RSA alternative, but because the Authority plans to resurface the runway at the same time the other improvements are constructed, the potential environmental impacts of runway resurfacing are being included in the EA. The runway resurfacing will involve milling the surface of the existing pavement and applying a new surface that meets FAA specifications.

Exhibit 2 shows the preferred Runway 1-19 RSA alternative, the existing approach lights, and the current plan for the aircraft hold apron area.

Environmental Resources

The EA will address each environmental resource category identified in Appendix A of FAA Order 1050.1E. Previous environmental and facilities planning studies indicate that the resource categories described below are in proximity to the proposed project area to be assessed in this EA:

- Coastal resources
- Fish, wildlife, and plants
- Hazardous materials
- Listed threatened or endangered species or critical habitat
- Water resources
- Wetlands

Scoping Process

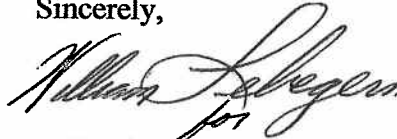
The environmental scoping process provides opportunities for you to identify potential environmental impacts that you believe should be assessed in the EA. In addition, the Authority will use the scoping process to identify: issues that need not be addressed in detail; temporal and geographic boundaries of the environmental analysis; available technical information prepared by others that may relate to the environmental resources being assessed; past, present, and reasonably foreseeable actions in the proposed project area that may be appropriate for consideration during the analysis of cumulative effects; and agencies with jurisdiction or having special expertise and their relevant issues, consultation requirements, and data needs.

The Authority will host a public scoping workshop from 6:00 PM to 8:00 PM on July 30, 2008 at the Historic Main Terminal adjacent to Terminal A at Ronald Reagan Washington National Airport, to provide information on the proposed improvements and to solicit comments from the public. The Authority and its Consultant Team will be available and relevant graphics will be on display throughout the workshop. A copy of the public notice for the workshop is enclosed with this letter.

Written scoping comments may be submitted to Charles Baummer, Planning Department, Metropolitan Washington Airports Authority, One Aviation Circle, Reagan Washington National Airport, Washington, DC 20001-6000, or by e-mail to environmental.comments@mwaa.com. Comments must be received by 5:00 PM Eastern Time, August 15, 2008.

If you have questions, please contact me at 703-417-8168. Thank you for your input to the scoping process.

Sincerely,



J. Charles Baummer, Jr., Ph.D.
Environmental Engineer
Planning Department

Enclosures

JCB:pp

NOTICE OF PUBLIC SCOPING WORKSHOP
Environmental Assessment for Runway Safety Area Improvements
Ronald Reagan Washington National Airport

The Metropolitan Washington Airports Authority (the Authority) is preparing an Environmental Assessment (EA) of potential environmental impacts associated with the proposed construction and operation of enhanced Runway Safety Areas (RSA) and related improvements at Ronald Reagan Washington National Airport. The RSA improvements include relocation of the Runway 1 threshold by 300 feet to the south, extension of taxiway pavement to the relocated threshold, relocation of the glide slope antenna and approach lights for Runway 1-19, and the rerouting an existing service road. Related improvements include relocation and expansion of an aircraft hold apron, and resurfacing of Runway 1-19. Under the preferred alternative, all construction would take place on existing Airport land except for the reconfiguration of the approach lights which are located on a pile-supported pier.

The EA is being prepared pursuant to the requirements and guidelines of Federal Aviation Administration (FAA) Order 1050.1E, *Environmental Impacts: Policies and Procedures* and FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*.

The RSA enhancements are required to bring the RSA into compliance with FAA Order 5200.8, *Runway Safety Area Program*, and related FAA orders. This program is intended to provide an enhanced measure of safety for aircraft taking off and landing on the runway.

The Authority invites the public to attend a workshop that will be held on Wednesday, July 30, 2008 from 6:00 PM to 8:00 PM at the Historic Main Terminal adjacent to Terminal A at Ronald Reagan Washington National Airport. Representatives from the Authority and its Consultant Team will be available to answer questions throughout the public workshop, and graphics will be on display illustrating the Airport, the FAA's RSA program, the preliminary purpose and need for the proposed improvements, alternatives considered, the Authority's preferred RSA alternative based on previous studies, the EA and scoping processes, and the schedules for the EA and implementation of the preferred alternative.

An opportunity to submit written comments will be provided during and after the public workshop. Written comments may be submitted to Charles Baummer, Metropolitan Washington Airports Authority, Planning Department, Metropolitan Washington Airports Authority, One Aviation Circle, Reagan Washington National Airport, Washington, DC 20001-6000, or by e-mail to environmental.comments@mwaac.com. Comments must be received by 5:00 PM Eastern Time, August 15, 2008.

Those interested in attending the public workshop who have special communication or accommodation needs are encouraged to contact Lisa Reznar of Ricondo & Associates, Inc. at (312) 606-0611, x105 at least 2 days prior to the workshop. Every reasonable effort to accommodate special needs will be made. This notice and graphics of the

project site may be previewed at
http://www.mwaa.com/news_publications/newsroom/public_notices.

Ronald Reagan Washington National Airport

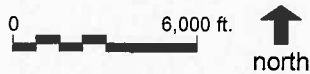


LEGEND

- | | | | |
|--|-------------------------|-----|---|
| | Interstate Highway | | Airport Boundary |
| | Jurisdictional Boundary | DCA | Ronald Reagan Washington National Airport |
| | | | Runway |

Source: AirPhotoUSA, 2001 (Aerial); Ricondo & Associates, Inc.
 Prepared by: Ricondo & Associates, Inc.

Exhibit 1



Area Map

Drawing: Z:\MWA\IDCA\RSA Study\Exhibit 1.dwg_Layout: 8.5x11-P_Jun 26, 2008, 2:25pm

Ronald Reagan Washington National Airport



Source: AirPhoto USA, 2001 (Aerial); Ricondo & Associates, Inc.
 Prepared by: Ricondo & Associates, Inc.

Exhibit 2



**Runway 1-19 Runway Safety Area (RSA) and Related Improvements
 Preferred Alternative**

Drawing: Z:\MVAAD\CARSA_Study\Exhibit 2.dwg, Layout: 8.5 x 11L, Jun 26, 2008, 2:53pm

**Environmental Assessment
 Runway 1-19 Runway Safety Area and Related Improvements**

June 2008

GOVERNMENT OF THE DISTRICT OF COLUMBIA
Executive Office of the Mayor



Adrian M. Fenty
Mayor

July 2, 2008

Charles J. Baummer Jr.
Environmental Engineer
Ronald Reagan Washington National Airport
Washington, DC 20001-4901

Dear Mr. Baummer:

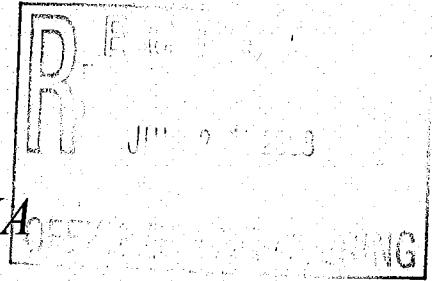
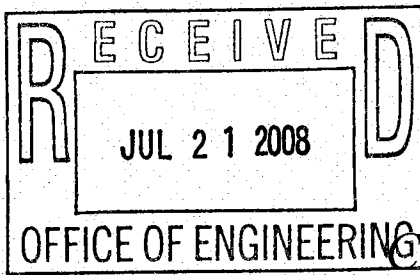
Thank you very much for your invitation to join you at the Scoping Workshop on July 30th, 2008, I truly appreciate it. As of now, my availability is uncertain, but I have forwarded the invitation to my Scheduling Specialist, Rahima Rice. If I will be attending your event, she will be in contact with you. If you have any further questions, you can email her at rahima.rice@dc.gov.

Once again, thank you for the invitation and I wish you all the best for a successful event.

Sincerely,

A handwritten signature in blue ink that reads "Adrian M. Fenty".

Adrian M. Fenty
Mayor



OFFICE OF ENGINEERING COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

Street address: 629 East Main Street, Richmond, Virginia 23219

Mailing address: P.O. Box 1105, Richmond, Virginia 23218

TDD (804) 698-4021

www.deq.virginia.gov

L. Preston Bryant, Jr.
Secretary of Natural Resources

David K. Paylor
Director

(804) 698-4000
1-800-592-5482

July 16, 2008

Mr. Charles Baummer
Planning Department
Metropolitan Washington Airports Authority
One Aviation Circle
Reagan Washington National Airport
Washington, DC 20001-6000

RE: Scoping comments for the preparation of a National Environmental Policy Act document for the proposed Runway 1-19 Safety Area Improvements and Related Improvements at Ronald Reagan Washington National Airport, Arlington County.

Dear Mr. Baummer:

This letter is in response to your June 27, 2008 letter (received July 2) requesting scoping comments for the preparation of a National Environmental Policy Act (NEPA) document for the proposed Runway 1-19 Safety Area Improvements and Related Improvements at Ronald Reagan Washington National Airport in Arlington County.

Project Description

According to the letter, the Metropolitan Washington Airports Authority (MWAA) proposes to make improvements to Runway 1-19 to bring it into full compliance with Federal Aviation Administration (FAA) Order 5200.8, *Runway Safety Area Program*. The order is intended to provide a measure of safety in the event of an aircraft's excursion from the runway by significantly reducing the extent of personal injury and aircraft damage during overruns, undershoots and veer-offs. MWAA's preferred alternative would provide standard RSAs (500 feet wide by 1,000 feet long for overruns, and 500 feet wide by 600 feet long for undershoots) at each end of Runway 1-19).

Scoping

The Department of Environmental Quality's (DEQ) Office of Environmental Impact Review (OEIR) does not coordinate scoping comments for the preparation of environmental documents. However, OEIR's roles with respect to the review of any future environmental documents that may be prepared for the proposed action are described below.

NEPA and Federal Consistency Review Authorities

DEQ-OEIR will coordinate Virginia's review of environmental documents prepared pursuant to the National Environmental Policy Act and comment to the Federal Aviation Administration on behalf of the Commonwealth. A similar review process pertains to Federal Consistency Certifications (FCC) submitted pursuant to the Coastal Zone Management Act (CZMA) of 1972, as amended.

Pursuant to the CZMA, federal licensing or permit activities affecting Virginia's coastal resources or coastal uses must be consistent with the Virginia Coastal Resources Management Program (VCP) (see section *Federal Consistency Regulations*, 15 CFR Part 930, sub-part D, Consistency for Activities Requiring a License or Permit). This Office must be provided with a federal consistency certification which involves an analysis of the activities in light of the Enforceable Policies of the VCP (first enclosure), and a commitment to comply with the Enforceable Policies. In addition, we invite your attention to the Advisory Policies of the VCP (second enclosure).

If an FCC is included as part of a NEPA document (i.e., EA or EIS), DEQ can conduct a single review of the document. *Federal Consistency Regulations* (15 CFR Part 930, §930.62(a)) allow up to six months for review of an FCC. However, federal consistency reviews are typically completed within 60 days provided no significant issues are identified. We recommend this approach to save time and extra effort for the project proponent as well as for the commonwealth.

Sections 930.57 and 930.58 of the *Federal Consistency Regulations* and Virginia's *Federal Consistency Information Package* available on DEQ's web site at <http://www.deq.virginia.gov/eir/federal.html>, give content requirements for a consistency certification.

Environmental Review Participants

The following state and local Virginia agencies are likely to be included in the coordinated review of environmental documents submitted for the proposal (note: starred (*) agencies administer one or more of the Enforceable Policies of the Virginia Coastal Resources Management Program; see "Federal Consistency..." below):

Department of Environmental Quality:
Office of Environmental Impact Review

Mr. Charles Baummer
Metropolitan Washington Airports Authority

Northern Regional Office*
Water Division
Air Division*
Waste Division
Department of Game and Inland Fisheries*
Department of Conservation and Recreation:
Division of Chesapeake Bay Local Assistance*
Division of Soil and Water Conservation*
Division of Planning and Recreation Resources
Marine Resources Commission*
Department of Historic Resources
Department of Mines, Minerals, and Energy
Department of Agriculture and Consumer Services
Department of Aviation
Department of Transportation
Northern Virginia Regional Commission
Arlington County
City of Alexandria

In order to ensure an effective coordinated review of any NEPA document and the consistency certification, we may require up to 20 copies of the document when it is published. The document should include one or more U.S. Geological Survey topographic maps as part of its information. While this Office does not participate in scoping efforts beyond the advice given herein, other agencies may independently provide scoping comments to you concerning the preparation of a NEPA document and consistency certification for the proposed project.

For further discussion of the environmental review process and the federal consistency review process, please feel free to call me at (804) 698-4325.

I hope this information is helpful to you.

Sincerely,



Ellie Irons, Manager
Office of Environmental Impact Review

cc: John Bowden, DEQ-NRO
Kotur S. Narasimhan, DEQ-Air
Paul Kohler, DEQ-Waste
Dave Davis, DEQ-Water Protection
Amy Ewing, DGIF
Robbie Rhur, DCR
Tony Watkinson, MRC

Mr. Charles Baummer
Metropolitan Washington Airports Authority

Ethel R. Eaton, DHR
Mary Stanley, VDOT
Keith Tignor, VDACS
Matt Heller, DMME
Rusty Harrington, DoAV
Ron Carlee, Arlington County
James Hartmann, City of Alexandria
G. Mark Gibb, Northern Virginia Regional Commission



COMMONWEALTH of VIRGINIA

L. Preston Bryant, Jr.
Secretary of Natural Resources

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 629 East Main Street, Richmond, Virginia 23219
Mailing address: P. O. Box 10009, Richmond, Virginia 23240
Fax (804) 698-4500 TDD (804) 698-4021
www.deq.virginia.gov

David K. Paylor
Director

(804) 698-4000
1-800-592-5482

Attachment 1

Enforceable Regulatory Programs comprising Virginia's Coastal Resources Management Program (VCP)

- a. Fisheries Management - The program stresses the conservation and enhancement of finfish and shellfish resources and the promotion of commercial and recreational fisheries to maximize food production and recreational opportunities. This program is administered by the Marine Resources Commission (VMRC); Virginia Code 28.2-200 to 28.2-713 and the Department of Game and Inland Fisheries (DGIF); Virginia Code 29.1-100 to 29.1-570.

The State Tributyltin (TBT) Regulatory Program has been added to the Fisheries Management program. The General Assembly amended the Virginia Pesticide Use and Application Act as it related to the possession, sale, or use of marine antifoulant paints containing TBT. The use of TBT in boat paint constitutes a serious threat to important marine animal species. The TBT program monitors boating activities and boat painting activities to ensure compliance with TBT regulations promulgated pursuant to the amendment. The VMRC, DGIF, and Virginia Department of Agriculture Consumer Services (VDACS) share enforcement responsibilities; Virginia Code 3.1-249.59 to 3.1-249.62.

- b. Subaqueous Lands Management - The management program for subaqueous lands establishes conditions for granting or denying permits to use state-owned bottomlands based on considerations of potential effects on marine and fisheries resources, tidal wetlands, adjacent or nearby properties, anticipated public and private benefits, and water quality standards established by the Department of Environmental Quality (DEQ). The program is administered by the Marine Resources Commission; Virginia Code 28.2-1200 to 28.2-1213.
- c. Wetlands Management - The purpose of the wetlands management program is to preserve wetlands, prevent their despoliation, and accommodate economic development in a manner consistent with wetlands preservation.
- (1) The tidal wetlands program is administered by the Marine Resources Commission; Virginia Code 28.2-1301 through 28.2-1320.
 - (2) The Virginia Water Protection Permit program administered by DEQ includes protection of wetlands --both tidal and non-tidal; Virginia Code §62.1-44.15:5 and Water Quality Certification pursuant to Section 401 of the Clean Water Act.

- d. Dunes Management - Dune protection is carried out pursuant to The Coastal Primary Sand Dune Protection Act and is intended to prevent destruction or alteration of primary dunes. This program is administered by the Marine Resources Commission; Virginia Code 28.2-1400 through 28.2-1420.
- e. Non-point Source Pollution Control – (1) Virginia's Erosion and Sediment Control Law requires soil-disturbing projects to be designed to reduce soil erosion and to decrease inputs of chemical nutrients and sediments to the Chesapeake Bay, its tributaries, and other rivers and waters of the Commonwealth. This program is administered by the Department of Conservation and Recreation; Virginia Code 10.1-560 et seq.

(2) Coastal Lands Management is a state-local cooperative program administered by the DCR's Division of Chesapeake Bay Local Assistance and 84 localities in Tidewater (see i) Virginia; Virginia Code §10.1-2100 –10.1-2114 and 9 VAC10-20 et seq.
- f. Point Source Pollution Control - The point source program is administered by the State Water Control Board (DEQ) pursuant to Virginia Code 62.1-44.15. Point source pollution control is accomplished through the implementation of:
 - (1) the National Pollutant Discharge Elimination System (NPDES) permit program established pursuant to Section 402 of the federal Clean Water Act and administered in Virginia as the Virginia Pollutant Discharge Elimination System (VPDES) permit program.
 - (2) The Virginia Water Protection Permit (VWPP) program administered by DEQ; Virginia Code §62.1-44.15:5 and Water Quality Certification pursuant to Section 401 of the Clean Water Act.
- g. Shoreline Sanitation - The purpose of this program is to regulate the installation of septic tanks, set standards concerning soil types suitable for septic tanks, and specify minimum distances that tanks must be placed away from streams, rivers, and other waters of the Commonwealth. This program is administered by the Department of Health (Virginia Code 32.1-164 through 32.1-165).
- h. Air Pollution Control - The program implements the federal Clean Air Act to provide a legally enforceable State Implementation Plan for the attainment and maintenance of the National Ambient Air Quality Standards. This program is administered by the State Air Pollution Control Board (Virginia Code 10.1-1300 through §10.1-1320).
- (i) Coastal Lands Management is a state-local cooperative program administered by the DCR's Division of Chesapeake Bay Local Assistance and 84 localities in Tidewater, Virginia established pursuant to the Chesapeake Bay Preservation Act; Virginia Code §10.1-2100 –10.1-2114 and Chesapeake Bay Preservation Area Designation and Management Regulations; Virginia Administrative Code 9 VAC10-20 et seq.

Attachment 2

Advisory Policies for Geographic Areas of Particular Concern

- a. Coastal Natural Resource Areas - These areas are vital to estuarine and marine ecosystems and/or are of great importance to areas immediately inland of the shoreline. Such areas receive special attention from the Commonwealth because of their conservation, recreational, ecological, and aesthetic values. These areas are worthy of special consideration in any planning or resources management process and include the following resources:
 - a) Wetlands
 - b) Aquatic Spawning, Nursery, and Feeding Grounds
 - c) Coastal Primary Sand Dunes
 - d) Barrier Islands
 - e) Significant Wildlife Habitat Areas
 - f) Public Recreation Areas
 - g) Sand and Gravel Resources
 - h) Underwater Historic Sites.

- b. Coastal Natural Hazard Areas - This policy covers areas vulnerable to continuing and severe erosion and areas susceptible to potential damage from wind, tidal, and storm related events including flooding. New buildings and other structures should be designed and sited to minimize the potential for property damage due to storms or shoreline erosion. The areas of concern are as follows:
 - i) Highly Erodible Areas
 - ii) Coastal High Hazard Areas, including flood plains.

- c. Waterfront Development Areas - These areas are vital to the Commonwealth because of the limited number of areas suitable for waterfront activities. The areas of concern are as follows:
 - i) Commercial Ports
 - ii) Commercial Fishing Piers
 - iii) Community Waterfronts

Although the management of such areas is the responsibility of local government and some regional authorities, designation of these areas as Waterfront Development Areas of Particular Concern (APC) under the VCRMP is encouraged. Designation will allow the use of federal CZMA funds to be used to assist planning for such areas and the implementation of such plans. The VCRMP recognizes two broad classes of priority uses for waterfront development APC:

- i) water access dependent activities;
- ii) activities significantly enhanced by the waterfront location and complementary to other existing and/or planned activities in a given waterfront area.

Advisory Policies for Shorefront Access Planning and Protection

- a. Virginia Public Beaches - Approximately 25 miles of public beaches are located in the cities, counties, and towns of Virginia exclusive of public beaches on state and federal land. These public shoreline areas will be maintained to allow public access to recreational resources.
- b. Virginia Outdoors Plan - Planning for coastal access is provided by the Department of Conservation and Recreation in cooperation with other state and local government agencies. The Virginia Outdoors Plan (VOP), which is published by the Department, identifies recreational facilities in the Commonwealth that provide recreational access. The VOP also serves to identify future needs of the Commonwealth in relation to the provision of recreational opportunities and shoreline access. Prior to initiating any project, consideration should be given to the proximity of the project site to recreational resources identified in the VOP.
- c. Parks, Natural Areas, and Wildlife Management Areas - Parks, Wildlife Management Areas, and Natural Areas are provided for the recreational pleasure of the citizens of the Commonwealth and the nation by local, state, and federal agencies. The recreational values of these areas should be protected and maintained.
- d. Waterfront Recreational Land Acquisition - It is the policy of the Commonwealth to protect areas, properties, lands, or any estate or interest therein, of scenic beauty, recreational utility, historical interest, or unusual features which may be acquired, preserved, and maintained for the citizens of the Commonwealth.
- e. Waterfront Recreational Facilities - This policy applies to the provision of boat ramps, public landings, and bridges which provide water access to the citizens of the Commonwealth. These facilities shall be designed, constructed, and maintained to provide points of water access when and where practicable.
- f. Waterfront Historic Properties - The Commonwealth has a long history of settlement and development, and much of that history has involved both shorelines and near-shore areas. The protection and preservation of historic shorefront properties is primarily the responsibility of the Department of Historic Resources. Buildings, structures, and sites of historical, architectural, and/or archaeological interest are significant resources for the citizens of the Commonwealth. It is the policy of the Commonwealth and the VCRMP to enhance the protection of buildings, structures, and sites of historical, architectural, and archaeological significance from damage or destruction when practicable.



COMMONWEALTH of VIRGINIA

Department of Historic Resources

2801 Kensington Avenue, Richmond, Virginia 23221-0311

L. Preston Bryant, Jr.
Secretary of Natural Resources

Kathleen S. Kilpatrick
Director

Tel: (804) 367-2323
Fax: (804) 367-2391
TDD: (804) 367-2386
www.dhr.virginia.gov

23 July 2008

Mr. Charles Baummer
Planning Department
Metropolitan Washington Airports Authority
One Aviation Circle
Ronald Reagan Washington National Airport
Washington, DC 20001-6000

Re: Environmental Assessment, Runway 1-19 Safety Area Improvements and Related Improvements
Ronald Reagan Washington National Airport, City of Arlington
VDHR File No. 2008-1260

Dear Mr. Baummer:

Through the Virginia Department of Environmental Quality (DEQ) we were made aware of the above referenced project.

We want to remind you that the Metropolitan Washington Airports Authority, as a federal agency, must consider the effects of its actions on historic properties listed in or eligible for the National Register of Historic Places and provide the Advisory Council on Historic Preservation the opportunity to comment in accordance with Sections 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR 800. The Section 106 review process begins when the federal agency provides a description of the undertaking and its Area of Potential Effect (APE) to the State Historic Preservation Officer (SHPO), which in Virginia is the Department of Historic Resources (DHR). For this reason we request that you consult with us directly on this undertaking. While 36 CFR 800.8 allows federal agencies to coordinate Section 106 compliance with the National Environmental Policy Act (NEPA), the agency must inform the applicable SHPO early in the process that it intends to do so. The agency must also take care that the environmental documentation prepared under NEPA does present information about historic properties and potential effects to such resources at a level of detail that allows the SHPO and other consulting parties to comment.

We look forward to working with you on this project. If you have any questions concerning our comments, please contact me at (804) 367-2323, ext. 114.

Sincerely,

Marc Holma, Manager
Office of Review and Compliance

Cc: Ellie Irons, DEQ

Administrative Services
10 Courthouse Avenue
Petersburg, VA 23803
Tel: (804) 863-1624
Fax: (804) 862-6196

Capital Region Office
2801 Kensington Ave.
Richmond, VA 23221
Tel: (804) 367-2323
Fax: (804) 367-2391

Tidewater Region Office
14415 Old Courthouse Way, 2nd Floor
Newport News, VA 23608
Tel: (757) 886-2807
Fax: (757) 886-2808

Roanoke Region Office
1030 Penmar Ave., SE
Roanoke, VA 24013
Tel: (540) 857-7585
Fax: (540) 857-7588

Northern Region Office
5357 Main Street
PO Box 519
Stephens City, VA 22655
Tel: (540) 868-7031
Fax: (540) 868-7033

FW Reagan National Airport Runway 1-19 improvements.txt

-----Original Message-----

From: John Nichols [mailto:John.Nichols@noaa.gov]

Sent: Monday, July 28, 2008 3:59 PM

To: Environmental Comments

Subject: Reagan National Airport, Runway 1-19 improvements

To Charles Baummer:

The following comments pertain to our phone conversation on July 28, 2008.

National Marine Fisheries Service has reviewed the request for scoping comments, dated June 27, 2008, for preparation of an Environmental Assessment for proposed improvements to Runway 1-19 at Reagan Washington

National Airport. Proposed actions will, for the most part, be confined

to upland areas, and should not affect aquatic resources under our jurisdiction in the Potomac River. The only proposed action that will encroach into adjacent waters of the Potomac River will be relocation of

approach light bars, which will be set on finger piers. The finger piers will have decking 6 feet wide, and situated 10 feet above the water surface. This should minimize any shading impacts to waters beneath the pier, as well as to submerged aquatic vegetation that may grow in this area.

Unless this proposal changes in the future with regard to encroachment into the Potomac River, National Marine Fisheries Service has no concerns, and will have no additional input on preparation of the Environmental Assessment.

GOVERNMENT OF THE DISTRICT OF COLUMBIA
HISTORIC PRESERVATION OFFICE
OFFICE OF PLANNING



August 5, 2008

J. Charles Baummer Jr., Ph.D.
Environmental Engineer
Planning Department
Metropolitan Washington Airports Authority
Ronald Reagan Washington National Airport
Washington, DC 20001-4901

RE: Environmental Assessment, Runway 1-19 Safety Area Improvements and related Improvements, Ronald Reagan Washington National Airport

Dear Dr. Baummer:

Thank you for contacting the DC State Historic Preservation Office (SHPO) regarding the above-referenced undertaking. Since we understand that the proposed runway improvements will require approval by the Federal Aviation Administration, we have reviewed the project information in accordance with Section 106 of the National Historic Preservation Act and are writing to provide our comments regarding effects on historic properties.

We understand that the majority of the proposed safety improvements will be carried out within the boundaries of Washington National Airport and will, therefore, have little potential to adversely affect any historic properties located within the District of Columbia. Although the proposed approach light safety improvements will require relocating the lights 300 feet to the south of their current location within the Potomac River and constructing three new 100-foot long crossbars, we do not believe that these actions will adversely affect any historic resources either. Therefore, we have determined that this undertaking will have "no adverse effect" on historic properties and that no further review or comment from the DC SHPO will be necessary.

If you should have any questions or comments regarding this matter, please contact me at andrew.lewis@dc.gov or 202-442-8841. Otherwise, thank you for providing this opportunity to review and comment.

Sincerely,

C. Andrew Lewis
Senior Historic Preservation Specialist
DC State Historic Preservation Office

08-255

From: nhreview nhreview [nhreview.po-richmond.dom-richmond@dcr.virginia.gov]

Sent: Wednesday, August 06, 2008 2:36 PM

To: Environmental Comments

Subject: Runway 1-19 Safety Area Improvements - Natural HeritageComments

Attachments: 53884, Runway 1-19 Safety Area Improvements.pdf

Mr. Baummer,

Please find attached the DCR-DNH comments for the above referenced project. The comments are in pdf format and can be printed for your records. Also species rank information is available at http://www.dcr.virginia.gov/natural_heritage/help.shtml for your reference.

Please send a confirmation e-mail upon receipt of our comments. Let us know if you have any questions.

Thank you for your request.

L. Preston Bryant, Jr.
Secretary of Natural Resources



Joseph H. Maroon
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

217 Governor Street
Richmond, Virginia 23219-2010
(804) 786-7951 FAX (804) 371-2674

August 6, 2008

Charles Baummer
Planning Department
Metropolitan Washington Airports Authority
One Aviation Circle, Reagan Washington National Airport
Washington, DC 20001-6000

Re: Runway 1-19 Safety Area Improvements and Related Improvements

Dear Mr. Baummer:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

Biotics documents the presence of natural heritage resources in the project vicinity. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

In addition, our files do not indicate the presence of any State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.


The Virginia Department of Game and Inland Fisheries maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters, which may contain information not documented in this letter. Their database may be

*State Parks • Soil and Water Conservation • Natural Heritage • Outdoor Recreation Planning
Chesapeake Bay Local Assistance • Dam Safety and Floodplain Management • Land Conservation*

accessed from http://www.dgif.virginia.gov/wildlife/info_map/index.html , or contact Shirly Dressler at (804) 367-6913.

Should you have any questions or concerns, feel free to contact me at 804-692-0984. Thank you for the opportunity to comment on this project.

Sincerely,

A handwritten signature in black ink that reads "Kristal McKelvey". The signature is written in a cursive style with a large, stylized initial "K".

Kristal McKelvey
Coastal Zone Locality Liaison

From: Maria.Stanco@faa.gov
Sent: Thursday, August 07, 2008 11:04 AM
To: Environmental Comments
Cc: Jennifer.Mendelsohn@faa.gov
Subject: DCA RW1-19 Scoping

Charles:

I want to bring to your attention one comment on the scoping letter on this project. This letter mentions that the EA will be prepared in accordance with FAA orders 1050.1E as well as 5050.4B. Please be aware that the document should also be consistent with the Environmental Desk Reference for Airport Actions which can be found at

http://www.faa.gov/airports_airtraffic/airports/environmental/environmental_desk_ref/

Thanks.

Maria Stanco, AICP
Environmental Program Manager, AEA-610
Federal Aviation Administration
Eastern Region
1 Aviation Plaza
Jamaica, New York 11434-4809
(718) 553-2511
(718) 995-5615 (fax)
maria.stanco@faa.gov

From: Erica.Bannerman@alexandriava.gov

Sent: Friday, August 15, 2008 12:09 PM

To: Environmental Comments

Cc: Baummer Jr., Charley; Cooper, Michael; Rich.Baier@alexandriava.gov;

William.Skrabak@alexandriava.gov; Lalit.Sharma@alexandriava.gov; Bernard.Caton@alexandriava.gov

Subject: City of Alexandria's Comments to EA Scoping: Runway Safety Area Improvements

Attachments: AlexCommentEARunwayProject.PDF

Hi Charles,

It was a pleasure meeting you at the public scoping meeting on July 30th. Attached are the City of Alexandria's comments on the Environmental Assessment Scoping for the Runway Safety Area Improvements at Ronald Reagan Washington National Airport. Please feel free to contact me if you have questions or concerns.

Thanks,

Erica Bannerman

Senior Environmental Specialist

City of Alexandria, Transportation & Environmental Services

301 N King Street Suite 3000

Alexandria, VA 22314

Telephone Number: 703-519-3400 ext 165

Fax Number: 703-519-5941

Sign-up today for [Environmental Quality E-News](#) to receive updates on volunteer opportunities and environmental events.

Public Comment Form - Environmental Assessment Scoping

Runway 1-19 Runway Safety Area Enhancements and Related Improvements

Ronald Reagan Washington National Airport

PLEASE NOTE: Comments must be received no later than 5:00 PM EST, August 15, 2008.

1. Submit your comments at the Public Information Workshop, Wednesday, July 30, 2008, from 6:00 PM to 8:00 PM, Historic Main Terminal, Ronald Reagan Washington National Airport; or,
2. Mail your comments to: Charles Baumger, Metropolitan Washington Airports Authority, Planning Department, One Aviation Circle, Reagan Washington National Airport, Washington, DC 20001-6000; or,
3. E-mail your comments to: environmental.comments@mwaac.com

Name: Erica Bannerman Date: 7/30/08
Address: 301 King St
City: Alexandria State: VA Zip: 22314
Phone: 703-519-3400 ext. 165 E-Mail: erica.bannerman@alexandriavirg.gov

Comments: Comments should identify: issues that need not be addressed in detail; temporal and geographic boundaries of the environmental analysis; available technical information prepared by others that may relate to the environmental resources being assessed; past, present, and reasonably foreseeable actions in the proposed project area that may be appropriate for consideration during the analysis of cumulative effects; and, agencies with jurisdiction or having special expertise and their relevant issues, consultation requirements, and data needs.

• Please notify me via email when environmental assessment will be released to public.

- Please ensure that proper attention is given to changes in noise US DNL, light intensity, air pollution, and potential noise generated from construction activities.

• Please present environmental assessment results to MWCOG APC (formerly known as CONAARDA).

• If possible, please ensure that staff operating noise hot line are aware of these changes and are able to help callers with concerns.

Additional comments may follow from the City of Alexandria.

If you have any questions, please contact Steve Muench, Ricondo & Associates, at 703-519-2181 ext. 209.

From: Brent_O'Neill@nps.gov
Sent: Friday, August 15, 2008 10:05 AM
To: Environmental Comments
Cc: Jon_James@nps.gov
Subject: public scoping comments

Charlie,

Below you will find comments from the George Washington Memorial Parkway. I would like to have the Superintendent review these before they are official to you, so please if you will consider them draft for the moment. Due to a couple of emergency compliance issues requiring documentation this week, and the fact that the Superintendent is out today, I have been unable to finalize these comments. I will send these to the GWMP Superintendent and ask him to forward to you after he has reviewed and made any changes, which I suspect would be minor. You can expect the comments to be sent to you next week.

Thank you for the opportunity to be involved in the EA process,

Brent O'Neill

To: Charles Baumer, Planning Department Metropolitan Washington Airports Authority

From, Jon G. James, Acting Superintendent, George Washington Memorial Parkway and Brent O'Neill, Environmental Protection Specialist, George Washington Memorial Parkway (GWMP)

Thank you for the opportunity to provide comments on the Environmental Assessment (EA) for proposed Runway 1-19 Safety Area Improvements and Related Improvements through your public scoping process. We have reviewed the materials you sent to us on June 27, 2008, and the July 30, 2008 public scoping materials. In addition my staff attended an agency scoping meeting on July 31, 2008. We have the following comments to offer you for consideration in your environmental review process and preparation of the EA.

The construction of the 300-foot extension of the approach light pier will involve new construction on the bed of the Potomac River to place pilings. A Right of Way permit will be required by the National Park Service, National Capital Region, who administers the land which belongs to the United States of America. Analysis should be included on any Submerged Aquatic Vegetation and mitigation identified. Construction should avoid months when migratory fish are spawning.

The extension of the approach light pier has the potential to impact recreation resources occurring from Daingerfield Island. The EA should address this topic in the affected environment and impact sections. The aerial maps provided in the scoping materials did not depict the extension of the light pier, but should in the EA. It was noted that the Washington Sailing Marina commented on the potential impacts the extension could have (barrier in the water) on their constituents/GWMP park users, and suggested the possibility to dredge the waters in the adjacent bay to provide improved recreation access of those waters. According to our records, the GWMP owns most of the waters that could be affected by these suggested dredging activities. A permit would be required from GWMP to conduct this

activity, which could be included in the ROW for the pier pilings to be determined. If this action is included in the EA, analysis would need to occur to determine if the sediments contain hazardous materials, and best management practices identified for removal and disposal of dredged materials. In addition, analysis should be included on any Submerged Aquatic Vegetation and fish habitat, and mitigation identified. Dredging operations should avoid months when migratory fish are spawning.

The proposed improvements on the southern end of Runway 1-19, including the proposed hold apron could have visual/viewsheds impacts from the Mount Vernon Trail. The EA should provide some analysis of those potential impacts and mitigation opportunities. If additional vegetation screening is proposed for mitigation, please consult with the park early on to determine what issues or concerns might exist in the area of effect.

The NPS is concerned by any change in green space currently in place for the Runway Safety Areas that can impact the viewshed from parklands. Consideration should be given in the purpose and needs section to define an objective which maintains green space (turf or meadow) to the maximum extent possible. The EA should identify any areas that may be turned into grass due to shifting of hard surface areas.

For any construction that will involve ground disturbance, archeological testing should be performed for the entire area of effect to determine if an archeological survey is needed. Our records indicate that the original Potomac River shoreline ran through approximately the midpoint (North and South) of what is now Reagan National Airport. The EA should contain a discussion of the affected environment, where fill lines are located (include historic maps), and what if any potential there is for archeological impacts.

It is unclear from the materials presented so far what considerations are being given to storm water runoff facilities associated with the improvements. The additional hard surface areas, most notably the runway extension (300 feet) and the hold apron expansion will add significant increases to runoff. The EA should provide analysis of this increase and the potential impacts to the Potomac River and Chesapeake Bay watersheds. Mitigation should be identified in the EA that considers best management practices to treat storm water runoff before it reaches the Potomac River. Mitigation could also consider treatments in locations within the Airport but outside the limits of disturbance for this project. In addition, consideration should be given to whether porous pavers could be used on the rerouted service road.

Note: these comments are draft. See comments sent by Jon G. James, Acting Superintendent, GWMP

Brent O'Neill
Environmental Protection Specialist
George Washington Memorial Parkway
McLean, VA 22101
Tel. 703-289-2540
cell 202-438-6614
Brent_O'Neill@nps.gov



DEPARTMENT OF TRANSPORTATION AND ENVIRONMENTAL SERVICES

Office of Environmental Quality

P.O. Box 178 – City Hall

Alexandria, Virginia 22314

<http://alexandriava.gov/>

August 15, 2008

Charles Baummer
Metropolitan Washington Airports Authority
Planning Department
One Aviation Circle
Ronald Reagan Washington National Airport
Washington, DC 20001-6000

Re: City of Alexandria's Comments on the Environmental Assessment Scoping for Runway Safety Area Improvements Ronald Reagan Washington National Airport

Dear Mr. Baummer:

The City of Alexandria ("Alexandria") appreciates the opportunity to provide comments on the Environmental Assessment Scoping for Runway Safety Area Improvements at Ronald Reagan Washington National Airport. As proposed, the Runway Safety Areas (RSA) improvements include relocation of the Runway 1 threshold by 300 feet to the south, extension of taxiway pavement to the relocated threshold, relocation of the glide slope antenna and approach lights for Runway 1-19, the rerouting of an existing service road, relocation and expansion of an aircraft hold apron, and resurfacing of Runway 1-19.

The comments presented below identify the specific items Alexandria would like the Metropolitan Washington Airports Authority (the Authority) to address during the environmental assessment process:

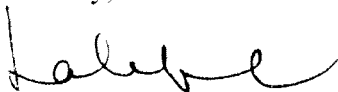
1. To a typical resident, noise generated by a single noise event, such as an airplane flying along the Potomac River is of most concern. Therefore, when determining a "significant change" in noise exposure using the Integrated Noise Model, etc., the Authority should evaluate the noise impact along the entire shoreline of Alexandria based on (a) a single noise event as well as (b) the A-weighted Day-Night Average Sound Level (DNL).
2. Potomac River Generating Station, located along the Potomac River in the City of Alexandria is very close to the existing flight path. The Federal Aviation Administration has permitted Mirant Potomac River Generating Station an increase in the height of its stacks by 50 feet. We understand the impact of RSA

improvements includes planes flying at elevation lower than their current elevation. The authority should thoroughly examine impacts on the safety aspects because of likely increase in the stack height as well as simultaneous lowering of the flight path elevation.

3. The Authority presented to the public only the “preferred alternative” at the public scoping workshop on July 30, 2008. Alexandria requests the Authority release to the public all proposed alternatives and include an alternative to relocate Runway 1 threshold by 300 feet to the north, and/or a combination where it is a combination of extension both north and south.

Once again, Alexandria appreciates the opportunity to provide these comments on the environmental assessment scoping. We look forward to receiving future notifications of important milestones related to the assessment and providing more substantial comments when the draft environmental assessment is released. Please feel free to contact me at (703) 519-3400 ext. 164 if you have questions or concerns.

Sincerely,



Lalit Sharma, P.E.
Division Chief, Office of Environmental Quality
Department of Transportation & Environmental Services
City of Alexandria

cc: Richard Baier, Director, T&ES, City of Alexandria
William Skrabak, Director, Office of Environmental Quality, City of Alexandria
Bernard Caton, Legislative Director, City of Alexandria
Erica Bannerman, Senior Air Pollution Control Specialist, City of Alexandria

FW ESSLog# 25539_ES Scoping_Ronald Reagan Washington National Airport.txt
From: Amy. Ewing@dgif.virginia.gov [mailto: Amy. Ewing@dgif.virginia.gov]
Sent: Monday, August 18, 2008 12:58 PM
To: Environmental Comments
Cc: elirons@deq.virginia.gov
Subject: ESSLog# 25539_ES Scoping_Ronald Reagan Washington National Airport

We received a letter from the Metropolitan Washington Airports Authority requesting information from our agency regarding fish and wildlife resources under our jurisdiction known from the subject project area. According to our records, Fourmile Run and the Potomac River have been designated Confirmed Anadromous Fish Use Areas. We recommend that the EA for this project address any potential impacts upon these resources and/or tributaries to them. We further recommend that the EA address erosion and sedimentation controls that will be in place during construction.

Thank you. Amy

Amy M. Ewing
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries 4010 West Broad Street
Richmond, VA 23230
804-367-2211
amy.ewing@dgif.virginia.gov

From: Jon_James@nps.gov

Sent: Monday, August 18, 2008 1:48 PM

To: Environmental Comments

Cc: Deborah_Deas@nps.gov; Sean_McCabe@nps.gov; Brent_O'Neill@nps.gov; Vincent_Santucci@nps.gov

Subject: Fw: public scoping comments for the Environmental Assessment (EA) for proposed Runway 1-19 Safety Area Improvements and Related Improvements at Reagan Airport

Mr. Baumer,

After reviewing GWMP Park Ranger (Community Planning and Lands) Sean McCabe's and Compliance Coordinator Brent O'Neill's comments, I'm in complete agreement with their recommendations and thoughts regarding the environmental review process and preparation of the environmental assessment for the Runway Safety Area Enhancements for Runway 1-19 Project. The topics you indicate in blue (i.e., Coastal Resources, Fish, Wildlife, and Plants, Floodplains, Hazardous Materials, Noise, Water Quality, and Wetlands) under the Environmental Impact Categories on page 13 are indeed areas that will require more in-depth study for the National Park Service (NPS). In addition, Historical, Architectural, Archeological, and Cultural Resources (particularly archeological); Light Emissions and Visual Impacts (Viewsheds in NPS terms); and the handling of storm water runoff are other areas of equal concern for the NPS.

We appreciate the opportunity to comment on this important safety project and look forward to working with you.

Thanks!

Jon G. James
Acting Supt., GWMP
(703) 289-2500

CONFIDENTIALITY NOTICE: This message (including any attachments) is intended exclusively for the individual or entity to which it is addressed. This communication may contain information that is proprietary, privileged or confidential or otherwise legally exempt from disclosure. If you are not the named addressee, you are not authorized to read, print, retain, copy or disseminate this message or any part of it. If you have received this message in error, please notify the sender immediately by e-mail and delete all copies of the message.

----- Forwarded by Jon James/GWMP/NPS on 08/18/2008 01:29 PM -----

|-----+----->
	Brent O'Neill
	08/15/2008 10:02
	AM EDT
-----+----->	

>-----+-----|

|
| To: Jon James/GWMP/NPS@NPS
| cc: |
| Subject: public scoping comments for the Environmental Assessment (EA) for proposed Runway 1-19 Safety Area |
| Improvements and Related Improvements at Reagan Airport |

JJ,

The public scoping comments for the Environmental Assessment (EA) for proposed Runway 1-19 Safety Area Improvements and Related Improvements at Reagan Airport are due today, August 15th. I will send the following comments to them which were generated by Sean and I with the caveat that you will forward comments with any of your changes next week. Please see other email and email address to send them to Charles Baumer at Metropolitan Washington Airport Authority. I will leave some background information in you box. I have discussed these comments with Sean, and we think we have covered everything we need to comment on. Sorry I missed you today. Also, I will be out all next week hence these emails. Simply emailing the comments to Charles Baumer is fine at environmental.comments@mwaac.com

Brent

.....

To: Charles Baumer, Planning Department Metropolitan Washington Airports Authority

From, Jon G. James, Acting Superintendent, George Washington Memorial Parkway and Brent O'Neill, Environmental Protection Specialist, George Washington Memorial Parkway (GWMP)

Thank you for the opportunity to provide comments on the Environmental Assessment (EA) for proposed Runway 1-19 Safety Area Improvements and Related Improvements through your public scoping process. We have reviewed the materials you sent to us on June 27, 2008, and the July 30, 2008 public scoping materials. In addition my staff attended an agency scoping meeting on July 31, 2008. We have the following comments to offer you for consideration in your environmental review process and preparation of the EA.

The construction of the 300-foot extension of the approach light pier will involve new construction on the bed of the Potomac River to place pilings. A Right of Way permit will be required by the National Park Service, National Capital Region, who administers the land which belongs to the United States of America. Analysis should be included on any Submerged Aquatic Vegetation and mitigation identified. Construction should avoid months when migratory fish are spawning.

The extension of the approach light pier has the potential to impact recreation resources occurring from Daingerfield Island. The EA should address this topic in the affected environment and impact sections. The aerial maps provided in the scoping materials did not depict the extension of the light pier, but should in the EA. It was noted that the Washington Sailing Marina commented on the potential impacts the extension could have (barrier in the water) on their constituents/GWMP park users, and suggested the possibility to dredge the waters in the adjacent bay to provide improved recreation access of those waters. According to our records, the GWMP owns most of the waters that could be affected by these suggested dredging activities. A permit would be required from GWMP to conduct this activity, which could be included in the ROW for the pier pilings to be

determined. If this action is included in the EA, analysis would need to occur to determine if the sediments contain hazardous materials, and best management practices identified for removal and disposal of dredged materials. In addition, analysis should be included on any Submerged Aquatic Vegetation and fish habitat, and mitigation identified. Dredging operations should avoid months when migratory fish are spawning.

The proposed improvements on the southern end of Runway 1-19, including the proposed hold apron could have visual/viewsheds impacts from the Mount Vernon Trail. The EA should provide some analysis of those potential impacts and mitigation opportunities. If additional vegetation screening is proposed for mitigation, please consult with the park early on to determine what issues or concerns might exist in the area of effect.

The NPS is concerned by any change in green space currently in place for the Runway Safety Areas that can impact the viewshed from parklands. Consideration should be given in the purpose and needs section to define an objective which maintains green space (turf or meadow) to the maximum extent possible. The EA should identify any areas that may be turned into grass due to shifting of hard surface areas.

For any construction that will involve ground disturbance, archeological testing should be performed for the entire area of effect to determine if an archeological survey is needed. Our records indicate that the original Potomac River shoreline ran through approximately the midpoint (North and South) of what is now Reagan National Airport. The EA should contain a discussion of the affected environment, where fill lines are located (include historic maps), and what if any potential there is for archeological impacts.

It is unclear from the materials presented so far what considerations are being given to storm water runoff facilities associated with the improvements. The additional hard surface areas, most notably the runway extension (300 feet) and the hold apron expansion will add significant increases to runoff. The EA should provide analysis of this increase and the potential impacts to the Potomac River and Chesapeake Bay watersheds. Mitigation should be identified in the EA that considers best management practices to treat storm water runoff before it reaches the Potomac River. Mitigation could also consider treatments in locations within the Airport but outside the limits of disturbance for this project. In addition, consideration should be given to whether porous pavers could be used on the rerouted service road.

S// Jon G. James

Brent O'Neill
Environmental Protection Specialist
George Washington Memorial Parkway
McLean, VA 22101
Tel. 703-289-2540
cell 202-438-6614
Brent_O'Neill@nps.gov

Public Comments

From: Gowdy, Jelani M [Jelani.M.Gowdy@boeing.com]

Sent: Tuesday, July 22, 2008 7:16 PM

To: Environmental Comments

Subject: Ronald Reagan Washington National Airport PUBLIC SCOPING WORKSHOP ?'s

Mr. Baummer,

I wanted to inquire about attending the environmental assessment for runway safety area improvements workshop remotely. Will there be a link available that the public can access which will allow the event to be broadcasted virtually? I will not be able to attend the workshop in person but would like to view the material that is scheduled to be presented during the evening of July 30. If a public link is not available, is it possible for me to request that the graphics and all other additional material that is contained within the presentation be e-mailed to me? Your consideration of my situation will be greatly appreciated.

Thank you in advance for your assistance.

Regards,

Jelani Gowdy

Public Comment Form - Environmental Assessment Scoping

Runway 1-19 Runway Safety Area Enhancements and Related Improvements

Ronald Reagan Washington National Airport

PLEASE NOTE: Comments must be received no later than 5:00 PM EST, August 15, 2008.

1. Submit your comments at the Public Information Workshop, Wednesday, July 30, 2008, from 6:00 PM to 8:00 PM, Historic Main Terminal, Ronald Reagan Washington National Airport; or,
2. Mail your comments to: Charles Baummer, Metropolitan Washington Airports Authority, Planning Department, One Aviation Circle, Reagan Washington National Airport, Washington, DC 20001-6000; or,
3. E-mail your comments to: environmental.comments@mwaac.com

Name: BERNADETTE LIPARI Date: 7/30/08
Address: 8727 CONTEE ROAD #304
City: LAUREL State: MD Zip: 20708
Phone: 301-497-1577 E-Mail: bklipari@hotmail.com

Comments: Comments should identify: issues that need not be addressed in detail; temporal and geographic boundaries of the environmental analysis; available technical information prepared by others that may relate to the environmental resources being assessed; past, present, and reasonably foreseeable actions in the proposed project area that may be appropriate for consideration during the analysis of cumulative effects; and, agencies with jurisdiction or having special expertise and their relevant issues, consultation requirements, and data needs.

THE PRESENTATION WAS VERY INFORMATIVE EXPLAINING TIME-LINES FOR CONSTRUCTION + LODS AND WILDLIFE CONCERNS.

If you have any questions, please contact Steve Muench, Ricondo & Associates, at 703-519-2181 ext. 209.

Public Comment Form - Environmental Assessment Scoping

Runway 1-19 Runway Safety Area Enhancements and Related Improvements

Ronald Reagan Washington National Airport

PLEASE NOTE: Comments must be received no later than 5:00 PM EST, August 15, 2008.

1. Submit your comments at the Public Information Workshop, Wednesday, July 30, 2008, from 6:00 PM to 8:00 PM, Historic Main Terminal, Ronald Reagan Washington National Airport; or,
2. Mail your comments to: Charles Baummer, Metropolitan Washington Airports Authority, Planning Department, One Aviation Circle, Reagan Washington National Airport, Washington, DC 20001-6000; or,
3. E-mail your comments to: environmental.comments@mwa.com

Name: PETER PENNINGTON Date: 30 JULY 2008
Address: 1213 PINE ST
City: ALEXANDRIA State: VA Zip: 22314
Phone: 703 836 7007 E-Mail: KERNOW@ATT.NET

Comments: Comments should identify: issues that need not be addressed in detail; temporal and geographic boundaries of the environmental analysis; available technical information prepared by others that may relate to the environmental resources being assessed; past, present, and reasonably foreseeable actions in the proposed project area that may be appropriate for consideration during the analysis of cumulative effects; and, agencies with jurisdiction or having special expertise and their relevant issues, consultation requirements, and data needs.

- 1) NOISE DURING CONSTRUCTION, DUST, TRUCKS ETC. NATIVES VERY TOUCHY ABOUT THESE ISSUES.
 - 2) MINANT (POTOMAC ELECTRICITY) WILL NOW BE PUSHING 5 STACKS WORTH EXHAUST UP 2 STACKS - IF PERMIT WAS GRANTED BY DEP TONIGHT.
 - 3) NEPA & ENDANGERED SPECIES ACT. DO ALL YOU CAN TO PRESERVE THE A/C THAT CONSISTENTLY ARRIVES & DEPARTS ON TIME.
- GOOD LUCK.

If you have any questions, please contact Steve Muench, Ricondo & Associates, at 703-519-2181 ext. 209.

From: Baummer Jr., Charley [John.Baummer@MWAA.com]
Sent: Thursday, July 31, 2008 9:11 AM
To: Stephen Muench
Subject: FW: Longer Runway

From: Eckenrode, Steve F CIV NCIS, Code 10 [mailto:stephen.f.eckenrode@navy.mil]
Sent: Thursday, July 31, 2008 8:45 AM
To: Environmental Comments
Subject: Longer Runway

I live in Palisade Gardens north of the airport and the planes come over my home all the time. Sometimes they are way lower then regulation permit. I truly feel longer runways only will bring larger planes not safety/ We have enough concrete in the area with run off in the river do we really need to add more?

Please stop this project and slow down the air traffic into Regan Airport. The air pollution is so bad at time our eyes burn and the paint on the cars are becoming damaged.

Stephen Eckenrode
Travel Manager NCIS HQ
<http://infoweb.ncis.navy.mil/agency/deptwebsites/personnel/travel.html>

From: Karyl Owings [karylc@yahoo.com]

Sent: Friday, August 15, 2008 10:53 AM

To: Environmental Comments

Subject: comments on EAS for Runway 1-19 Safety Enhancements plan

As a slipholder at Washington Sailing Marina and member a local sailing club based at that marina, I offer the following comments on recreational and cultural uses of the nearby Washington Sailing Marina, on the VA side of the Potomac, that should be considered and protected during construction of the DCA Runway 1-19 safety enhancements:

- Placement of the barge containing equipment on the river may impact, or be impacted by, child and adult sailing classes conducted at the marina by both the Sailing Club of Washington (www.scow.org) and the park service. Construction noise in particular can disrupt classes being held in the Cove.
- Also potentially impacted by barge placement are the numerous child and adult collegiate and private club sailing races and regattas held every year, which are all based out of Washington Sailing Marina. One of the largest regattas held each year is for the Leukemia and Lymphoma Society; known as the "Leukemia Cup", this regatta runs every Labor Day weekend.
- Likewise, all sailors utilizing Washington Sailing Marina do not wish to present a distraction or security concern to construction at DCA. Keeping the barge as far away from areas utilized by pleasure craft (ie, the Cove, the small boat docks, and the channel leading out of Washington Sailing Marina), should be a priority when choosing where to site an equipment barge. A potential solution could be the creation of a "safety zone" around the barge, in whole or in part, with the use of small floating buoys tied together, to discourage the curious from getting close to the barge. Large No Trespassing signs could be added to the sides of the barge.
- Additionally, the propensity for silting around the barge should also be considered when choosing its site. Not only could the barge potentially cause a local increase in silting right around where it is situated, it could also become mired by silt buildup around it, making it difficult to move if needed.
- When choosing where to site the barge, the shallow status of the water around the runway extension should be considered. It is possible that the water in that area is already too low to get a barge exactly where it's desired. Water levels at proposed barge sites should be tested at the lowest possible low tides (outgoing low tide when wind is WNW in a dry month, if at all possible) to avoid an unexpectedly grounded barge. Some areas of the shoal surrounding the runway extension are exposed to the air at very low tides.
- The possibility of causing additional silting locally or new silting patterns downstream of the barge should be considered during planning. No matter where the barge is located, it will have implications for changes in silting patterns downstream. The possibility of negatively impacting the small channel for pleasure boats leading out of the Washington Sailing Marina on the VA side should be considered, and the possibility of needing to dredge a part of the small boat channel if silting occurs such that the channel is unusable for boats with less than a 5" draft, should be kept in mind.

Thank you for the opportunity to comment.

Karyl Owings

member, Sailing Club of Washington (www.scow.org)

Comments Received Between the Close of Scoping and the Release of the Draft Environmental Assessment



Northern Virginia Regional Commission

November 3, 2008

Mr. Charles Baummer
Planning Department
Metropolitan Washington Airports Authority
One Aviation Circle
Reagan Washington National Airport
Washington, DC 20001-6000

Re: Environmental Assessment, Runway 1-19 Safety Area Improvements and Related Improvements, Ronald Reagan Washington National Airport

Dear Mr. Baummer:

The Northern Virginia Regional Commission staff has reviewed the document described above and has the following comments.

Please be advised that Arlington County has enacted jurisdiction-wide Chesapeake Bay Resource Management Area (RMA) designation. This RMA designation requires that all development result in a no-net-increase standard for phosphorus loadings, based on the jurisdiction's average imperviousness. Please refer to the Northern Virginia BMP Handbook for calculations procedures. A copy of the Handbook is available on NVRC's website at <http://www.novaregion.org/index.asp?NID=250>.

Special attention should be given to post-construction stormwater quality management. The developing agency must adhere to the *post*-development water quality requirements set forth by the Virginia Stormwater Management Regulations (VR 215-02-00 Part IV and §2.3). This project falls under the jurisdiction of the Chesapeake Bay Preservation Act (CBPA). The CBPA requires the maintenance of a 100 foot riparian buffer along all perennial streams and wetlands. Please refer to the CBPA for allowable uses within, or near, such Resource Protection and Maintenance Areas.

A copy of this letter should be included with your submission to indicate that preliminary review by this agency has been completed. Your cooperation with this intergovernmental review process is appreciated.

Sincerely,

A handwritten signature in black ink that reads "Marshall Popkin".

Marshall Popkin
Environmental Planner

Chairman

Hon. Gerald E. Connolly

Vice-Chairman

Hon. Harry J. "Hal" Parrish, II

Treasurer

Hon. Martin E. Nohe

Executive Director

G. Mark Gibb

County of Arlington

Hon. Barbara A. Favola

Hon. J. Walter Tejada

County of Fairfax

Hon. Sharon Bulova

Hon. Gerald E. Connolly

Hon. John Foust

Hon. Penelope A. Gross

Hon. Pat Herry

Hon. Catherine M. Hudgins

Hon. Linda Smyth

County of Loudoun

Hon. Lori Waters

Hon. Scott K. York

County of Prince William

Hon. Michael C. May

Hon. Martin E. Nohe

Hon. Frank J. Principi

City of Alexandria

Hon. Redella S. Pepper

Hon. Paul C. Smedberg

City of Fairfax

Hon. Joan Cross

City of Falls Church

Hon. Harold Lippman

City of Manassas

Hon. Harry J. "Hal" Parrish, II

City of Manassas Park

Hon. William J. Treuting, Jr.

Town of Dumfries

Hon. Fred E. Yohey, Jr.

Town of Herndon

Hon. Steve DeBenedittis

Town of Leesburg

Hon. Kristen C. Umstatt

Town of Purcellville

Hon. Robert W. Lazaro, Jr.

Town of Vienna

Hon. M. Jane Seeman

(as of February 20, 2008)



**NORTHERN VIRGINIA
REGIONAL COMMISSION**
3060 Williams Drive, Suite 510
Fairfax, Virginia 22031

NOV 04 2008

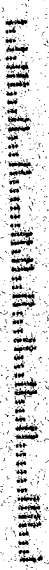
210301

Mr. Charles Baummer
Planning Department
Metropolitan Washington Airports Authority
One Aviation Circle
Reagan Washington National Airport
Washington, DC 20001-6001

20001-6000



UNITED STATES POSTAGE
FIRST CLASS
\$00.42⁰
02 1A
0004601892 NOV 04 2008
MAILED FROM ZIP CODE 22031



From: Gowdy, Jelani M [Jelani.M.Gowdy@boeing.com]
Sent: Wednesday, November 05, 2008 8:45 PM
To: Baummer Jr., Charley
Subject: RE: Ronald Reagan Washington National Airport PUBLIC SCOPING WORKSHOP ?'s

Mr. Baummer,

Earlier during the summer, I inquired about the PUBLIC SCOPING WORKSHOP that was held at Ronald Reagan Washington National Airport on the evening of July 30. Within your reply to my question regarding a virtual broadcast, you provided me with a link to the story boards that were on display during the workshop. Recently, I had the opportunity to thoroughly exam each one and some questions were raised regarding the board detailing the total work scope that is planned for the airport. I've listed my questions individually below.

1.) According to the legend, all items that are shaded in teal are considered to be future developments. From the plans, it appears that Terminal A will be demolished and expanded once it is reconstructed. Will the number of gates increase and the services currently offered in the terminal be improved upon?

2.) I also noticed north of Terminal C, there is a planned building that is situated in what seems to be the tarmac. I've flown into the airport on numerous occasions and I assume the building would be a regional jet terminal for US Airways since their airplanes are always parked in that area. It was just a guess, but I wanted to see if you could confirm it for me. If indeed it is an RJ terminal, do you know how many gates will be housed within it and how passengers will travel between the two terminals?

For these two projects, as well as the others highlighted in teal (i.e. - Runway 19 holding apron expansion, roadway improvements and reconfigurations), I didn't see any information contained within the exhibit that provided a work in progress timeline on when items would be complete. Is there a link to observe ongoing projects? Your help with answering my questions would be greatly appreciated. I'm sure if I would have had the opportunity to attend the workshop during the summer, all of my concerns would have been addressed at that time.

Thank you again in advance for your assistance.

Regards,

Jelani M. Gowdy
Boeing Commercial Airplanes
Flight Test Engineering - Propulsion Analysis
Building: 15-20| Third Floor | 3F3-5.4
*: 2R-71 | *: 425.266.2182
* :jelani.m.gowdy@boeing.com

-----Original Message-----

From: Baummer Jr., Charley [<mailto:John.Baummer@MWWA.com>]
Sent: Wednesday, July 23, 2008 12:46 PM
To: Gowdy, Jelani M
Subject: RE: Ronald Reagan Washington National Airport PUBLIC SCOPING

WORKSHOP ?'s

Mr. Gowdy:

Thank you for your July 22 e-mail. We do not have plans to provide a virtual broadcast of the scoping workshop. The format for the workshop will involve story boards staffed by consultant and Airports Authority personnel, and an opportunity for participants to discuss the proposed project with those individuals. Written comments may be submitted during the workshop, or via mail or e-mail as stated in the public notice (http://www.mwaa.com/news_publications/newsroom/public_notices). Copies of the story boards will be posted on this website by July 30.

We appreciate your interest in the environmental assessment for this important project.

Charles Baummer
Planning Department
Metropolitan Washington Airports Authority

From: Baummer Jr., Charley [John.Baummer@MWAA.com]

Sent: Thursday, November 06, 2008 8:19 AM

To: Gowdy, Jelani M

Subject: RE: Ronald Reagan Washington National Airport PUBLIC SCOPING WORKSHOP ?'s

Mr. Gowdy:

Thank you for your November 5 e-mail.

The Scoping exhibit "DCA Airport Layout Plan" shows future development as well as existing conditions. The replacement for Terminal A, the regional jet terminal, Hold Apron 19 expansion, and the roadway improvements are planned future development projects, however, none of these have been scheduled for construction. They are not part of the proposed action to be evaluated in the environmental assessment for Runway Safety Area Enhancements for Runway 1-19.

The regional jet terminal is planned to have 10 gates; access would be via an underground walkway connected to Terminal C. The Airports Authority has not determined the number of additional gates or the passenger service improvements to be offered upon the replacement for Terminal A.

Charles Baummer
Planning Department
Metropolitan Washington Airports Authority

Appendix C. List of Acronyms

AAM	Annual arithmetic mean
AC	Advisory Circular
ACE	Army Corps of Engineers
ACHP	Advisory Council on Historic Preservation
ADG	Airplane Design Group
AIP	Airport Improvement Program
ALP	Airport Layout Plan
ALSF-2	Approach lighting system with sequenced flashing lights
AQS	Air Quality System
ARC	Airport Reference Code
ARFF	Aircraft Rescue and Fire Fighting
ATC	Air traffic control
ATCT	Airport Traffic Control Tower
CAA	Clean Air Act
CAAA	Clean Air Act Amendments of 1990
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (Superfund)
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
CO	Carbon monoxide
CZMP	Coastal Zone Management Program
dB	Decibel
dBA	A-weighted sound pressure level, in decibels
D.C.	District of Columbia
DCA	Ronald Reagan Washington National Airport
DCFWD	District of Columbia's Fisheries and Wildlife Division
DCHPO	District of Columbia's Historic Preservation Office

DNL	Day-night average sound level, expressed in A-weighted decibels
DOT	Department of Transportation
EA	Environmental Assessment
EAC	Early Action Compact
EDMS	Emissions and Dispersion Modeling System
EMAS	Engineered Material Arresting System
EPA	Environmental Protection Agency
ERNS	Emergency Response Notification System
ETMS	Enhanced Traffic Management System
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FEMA	Federal Emergency Management Agency
FICAN	Federal Interagency Committee on Aviation Noise
FICON	Federal Interagency Committee on Noise
FIRM	Flood Insurance Rate Map
FFY	Federal Fiscal Year
FR	Federal Register
FWS	Fish and Wildlife Service
GEMS	Airport operations radar data
GIS	Geographic information system
GWMP	George Washington Memorial Parkway
INM	Integrated Noise Model
l	Liter
lb	Pound
L _{MAX}	Maximum Noise Level
LOPD	Limits of Physical Disturbance
m	Meter
mg/l	Milligrams per liter
mph	Miles per hour

MSL	Mean sea level
MWAA	Metropolitan Washington Airports Authority
MWAQC	Metropolitan Washington Air Quality Committee
NAAQS	National Ambient Air Quality Standards
NED	National Elevation Dataset
NEPA	National Environmental Policy Act of 1969
NFIP	National Flood Insurance Program
NFRAP	No Further Remedial Action Planned
NHPA	National Historic Preservation Act
nm	Nautical Miles
NMFS	National Marine Fisheries Service
NO	Nitric oxide
NOAA	National Oceanic and Atmospheric Administration
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPIAS	National Plan of Integrated Airport Systems
NPS	National Park Service
NRC	National Response Center
NRHP	National Register of Historic Places
O ₂	Atmospheric oxygen
O ₃	Ozone
OPSNET	FAA Operations Network
Pb	Lead
PCB	Polychlorinated biphenyls
PM ₁₀	Particulate matter
PM _{2.5}	Fine particulate matter
ppm	Parts per million

RCRA	Resource Conservation and Recovery Act
RSA	Runway Safety Area
RSAP	Runway Safety Area Program
SARA	Superfund Amendments and Reauthorization Act
SAV	Submerged aquatic vegetation
SEL	Sound exposure level
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SIS	South Investigation Site
SO ₂	Sulfur dioxide
SO _x	Sulfur oxides
SVOC	Semi-volatile organic compound
SWPPP	Storm Water Pollution Prevention Plan
TAF	Terminal Area Forecast
TDZ	Touchdown Zone
TMDL	Total Maximum Daily Load
TRACON	Terminal Radar Approach Control
USC	United States Code
USDOT	U.S. Department of Transportation
USGS	U.S. Geological Survey
UST	Underground storage tank
VANHP	Virginia Natural Heritage Program
VAPCB	Virginia Air Pollution Control Board
VASHPO	Virginia State Historic Preservation Officer
VCP	Virginia's Coastal Resource Management Program
VDACS	Virginia Department of Agriculture and Consumer Services
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries

VDHR	Virginia Department of Historic Resources
VIMS	Virginia Institute of Marine Science
VMRC	Virginia Marine Resources Commission
VMT	Vehicle miles traveled
VOC	Volatile organic compound
VPDES	Virginia Pollutant Discharge Elimination System

THIS PAGE LEFT INTENTIONALLY BLANK

Appendix D. Aircraft Noise Modeling Assumptions

The general characteristics of aircraft noise and the methodologies used for the aircraft noise analysis in this Environmental Assessment (EA) are described in this appendix.

D.1 General Characteristics of Aircraft Noise

Sound, when transmitted through the air and upon reaching our ears, may be perceived as desirable or unwanted.¹ People normally refer to noise as unwanted sound. Because sound can be subjective, individuals have different perceptions, sensitivities, and reactions to noise. Loud sounds may bother some people, while others may be bothered by certain rhythms or frequencies of sound. Sounds that occur during sleeping hours are usually considered to be more objectionable than those that occur during daytime hours.

Aircraft noise originates from both the engines and the airframe of an aircraft, but the engines are, by far, the more significant source of noise.

Meteorological conditions affect the transmission of sound through the air. Wind speed and direction, and the temperature immediately above ground level, cause diffraction and displacement of sound waves. Humidity and temperature materially affect the transmission of air-to-ground sound through absorption associated with the instability and viscosity of the air.

D.2 Noise Analysis Methodology

The methodology used for this aircraft noise analysis involved the: (a) use of noise descriptors developed for airport noise analyses, (b) development of basic data and assumptions as input to the Integrated Noise Model (INM), and (c) application of the INM developed for the Airport that provides estimates of aircraft noise levels.

D.2.1 Noise Descriptors

Noise levels are measured using a variety of scientific metrics. As a result of extensive research into the characteristics of aircraft noise and human response to that noise, standard noise descriptors have been developed for aircraft noise exposure analyses. The descriptors used in this noise analysis are described below.

A-Weighted Sound Pressure Level (dBA): The decibel (dB) is a unit used to describe sound pressure level. When expressed in dBA, the sound has been filtered to reduce the effect of very low and very high frequency sounds, much as the human ear filters sound. Without this filtering, calculated and measured sound levels would include events that the human ear cannot hear (e.g., dog whistles and low frequency sounds, such as the groaning sounds emanating from large buildings with changes in temperature and wind). With A-weighting, calculations and sound monitoring equipment approximate the sensitivity of the human ear to sounds of different frequencies.

Some common sounds on the dBA scale are listed in **Table D-1**. As shown in the table, the relative perceived loudness of a sound doubles for each increase of 10 dBA, although a 10 dBA change in the sound level corresponds to a factor of 10 change in relative sound energy.

¹ Federal Aviation Administration, *Aviation Noise Effects*, March 1985.

Table D-1**Common Sounds On The A-Weighted Decibel Scale**

Sound	Sound level (dBA)	Relative loudness (approximate)	Relative sound energy
Rock music, with amplifier	120	64	1,000,000
Thunder, snowmobile (operator)	110	32	100,000
Boiler shop, power mower	100	16	10,000
Orchestral crescendo at 25 feet, noisy kitchen	90	8	1,000
Busy street	80	4	100
Interior of department store	70	2	10
Ordinary conversation, 3 feet away	60	1	1
Quiet automobiles at low speed	50	1/2	.1
Average office	40	1/4	.01
City residence	30	1/8	.001
Quiet country residence	20	1/16	.0001
Rustle of leaves	10	1/32	.00001
Threshold of hearing	0	1/64	.000001

Source: U.S. Department of Housing and Urban Development, *Aircraft Noise Impact—Planning Guidelines for Local Agencies*, 1972.
Prepared by: Ricondo & Associates, Inc., November 2004.

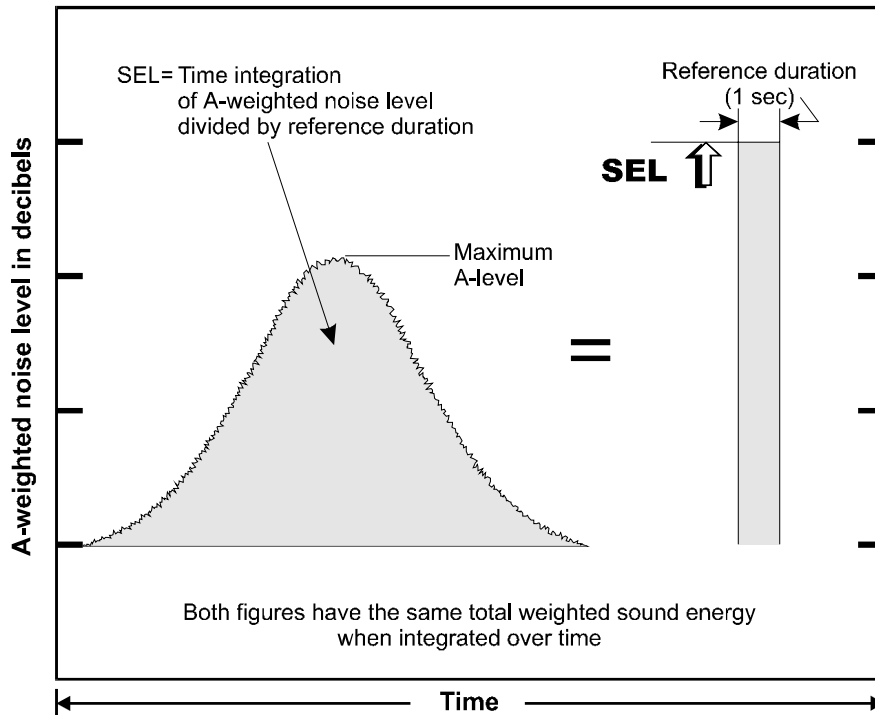
Generally, sounds with differences of 2 dBA or less are not perceived to be noticeably different by most listeners.

Maximum Noise Level (L_{max}): L_{max} is the maximum or peak sound level during a noise event. The metric only accounts for the instantaneous peak intensity of the sound, and not for the duration of the event. As an aircraft passes by an observer, the sound level increases to a maximum level and then decreases. Some sound level meters measure and record the maximum or L_{max} level.

Sound Exposure Level (SEL): SEL is a time-integrated measure, expressed in decibels, of the sound energy of a single noise event at a reference duration of one second. The sound level is integrated over the period that the level exceeds a threshold. Therefore, SEL accounts for both the maximum sound level and the duration of the sound. The standardization of discrete noise events into a one-second duration allows calculation of the cumulative noise exposure of a series of noise events that occur over a period of time. Because of this compression of sound energy, the SEL of an aircraft noise event is typically 7 to 12 dBA greater than the L_{max} of the event. SELs for aircraft noise events depend on the location of the aircraft relative to the noise receptor, the type of operation (landing, takeoff, or overflight), and the type of aircraft. The SEL concept is depicted on **Exhibit D-1**.

Exhibit D-1

Sound Exposure Level Concept



Source: Brown-Buntin Associates, Inc., November 2004.
 Prepared by: Ricondo & Associates, Inc., November 2004.

A-weighted Day-Night Average Sound Level (DNL): DNL, formerly referred to as L_{dn} , is expressed in dBA and represents the noise level over a 24-hour period. DNL includes the cumulative effects of a number of sound events rather than a single event. It also accounts for increased sensitivity to noise during relaxation and sleeping hours. The DNLs are used to estimate the effects of specific noise levels on land uses. The U.S. Environmental Protection Agency (EPA) introduced the metric in 1976 as a single number measurement of community noise exposure. The FAA adopted DNL as the noise metric for measuring cumulative aircraft noise under Federal Aviation Regulations (FAR) Part 150, *Airport Noise Compatibility Planning*. The Department of Housing and Urban Development, the Veterans Administration, the Department of Defense, the United States Coast Guard, and the Federal Transit Administration have also adopted DNL for measuring cumulative noise exposure.

In the calculation of DNL, for each hour during the nighttime period (10:00 p.m. to 6:59 a.m.), the sound levels are increased by a 10-decibel-weighting penalty (equivalent to a 10-fold increase in aircraft operations) before the 24-hour value is computed. The weighting penalty accounts for the more intrusive nature of noise during the nighttime hours.

DNL is expressed as an average noise level on the basis of annual aircraft operations for a calendar year, not on the average noise levels associated with different aircraft operations. To calculate the DNL at a specific location, the SELs at that location associated with each individual aircraft operation (landing or takeoff) are determined. Using the SEL for each noise event and applying the 10-decibel penalty for nighttime operations as appropriate, a partial DNL is then calculated for each

aircraft operation. The partial DNLs for each aircraft operation are added logarithmically to determine the total DNL.

The logarithmic addition process, whereby the partial DNLs are combined, can be approximated by the following guidelines:

When two DNLs differ by:	Add the following amount to the higher value:
0 or 1 dBA	3 dBA
2 or 3 dBA	2 dBA
4 to 9 dBA	1 dBA
10 dBA or more	0 dBA

For example:

$$70 \text{ dBA} + 70 \text{ dBA} \text{ (difference: 0 dBA)} = 73 \text{ dBA}$$

$$60 \text{ dBA} + 70 \text{ dBA} \text{ (difference: 10 dBA)} = 70 \text{ dBA}$$

Adding the noise from a relatively quiet event (60 dBA) to a relatively noisy event (70 dBA) results in a value of 70 dBA because the quieter event has only 1/10 the sound energy of the noisier event. As a result, the quieter noise event is “drowned out” by the noisier one, and there is no increase in the overall noise level as perceived by the human ear.

DNL is used to describe existing and predicted noise exposure in communities in an airport environs based on the average daily operations over the year and the average annual operational conditions at the airport. Therefore, at a specific location near an airport, the noise exposure on a particular day is likely to be higher or lower than the annual average noise exposure, depending on the specific operations at the airport on that day. DNL is widely accepted as the best available method to describe aircraft noise exposure and is the noise descriptor required for aircraft noise exposure analyses and land use compatibility planning under FAR Part 150 and for environmental assessments for airport improvement projects.

D.2.2 DNL and Noise Exposure Ranges

Noise exposure criterion levels of 65, 70, and 75 dBA were used for the analysis, in accordance with FAA Orders 1050.IE and 5050.4B, to keep the noise exposure analyses consistent with those used for environmental impact statements and FAR Part 150 noise compatibility programs. These criterion noise levels are typically used in environmental assessments. The three noise exposure ranges used in this analysis were: (a) DNL 65 to 70, (b) DNL 70 to 75, and (c) DNL 75+. Noise exposure maps

for baseline conditions in 2007 and for future conditions in 2010 and 2015 for the Proposed Action and No Action alternative were prepared for this EA.

D.2.3 Graphic Representation

Contour lines that connect points of equal DNLs are drawn on a map. For example, a contour may be drawn to connect all points with a DNL of 70; another may be drawn to connect all points with a DNL of 65; and so forth. Aircraft noise exposure contours were drawn at 5-DNL intervals to reflect the DNL ranges from 65 to 75.

D.2.4 The DNL Descriptor

The validity and accuracy of DNL calculations depend on the basic information used in the calculations. For future airport activities, the reliability of DNL calculations is affected by a number of uncertainties:

- Future aviation activity levels—the forecast number of aircraft operations, the types of aircraft serving the airport, the times of operation (daytime, evening, and nighttime), and aircraft flight tracks—are estimates. Achievement of the estimated levels of activity cannot be assured.
- Acoustical and performance characteristics of future aircraft types are also estimates. When new aircraft designs are considered, aircraft noise data and flight characteristics must be estimated.
- The noise descriptors used as the basis for calculating DNL represent typical human response (and reaction) to aircraft noise. Because people vary in their responses to noise and because the physical measure of noise accounts for only a portion of an individual's reaction to that noise, DNL can be used only to obtain an average response to aircraft noise that might be expected from a community.
- Single flight tracks used in computer modeling represent a wider band of actual flight tracks.

These uncertainties aside, DNL mapping was developed as a tool to assist in land use planning around airports. The mapping is best used for comparative purposes rather than for providing absolute values. That is, DNL calculations provide valid comparisons between different projected conditions, so long as consistent assumptions and basic data are used for all calculations.

Thus, sets of DNL calculations can show anticipated changes in aircraft noise exposure over time, or differences in noise exposure associated with different airport development alternatives or operational procedures. However, a line drawn on a map does not imply that a particular noise condition exists on one side of that line and not on the other. DNL calculations provide a means for comparing noise exposure under different scenarios.

Nevertheless, DNL contours can be used to: (a) highlight an existing or potential aircraft noise problem that requires attention, (b) assist in the preparation of noise compatibility programs, and (c) provide guidance in the development of land use controls, such as zoning ordinances, subdivision regulations, and building codes. DNL is considered to be the best noise metric available for expressing aircraft noise exposure.

D.2.5 Evaluation of the Adequacy of the DNL Descriptor

To address concerns related to methods of aircraft noise measurement, and to reach a national consensus, the Federal Interagency Committee on Noise (FICON) was created to assess the manner in which noise exposure and its effects are evaluated and the usefulness of DNL to describe the effects of aircraft noise on people. The committee included representatives of all federal agencies involved in environmental noise studies, including staff from the U.S. Department of Transportation (DOT), U.S. EPA, Council on Environmental Quality (CEQ), and the Departments of Treasury, Defense, Housing and Urban Development, and Veterans Affairs, as well as technical advisors from the Committee on Hearing and Biomechanics.

The FICON evaluated the threshold for acceptable noise levels (threshold of significance) and whether or not the DNL 65 was the proper threshold. The committee's findings were released in the *Federal Register* (FR 44223, September 24, 1992). Some of the FICON's conclusions were:

- Continue using the DNL to measure aircraft noise;
- Complaints are an inadequate indicator of the full extent of noise effects on a population;
- Noise predictions and interpretations are frequently less reliable below DNL 65— predictions below this level should take into account the inaccuracy of prediction models at large distances from an airport;
- No definitive evidence of non-auditory health effects from aircraft noise exist, particularly below DNL 70;
- Every change in the noise environment does not necessarily affect public health and welfare.
- The FICON also recommended that a new federal interagency committee be formed with a mandate to provide a forum for debate of future aviation noise research needs.

In March 1993, the FAA requested public comments concerning the FICON report released in 1992.² The request for comment coincided with a study prepared by the FAA in accordance with the Airport and Airway Safety, Capacity, Noise Improvement, and Intermodal Transportation Act of 1992.³ Later in 1993, the Federal Interagency Committee on Aviation Noise (FICAN) was formed. The FICAN has provided a forum for soliciting input from interested members of the aviation profession and communities. FICAN members have worked with researchers to develop individual agency priorities for research to address noise issues, and have published technical papers on aviation noise topics, including a 1997 study of the effects of aviation noise on sleep.⁴ The work of FICON and FICAN has validated the use of the DNL metric as an adequate descriptor of aircraft noise.

² *Federal Register*, FR16569, March 29, 1993

³ Section 123 of the Airport and Airway Safety, Capacity, Noise Improvement, and Intermodal Transportation Act of 1992 (49 USC app 2102, PL 102-581) required the FAA to conduct a noise study and report the results to Congress no later than October 31, 1993. The social, economic, and health effects of airport noise within the DNL 55, 60, and 65 contours were analyzed to determine the actual level at which noise adversely affects populations. The study also included an evaluation of single event noise on populations.

⁴ Federal Interagency Committee on Aviation Noise, *Effects of Aviation Noise on Awakenings from Sleep*, June 1997.

D.3 Integrated Noise Model

In 1978, the FAA released the first version of a computer simulation model (the INM) designed to assess aircraft noise exposure. The INM has become the standard tool for modeling aircraft noise. The INM generates noise exposure contours and noise levels at individual locations and provides a graphical image of aircraft noise levels for a selected geographic area.

The INM computes DNL using an internal database that includes performance characteristics and noise data for a wide variety of civilian and military aircraft. Noise exposure levels are calculated from airport-specific data that are input into the model. The input includes runway coordinates, flight tracks, fleet mix, activity levels, runway and flight track use, average local temperatures, time of day, and departure trip length data. The INM correlates these data with its internal aircraft database using a series of algorithms that calculate noise exposure. The INM database incorporates detailed information regarding each aircraft type, including departure profiles for different trip lengths, approach profiles, and SEL noise curves based on distances and various thrust settings. The outputs of these calculations include plots of points that connect to form noise contours. The INM is typically used to model average annual aircraft noise exposure, that is, the average sound level over an average 24-hour period of both busy and quiet times for the airport.

Other output from the INM include the area within each contour, noise measurements at specific locations (referred to as grid points), and SEL curves or values for specific aircraft types. The SEL curves can be used to estimate SEL for a specific aircraft type depending on how far the aircraft is from a listening point or observer and the estimated thrust setting. Since the INM was introduced, the FAA has released newer versions with updated aircraft databases to reflect changes in the existing and future aircraft fleet mixes at airports throughout the National Airspace System and to incorporate enhanced algorithms for calculating aircraft noise at specific locations and transmissions of noise.

The latest approved version of the INM (Version 7.0a) at the time the noise analysis was performed for this EA was used. INM Version 7.0a is an accepted, state-of-the-art tool for determining the total effect of aircraft noise at and around airports. The aircraft database contains a representation of commercial, general aviation, and military aircraft powered by turbojet, turbofan, turboprop, or piston-driven engines.

Noise exposure maps were generated for the Proposed Action and the No Action alternative using the INM. The only factor that changed in each of the future year INM runs was the extension of the Runway 1 and Taxiway J pavement 300 feet to the south. The Proposed Action would not change: (a) the number of existing and forecast operations by time of day, aircraft type, or stage length; (b) runway use (the ratio of flights arriving on or departing from each runway compared to the total number of arrivals and departures); (c) location and use of flight tracks (the paths that pilots fly to arrive at and depart from the Airport), (d) departure profiles; or (e) existing noise abatement procedures.. For the No Action alternative, no changes were made to any of the runway end points or the displaced thresholds for the runways. The noise exposure maps derived from the INM for these two alternatives are based on the DNL noise metric.

D.4 Basic Data and Assumptions

The primary data required to develop noise exposure maps using INM Version 7.0a are:

- The existing and forecast number of aircraft operations by time of day, aircraft type, and stage length (nonstop departure trip length from the Airport).

- Operational information, including runway use, flight track location and use, departure profiles, existing noise abatement procedures, and the like.

D.4.1 Aircraft Operations

Existing conditions at the Airport are represented by 2007 aircraft operations data and fleet mix information from the FAA's Enhanced Traffic Management System (ETMS) database. The data provide aircraft type, time of day, operation mode, and flight origin/destination. The flight track and runway use assumptions developed for 2004 were maintained for this analysis. These data and assumptions were documented in a May 4, 2005, memorandum by Wyle Laboratories (Wyle) entitled, *Washington National Airport (DCA) 2004 DNL Contours*. Future year operations data for analysis years 2012 and 2017 were derived from the 2007 FAA *Terminal Area Forecast (TAF)*. Aircraft operations data for existing conditions using the FAA Operations Network (OPSNET), and future analysis years from the FAA TAF are summarized in **Table D-2**.

Table D-2

Operational Data for Existing Conditions and Future Analysis Years

	2004 Existing ^{a/}	2007 OPSNET	2012 TAF	2017 TAF
Air Carrier	n.a.	155,425	154,087	158,371
Air Taxi	n.a.	118,241	124,625	122,151
General Aviation/ Military ^{b/}	n.a.	5,822	6,266	7,221
Total	269,370	279,488	284,978	287,743

Notes:

n.a. = Not available

a/ Data in the Wyle memorandum dated May 4, 2005, are not presented in a format that is compatible with the 2006 TAF data. Thus individual categories are omitted.

b/ Consistent with assumptions made in the November 2004, *Ronald Reagan Washington National Airport FAR Part 150 Noise Exposure Maps and Noise Compatibility Program, Volume 1*, military operations were not modeled in the INM. Rather, they were added to the general aviation operations subtotal. To be consistent with the FAR Part 150 process, 75 percent of military operations were modeled as general aviation jet aircraft and 25 percent of military operations were modeled as general aviation propeller aircraft.

Sources: Federal Aviation Administration Operations Network (OPSNET) January 2007 through December 2007 operations count data and 2007 TAF, September 2008.

Prepared by: Ricondo & Associates, Inc., September 2008.

To determine existing and projected aircraft noise exposure, aircraft operations associated with the average day of the year are used in the INM. For this EA, noise exposure was analyzed for calendar years 2007, 2012, and 2017. The number of aircraft operations by aircraft type, type of operation, and time of day for the average day in 2007 is provided in **Table D-3**. The forecasts of operations for the average day in 2012 and 2017, shown in **Table D-4** through **D-5**, were derived from the fleet mix data collected for 2007 and applied to the FAA TAF (December 2007) forecast operations by carrier grouping for 2012 and 2017.

Table D-3

Average Daily Operations in 2007

INM Aircraft Type	Arrivals			Departures			Total
	Day	Night	Total	Day	Night	Total	
Commercial Air Carrier Jet Aircraft	186.33	19.84	206.17	191.31	14.86	206.17	412.33
Regional Air Carrier Propeller Aircraft	46.10	1.67	47.77	44.94	2.83	47.77	95.54
Regional Air Carrier Jet Aircraft	112.98	9.00	121.98	115.01	6.97	121.98	243.95
General Aviation Jet Aircraft	5.02	0.63	5.65	5.33	0.32	5.65	11.29
General Aviation Propeller Aircraft	1.86	0.02	1.88	1.86	0.01	1.88	3.76
Total	352.28	31.16	383.44	358.45	24.99	383.44	766.88

Note: Columns and rows may not add to totals shown because of rounding.

Source: Ricondo & Associates, Inc.; estimated using information from Federal Aviation Administration Operations Network (OPSNET) January 2007 through December 2007 operations count data, September 2008.
 Prepared by: Ricondo & Associates, Inc., September 2008.

Table D-4

Average Daily Operations in 2012 (Proposed Action and No Action)

INM Aircraft Type	Arrivals			Departures			Total
	Day	Night	Total	Day	Night	Total	
Commercial Air Carrier Jet Aircraft	190.76	20.31	211.08	195.86	15.21	211.08	422.15
Regional Air Carrier Propeller Aircraft	46.37	1.68	48.05	45.20	2.85	48.05	96.09
Regional Air Carrier Jet Aircraft	113.62	9.05	122.67	115.67	7.01	122.67	245.35
General Aviation Jet Aircraft	5.70	0.72	6.41	6.05	0.36	6.41	12.83
General Aviation Propeller Aircraft	2.11	0.03	2.13	2.12	0.02	2.13	4.27
Total	358.56	31.79	390.34	364.90	25.44	390.34	780.68

Note: Columns and rows may not add to totals shown because of rounding.

Source: Ricondo & Associates, Inc.; estimated using information based on Federal Aviation Administration Enhanced Traffic Management System flight header data for 12 months in 2007 and Federal Aviation Administration 2007 TAF annual total operations, September 2008.
 Prepared by: Ricondo & Associates, Inc. September 2008.

Table D-5

Average Daily Operations in 2017 (Proposed Action and No Action)

INM Aircraft Type	Arrivals			Departures			Total
	Day	Night	Total	Day	Night	Total	
Commercial Air Carrier Jet Aircraft	196.07	20.88	216.95	201.31	15.64	216.94	433.89
Regional Air Carrier Propeller Aircraft	45.45	1.65	47.09	44.30	2.79	47.09	94.18
Regional Air Carrier Jet Aircraft	111.37	8.87	120.24	113.37	6.87	120.24	240.48
General Aviation Jet Aircraft	6.57	0.83	7.40	6.98	0.42	7.40	14.79
General Aviation Propeller Aircraft	2.43	0.03	2.46	2.44	0.02	2.46	4.92
Total	361.88	32.25	394.13	368.40	25.73	394.13	788.26

Note: Columns and rows may not add to totals shown because of rounding.

Source: Ricondo & Associates, Inc.; estimated using information based on Federal Aviation Administration Enhanced Traffic Management System flight header data for 12 months in 2007 and Federal Aviation Administration 2007 TAF annual total operations, September 2008.

Prepared by: Ricondo & Associates, Inc., September 2008.

As shown in Tables D-2 through D-5, approximately 767 average daily aircraft operations were accommodated at the Airport in 2007, and approximately 781 and 788 daily aircraft operations are forecast to be accommodated in 2012 and 2017, respectively. As noted previously, the Proposed Action is not expected to increase the number of forecast operations or result in fleet mix changes; therefore, the fleet mix operation levels were held constant between the Proposed Action and the No Action alternative for each future year.

D.4.2 Aircraft Fleet Mix

The aircraft fleet mix data for calendar year 2007 are based on analyses of the 12 consecutive months of flight plan data provided by the FAA's ETMS database. These data provide information on aircraft type, operation mode, time of day, and flight origin/destination. The data were averaged to represent an average annual day and assigned the appropriate INM aircraft types. Aircraft fleet mix percentages for 2012 and 2017 were based on aircraft fleet mix data developed for 2007.

In terms of the time-of-day classifications, daytime hours are assumed to be between 7:00 a.m. and 9:59 p.m. and nighttime hours are assumed to be between 10:00 p.m. and 6:59 a.m. Arrival and departure day/night splits in 2012 and 2017 were based on the observed day/night split data provided by the 2007 ETMS data.

The breakdown of aircraft operations by aircraft type, type of operation, and time of day, for the annual average day for existing conditions (2007) is presented in **Table D-6**. The breakdown of aircraft operations for 2012 and 2017 is presented in **Table D-7** and **Table D-8**, respectively.

Table D-6

Summary of Aircraft Fleet Mix for Existing Conditions (2007)

INM Aircraft Type	Arrivals			Departures			Total
	Day	Night	Total	Day	Night	Total	
Commercial Air Carrier Jet Aircraft							
717200	7.02	1.92	8.94	8.37	0.57	8.94	17.88
7373B2	11.53	0.14	11.66	11.04	0.62	11.66	23.33
737400	12.66	0.08	12.74	12.04	0.70	12.74	25.48
737500	5.20	0.03	5.23	5.22	0.01	5.23	10.46
737700	7.34	1.87	9.21	7.66	1.55	9.21	18.42
737800	14.05	3.82	17.87	14.50	3.37	17.87	35.74
0PW	3.57	-	3.57	3.50	0.07	3.57	7.13
757RR	0.71	0.32	1.03	1.02	0.01	1.03	2.07
A319-131	47.54	4.84	52.38	48.17	4.21	52.38	104.76
A320-211	10.64	1.88	12.52	12.14	0.37	12.52	25.04
A321-232	1.64	0.04	1.68	1.57	0.11	1.68	3.36
DC95HW	0.21	-	0.21	0.21	-	0.21	0.42
MD83	31.43	2.79	34.22	33.86	0.36	34.22	68.44
MD9028	0.02	-	0.02	0.02	-	0.02	0.04
CRJ701	1.05	-	1.05	0.96	0.08	1.05	2.10
CRJ900	0.49	-	0.49	0.49	-	0.49	0.98
EMB190	<u>31.23</u>	<u>2.12</u>	<u>33.35</u>	<u>30.53</u>	<u>2.82</u>	<u>33.35</u>	<u>66.70</u>
Commercial Air Carrier Jet Aircraft Subtotal	186.33	19.84	206.17	191.31	14.86	206.17	412.33
Regional Air Carrier Propeller Aircraft Subtotal	46.10	1.67	47.77	44.94	2.83	47.77	95.54
Regional Air Carrier Jet Aircraft Subtotal	112.98	9.00	121.98	115.01	6.97	121.98	243.95
General Aviation Jet Aircraft Subtotal	5.02	0.63	5.65	5.33	0.32	5.65	11.29
General Aviation Propeller Aircraft Subtotal	1.86	0.02	1.88	1.86	0.01	1.88	3.76
Total	352.28	31.16	383.44	358.45	24.99	383.44	766.88

Note: Columns and rows may not add to totals shown because of rounding.

Source: Ricondo & Associates, Inc. based on 2007 FAA Enhanced Traffic Management System flight data and FAA Integrated Noise Model aircraft database, September 2008.

Prepared by: Ricondo & Associates, Inc., September 2008.

THIS PAGE LEFT INTENTIONALLY BLANK

Table D-7
Summary of Aircraft Fleet Mix for Future Conditions (2012)

INM Aircraft Type	Departures by Trip Length Category ^{a/}													
	Arrivals			Departures			Stage Length 1		Stage Length 2		Stage Length 3		Stage Length 4	
	Day	Night	Total	Day	Night	Total	Day	Night	Day	Night	Day	Night	Day	Night
Commercial Air Carrier Jet Aircraft														
717200	7.18	1.97	9.15	8.57	0.58	9.15	0.56	0.02	6.33	0.54	1.67	0.02	-	-
7373B2	11.80	0.14	11.94	11.31	0.64	11.94	3.71	0.61	7.51	0.03	0.09	-	-	-
737400	12.96	0.09	13.04	12.32	0.72	13.04	4.88	0.64	7.44	0.08	-	-	-	-
737500	5.33	0.03	5.35	5.35	0.01	5.35	3.84	0.00	1.13	0.00	0.37	0.00	-	-
737700	7.52	1.91	9.43	7.84	1.59	9.43	0.42	0.00	2.22	0.81	4.91	0.77	0.30	-
737800	14.38	3.91	18.30	14.85	3.45	18.30	4.07	0.12	6.40	2.64	2.74	0.69	1.65	0.01
737900	-	-	-	-	-	-	-	-	-	-	-	-	-	-
757PW	3.65	-	3.65	3.58	0.07	3.65	0.85	0.04	1.49	0.00	0.64	-	0.60	0.02
757RR	0.73	0.33	1.06	1.05	0.01	1.06	0.43	-	0.03	-	-	0.00	0.59	0.01
A319-131	48.68	4.95	53.63	49.32	4.31	53.63	31.63	3.19	13.86	0.83	2.73	0.01	1.10	0.29
A320-211	10.90	1.92	12.82	12.43	0.38	12.82	6.31	0.15	5.82	0.23	0.28	0.00	0.02	-
A321-232	1.68	0.04	1.72	1.61	0.11	1.72	0.69	0.11	0.91	-	-	-	-	-
DC8QN	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DC95HW	0.21	-	0.21	0.21	-	0.21	0.21	-	0.01	-	-	-	-	-
MD83	32.18	2.86	35.04	34.67	0.37	35.04	19.03	0.28	13.34	0.04	2.30	0.06	0.00	-
MD9028	0.02	-	0.02	0.02	-	0.02	-	-	0.02	-	-	-	-	-
CRJ701	1.07	-	1.07	0.99	0.09	1.07	0.99	0.09	-	-	-	-	-	-
CRJ900	0.50	-	0.50	0.50	-	0.50	0.50	-	-	-	-	-	-	-
EMB190	31.98	2.17	34.14	31.25	2.89	34.14	18.65	2.58	10.22	0.26	2.38	0.05	-	-
Commercial Air Carrier Jet Aircraft Subtotal	190.76	20.31	211.08	195.86	15.21	211.08	96.76	7.83	76.72	5.46	18.12	1.60	4.27	0.33
Regional Air Carrier Propeller Aircraft Subtotal	46.37	1.68	48.05	45.20	2.85	48.05	45.11	2.83	0.09	0.02	-	-	-	-
Regional Air Carrier Jet Aircraft Subtotal	113.62	9.05	122.67	115.67	7.01	122.67	99.37	6.12	15.64	0.89	0.66	-	0.01	-
General Aviation Jet Aircraft Subtotal	5.70	0.72	6.41	6.05	0.36	6.41	6.05	0.36	-	-	-	-	-	-
General Aviation Propeller Aircraft Subtotal	2.11	0.03	2.13	2.12	0.02	2.13	2.12	0.02	-	-	-	-	-	-
Total	358.56	31.79	390.34	364.90	25.44	390.34	249.40	17.15	92.45	6.37	18.78	1.60	4.27	0.33

Note: Columns and rows may not add to totals shown because of rounding.

a/ Stage Length 1 = 0 to 500 nautical miles (nm). Stage Length 2 = 501 to 1,000 nm; Stage Length 3 = 1,001 to 1,500 nm; Stage Length 4 = 1,501 to 2,500 nm.

Source: Ricondo & Associates, Inc. based on 2007 FAA Enhanced Traffic Management System flight data (fleet mix percentage), FAA Integrated Noise Model aircraft database (aircraft type designations), and FAA 2007 Terminal Area Forecast (forecast 2012 operation levels), September 2008.
Prepared by: Ricondo & Associates, Inc., September 2008.

THIS PAGE LEFT INTENTIONALLY BLANK

Table D-8
Summary of Aircraft Fleet Mix for Future Conditions (2017)

INM Aircraft Type	Arrivals			Departures			Departures by Trip Length Category ^{a/}							
	Day	Night	Total	Day	Night	Total	Stage Length 1		Stage Length 2		Stage Length 3		Stage Length 4	
							Day	Night	Day	Night	Day	Night	Day	Night
Commercial Air Carrier Jet Aircraft														
717200	7.38	2.02	9.41	8.81	0.60	9.41	0.58	0.02	6.51	0.55	1.72	0.02	-	-
7373B2	12.13	0.14	12.27	11.62	0.65	12.27	3.81	0.63	7.71	0.03	0.09	-	-	-
737400	13.32	0.09	13.41	12.66	0.74	13.41	5.02	0.66	7.65	0.08	-	-	-	-
737500	5.47	0.03	5.50	5.49	0.01	5.50	3.95	0.01	1.17	0.00	0.38	0.00	-	-
737700	7.73	1.96	9.69	8.06	1.63	9.69	0.43	0.00	2.28	0.83	5.05	0.79	0.30	-
737800	14.78	4.02	18.81	15.26	3.55	18.81	4.18	0.12	6.58	2.71	2.81	0.70	1.69	0.01
737900	-	-	-	-	-	-	-	-	-	-	-	-	-	-
757PW	3.75	-	3.75	3.68	0.07	3.75	0.87	0.04	1.53	0.00	0.66	-	0.62	0.02
757RR	0.75	0.34	1.09	1.08	0.01	1.09	0.44	-	0.03	-	-	0.00	0.61	0.01
A319-131	50.03	5.09	55.12	50.69	4.43	55.12	32.51	3.28	14.25	0.85	2.81	0.01	1.13	0.30
A320-211	11.20	1.97	13.17	12.78	0.39	13.17	6.49	0.15	5.98	0.24	0.29	0.00	0.02	-
A321-232	1.72	0.05	1.77	1.65	0.12	1.77	0.71	0.12	0.94	-	-	-	-	-
DC8QN	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DC95HW	0.22	-	0.22	0.22	-	0.22	0.21	-	0.01	-	-	-	-	-
MD83	33.08	2.94	36.01	35.63	0.38	36.01	19.56	0.28	13.71	0.04	2.36	0.06	0.00	-
MD9028	0.02	-	0.02	0.02	-	0.02	-	-	0.02	-	-	-	-	-
CRJ701	1.10	-	1.10	1.01	0.09	1.10	1.01	0.09	-	-	-	-	-	-
CRJ900	0.51	-	0.51	0.51	-	0.51	0.51	-	-	-	-	-	-	-
EMB190	32.86	2.23	35.09	32.12	2.97	35.09	19.16	2.65	10.51	0.27	2.45	0.05	-	-
Commercial Air Carrier Jet Aircraft Subtotal	196.07	20.88	216.95	201.31	15.64	216.94	99.45	8.05	78.85	5.61	18.62	1.64	4.38	0.33
Regional Air Carrier Propeller Aircraft Subtotal	45.45	1.65	47.09	44.30	2.79	47.09	44.21	2.77	0.09	0.02	-	-	-	-
Regional Air Carrier Jet Aircraft Subtotal	111.37	8.87	120.24	113.37	6.87	120.24	97.40	6.00	15.33	0.87	0.64	-	0.01	-
General Aviation Jet Aircraft Subtotal	6.57	0.83	7.40	6.98	0.42	7.40	6.98	0.42	-	-	-	-	-	-
General Aviation Propeller Aircraft Subtotal	2.43	0.03	2.46	2.44	0.02	2.46	2.44	0.02	-	-	-	-	-	-
Total	361.88	32.25	394.13	368.40	25.73	394.13	250.47	17.25	94.27	6.51	19.27	1.64	4.39	0.33

Note: Columns and rows may not add to totals shown because of rounding.

a/ Stage Length 1 = 0 to 500 nautical miles (nm). Stage Length 2 = 501 to 1,000 nm; Stage Length 3 = 1,001 to 1,500 nm; Stage Length 4 = 1,501 to 2,500 nm.

Source: Ricondo & Associates, Inc. based on 2007 FAA Enhanced Traffic Management System flight data (fleet mix percentage), FAA Integrated Noise Model aircraft database (aircraft type designations), and FAA 2007 Terminal Area Forecast (forecast 2017 operation levels), September 2008.
Prepared by: Ricondo & Associates, Inc., September 2008.

THIS PAGE LEFT INTENTIONALLY BLANK

Aircraft noise characteristics can be classified according to federal noise level standards specified in FAR Part 36, *Noise Standards, Aircraft Type and Airworthiness Certification*, as meeting Stage 1 (noisiest), Stage 2 (quieter), or Stage 3 (quietest) standards. As of January 1, 1985, Stage 1 aircraft could no longer be operated in the United States. In accordance with the Airport Noise and Capacity Act of 1990, the FAA established a schedule for phasing out within the 48 contiguous states the use of FAR Part 36 Stage 2 aircraft weighing more than 75,000 pounds in favor of FAR Part 36 Stage 3 aircraft. FAR Part 91, *General Operating and Flight Rules*, specifies that, after December 31, 1999, no person may operate an FAR Part 36 Stage 2 aircraft over 75,000 pounds in the contiguous United States. It should be noted that no schedule has been established for phasing out Stage 2 jet aircraft weighing less than 75,000 pounds. Practically every corporate or general aviation jet aircraft that operates in the United States weighs less than 75,000 pounds. According to a report by the General Accounting Office, as of October 1, 1999, about 69 percent of the 9,000 civil jet aircraft weighing less than 75,000 pounds were Stage 3 compliant.

D.4.3 Time of Day

The calculation of DNL includes a 10-decibel weighting penalty for operations occurring during nighttime hours (10:00 p.m. to 6:59 a.m.).

D.4.4 Departure Trip length (Stage Length)

Departure trip length, commonly referred to as stage length (unrelated to “Stage” classifications of aircraft for FAR Part 36 noise certification discussed above), refers to the nonstop distance an aircraft travels after departure. This information is needed to determine average gross takeoff weights for the different aircraft types. The noise generated by departures of a specific aircraft type will vary depending on the takeoff weights of the particular operations. For example, a fully loaded aircraft departing on a long flight will weigh more on departure than the same fully loaded aircraft departing on a shorter flight because the longer flight requires more fuel on board. The heavier aircraft usually takes longer to reach its takeoff velocity, thereby using more runway length and climbing at a slower rate than a lighter aircraft, particularly on hot days. Therefore, more land area will be exposed to higher levels of aircraft noise by departures of heavier aircraft than departures of the same aircraft with lighter loads.

In the INM, up to seven different stage length categories have been established, representing different departure trip length distances, as presented in **Table D-9**.

Table D-9

INM Departure Stage Length Categories

Stage Length Category	Departure Trip Length Range (nautical miles)
1	0 – 500
2	500 – 1,000
3	1,000 – 1,500
4	1,500 – 2,500
5	2,500 – 3,500
6	3,500 – 4,500
7	4,500 +

Source: Federal Aviation Administration, *INM User's Guide, Version 7.0*, April 2007.
 Prepared by: Ricondo & Associates, Inc., September 2008.

The INM contains departure profiles for each aircraft type for each of the stage length categories, as appropriate. The stage length category for each departure determines which departure profile is used within INM for modeling a particular departure operation. In most cases, using the great circle distances from the airport to a given destination to determine the stage length and, therefore, the departure profile to be used provides good correlation between noise levels estimated by the INM and measured noise levels. Destination data in the 2007 ETMS database were used to derive stage length departure profiles. The departure stage length assignments were held constant for 2012 and 2017.

D.4.5 Airport Operational Information

The existing and assumed future uses of the runways and flight tracks to and from the Airport are important in determining where aircraft fly and, consequently, the noise levels generated in the Airport environs.

D.4.5.1 Runway Use

The runways available for departure and arrival at any given time are a function of the designated flow configuration at the Airport, which is typically determined by wind and weather conditions. Runway use data for the Airport were not readily available for 2007. Therefore, runway use data developed for 2004 and supplemented via 2005/2006 Airport operations data were applied. These data were provided to Airport staff, who confirmed that the earlier values still represent existing average annual day runway use.

These data were taken directly from the previously mentioned Wyle memorandum dated May 4, 2005, and minor modifications were made to capture the occasional use of Runway 4 for arrivals and departures and Runway 22 for arrivals by jet carriers. The 2005/2006 Airport operations radar data sample showed that pilots of commercial jets and regional jets⁵ occasionally use Runway 4 for arrivals and departures and Runway 22 for arrivals. Therefore, to accurately reflect operating conditions at the Airport, a nominal percentage of operations was allocated to these runways for these two aircraft categories. This percentage allocation is shown in **Table D-10**. An increase in the percentage of operations on Runway 4 or Runway 22 was offset by a decrease in the percentage of operations assigned to Runway 1 or Runway 19, respectively.

The runway use data developed were based on each unique aircraft type. Using the updated aircraft type operations based on the 2007 ETMS data, the updated runway use patterns better reflect existing conditions. **Table D-11** summarizes the runway use by aircraft category for 2007.

⁵ For this study, the term commercial jet refers to aircraft such as the MD-88, MD-90, B-737 and larger aircraft operated by mainline air carriers such as American Airlines, Delta Air Lines, and US Airways. The term regional jet refers to the smaller 50 – 100 seat jet aircraft, such as the Canadair CRJ-100 and Embraer 170 aircraft operated by commuter airlines such as American Eagle, Delta Connection, and US Airways Express.

Table D-10

Summary of Changes Made to Runway Use Percentages

Aircraft Category	Runway 4 Increase		Runway 22 Increase	
	Arrivals	Departures	Arrivals	Departures
Commercial Jet	0.50%	0.40%	0.02%	--
Regional Jet	6.00%	1.00%	1.40%	--

Source: Ricondo & Associates, Inc. based on Wyle Laboratories, *Washington National Airport (DCA) 2004 DNL Contours*, May 4, 2005 (individual aircraft type runway use), 2005/2006 Global Environmental Monitoring System (GEMS) data (adjustments to reflect Runway 4 and 22 use by jet carriers) and FAA 2007 Enhanced Traffic Management System flight data (2007 aircraft type operations).
Prepared by: Ricondo & Associates, Inc. September 2008.

Table D-11

Runway Use by Time of Day – 2007

Aircraft Category	Time and Operation Type	Runway						Total
		01	04	15	19	22	33	
Commercial Jet	Day, Arrival	57.2%	0.5%	0.3%	38.8%	0.0%	3.1%	100.0%
Regional Jet	Day, Arrival	44.9%	6.0%	2.0%	35.2%	1.4%	10.5%	100.0%
Regional Prop	Day, Arrival	25.7%	1.4%	10.0%	12.0%	18.4%	32.5%	100.0%
Commercial Jet	Day, Departure	58.8%	0.0%	1.2%	38.4%	0.0%	1.6%	100.0%
Regional Jet	Day, Departure	49.4%	0.0%	2.4%	39.9%	0.0%	8.3%	100.0%
Regional Prop	Day, Departure	14.0%	40.7%	22.4%	11.3%	0.8%	10.9%	100.0%
Commercial Jet	Night, Arrival	54.4%	0.4%	0.3%	44.6%	0.0%	0.3%	100.0%
Regional Jet	Night, Arrival	60.2%	0.5%	0.0%	35.7%	1.4%	2.2%	100.0%
Regional Prop	Night, Arrival	27.1%	0.4%	10.3%	15.2%	16.6%	30.4%	100.0%
Commercial Jet	Night, Departure	63.7%	0.0%	0.4%	35.2%	0.0%	0.6%	100.0%
Regional Jet	Night, Departure	52.5%	1.0%	0.0%	45.6%	0.0%	0.9%	100.0%
Regional Prop	Night, Departure	11.1%	25.1%	29.7%	10.2%	0.0%	23.9%	100.0%

Note: Rows may not add to totals shown because of rounding.

Source: Ricondo & Associates, Inc., based on Wyle Laboratories, *Washington National Airport (DCA) 2004 DNL Contours*, May 4, 2005 (individual aircraft type runway use), 2005/2006 Global Environmental Monitoring System (GEMS) data (adjustments to reflect Runway 4 and 22 use by jet carriers), and FAA 2007 Enhanced Traffic Management System flight data (2007 aircraft type operations).
Prepared by: Ricondo & Associates, Inc. September 2008.

Runway use data for 2012 and 2017 were developed using the 2007 runway use patterns by aircraft type, which were then applied to forecast aircraft operations levels to result in a runway use pattern reflecting the forecast demand. **Tables D-12** and **D-13** summarize future runway use by aircraft category for 2012 and 2017, respectively.

Table D-12

Annual Runway Use for 2012

	Runway						Total
	01	04	15	19	22	33	
Daytime Arrivals							
Commercial Jet	57.2%	0.5%	0.3%	38.8%	0.0%	3.1%	100.0%
General Aviation Jet	51.3%	0.2%	3.2%	25.0%	6.7%	13.5%	100.0%
General Aviation Prop	22.2%	1.0%	18.5%	44.2%	5.0%	9.2%	100.0%
Regional Jet	44.9%	6.0%	2.0%	35.2%	1.4%	10.5%	100.0%
Regional Prop	25.7%	1.4%	10.0%	12.0%	18.4%	32.5%	100.0%
All Aircraft	48.9%	2.4%	2.3%	34.0%	3.0%	9.4%	100.0%
Nighttime Arrivals							
Commercial Jet	54.4%	0.4%	0.3%	44.6%	0.0%	0.3%	100.0%
General Aviation Jet	70.1%	0.6%	1.4%	25.0%	2.3%	0.6%	100.0%
General Aviation Prop	24.4%	0.5%	9.0%	16.7%	18.1%	31.3%	100.0%
Regional Jet	60.2%	0.5%	0.0%	35.7%	1.4%	2.2%	100.0%
Regional Prop	27.1%	0.4%	10.3%	15.2%	16.6%	30.4%	100.0%
All Aircraft	55.0%	0.4%	0.8%	40.0%	1.3%	2.5%	100.0%
Daytime Departures							
Commercial Jet	58.8%	0.0%	1.2%	38.4%	0.0%	1.6%	100.0%
General Aviation Jet	41.7%	2.6%	14.4%	17.8%	0.1%	23.4%	100.0%
General Aviation Prop	30.5%	25.9%	14.9%	23.3%	0.4%	5.1%	100.0%
Regional Jet	49.4%	0.0%	2.4%	39.9%	0.0%	8.3%	100.0%
Regional Prop	14.0%	40.7%	22.4%	11.3%	0.8%	10.9%	100.0%
All Aircraft	49.8%	5.2%	4.5%	35.1%	0.1%	5.2%	100.0%
Nighttime Departures							
Commercial Jet	63.7%	0.0%	0.4%	35.2%	0.0%	0.6%	100.0%
General Aviation Jet	38.1%	9.8%	6.2%	34.1%	0.0%	11.8%	100.0%
General Aviation Prop	25.0%	62.5%	0.0%	12.5%	0.0%	0.0%	100.0%
Regional Jet	52.5%	1.0%	0.0%	45.6%	0.0%	0.9%	100.0%
Regional Prop	11.1%	25.1%	29.7%	10.2%	0.0%	23.9%	100.0%
All Aircraft	54.4%	3.3%	3.6%	35.3%	0.0%	3.5%	100.0%

Note: Rows may not add to totals shown because of rounding.

Source: Ricondo & Associates, Inc. based on Authority Global Environmental Monitoring System (GEMS) data from September 2000 through August 2001 and for 5 months in 2005/2006.

Prepared by: Ricondo & Associates, Inc., September 2008.

Table D-13

Annual Runway Use for 2017

Daytime Arrivals	Runway						Total
	01	04	15	19	22	33	
Commercial Jet	57.2%	0.5%	0.3%	38.8%	0.0%	3.1%	100.0%
General Aviation Jet	51.3%	0.2%	3.2%	25.0%	6.7%	13.5%	100.0%
General Aviation Prop	22.2%	1.0%	18.5%	44.2%	5.0%	9.2%	100.0%
Regional Jet	44.9%	6.0%	2.0%	35.2%	1.4%	10.5%	100.0%
Regional Prop	25.7%	1.4%	10.0%	12.0%	18.4%	32.5%	100.0%
All Aircraft	49.1%	2.3%	2.2%	34.1%	2.9%	9.3%	100.0%
Nighttime Arrivals							
Commercial Jet	54.4%	0.4%	0.3%	44.6%	0.0%	0.3%	100.0%
General Aviation Jet	70.1%	0.6%	1.4%	25.0%	2.3%	0.6%	100.0%
General Aviation Prop	24.4%	0.5%	9.0%	16.7%	18.1%	31.3%	100.0%
Regional Jet	60.2%	0.5%	0.0%	35.7%	1.4%	2.2%	100.0%
Regional Prop	27.1%	0.4%	10.3%	15.2%	16.6%	30.4%	100.0%
All Aircraft	55.0%	0.4%	0.8%	40.1%	1.3%	2.4%	100.0%
Daytime Departures							
Runway							
Daytime Departures	01	04	15	19	22	33	Total
Commercial Jet	58.8%	0.0%	1.2%	38.4%	0.0%	1.6%	100.0%
General Aviation Jet	41.7%	2.6%	14.4%	17.8%	0.1%	23.4%	100.0%
General Aviation Prop	30.5%	25.9%	14.9%	23.3%	0.4%	5.1%	100.0%
Regional Jet	49.4%	0.0%	2.4%	39.9%	0.0%	8.3%	100.0%
Regional Prop	14.0%	40.7%	22.4%	11.3%	0.8%	10.9%	100.0%
All Aircraft	50.0%	5.1%	4.4%	35.1%	0.1%	5.2%	100.0%
Nighttime Departures							
Commercial Jet	63.7%	0.0%	0.4%	35.2%	0.0%	0.6%	100.0%
General Aviation Jet	38.1%	9.8%	6.2%	34.1%	0.0%	11.8%	100.0%
General Aviation Prop	25.0%	62.5%	0.0%	12.5%	0.0%	0.0%	100.0%
Regional Jet	52.5%	1.0%	0.0%	45.6%	0.0%	0.9%	100.0%
Regional Prop	11.1%	25.1%	29.7%	10.2%	0.0%	23.9%	100.0%
All Aircraft	54.6%	3.2%	3.5%	35.3%	0.0%	3.4%	100.0%

Note: Rows may not add to totals shown because of rounding.

Source: Ricondo & Associates, Inc. based on Authority Global Environmental Monitoring System (GEMS) data from September 2000 through August 2001 and for 5 months in 2005/2006.

Prepared by: Ricondo & Associates, Inc., September 2008.

D.4.5.2 Aircraft Flight Tracks

Flight tracks developed for the November 2004 FAR Part 150 noise analyses for the Airport were based on an October 2002 radar data sample and confirmed based on 2005/2006 airport operations Global Environmental Monitoring System (GEMS) radar data. The generalized arrival and departure flight tracks are depicted on **Exhibit D-2** and **Exhibit D-3**, respectively. The 2007 existing conditions, 2012 No Action, and 2017 No Action noise analyses incorporate the same flight track data, with respect to their locations on the ground. Airport staff confirmed that the flight track routing has not changed since 2006, and that these generalized tracks depict existing conditions. For the Proposed Action in 2012 and 2017, the departure and arrival tracks to/from Runway 1 for the No Action alternative were adjusted to account for the extension of Runway 1 300 feet to the south.

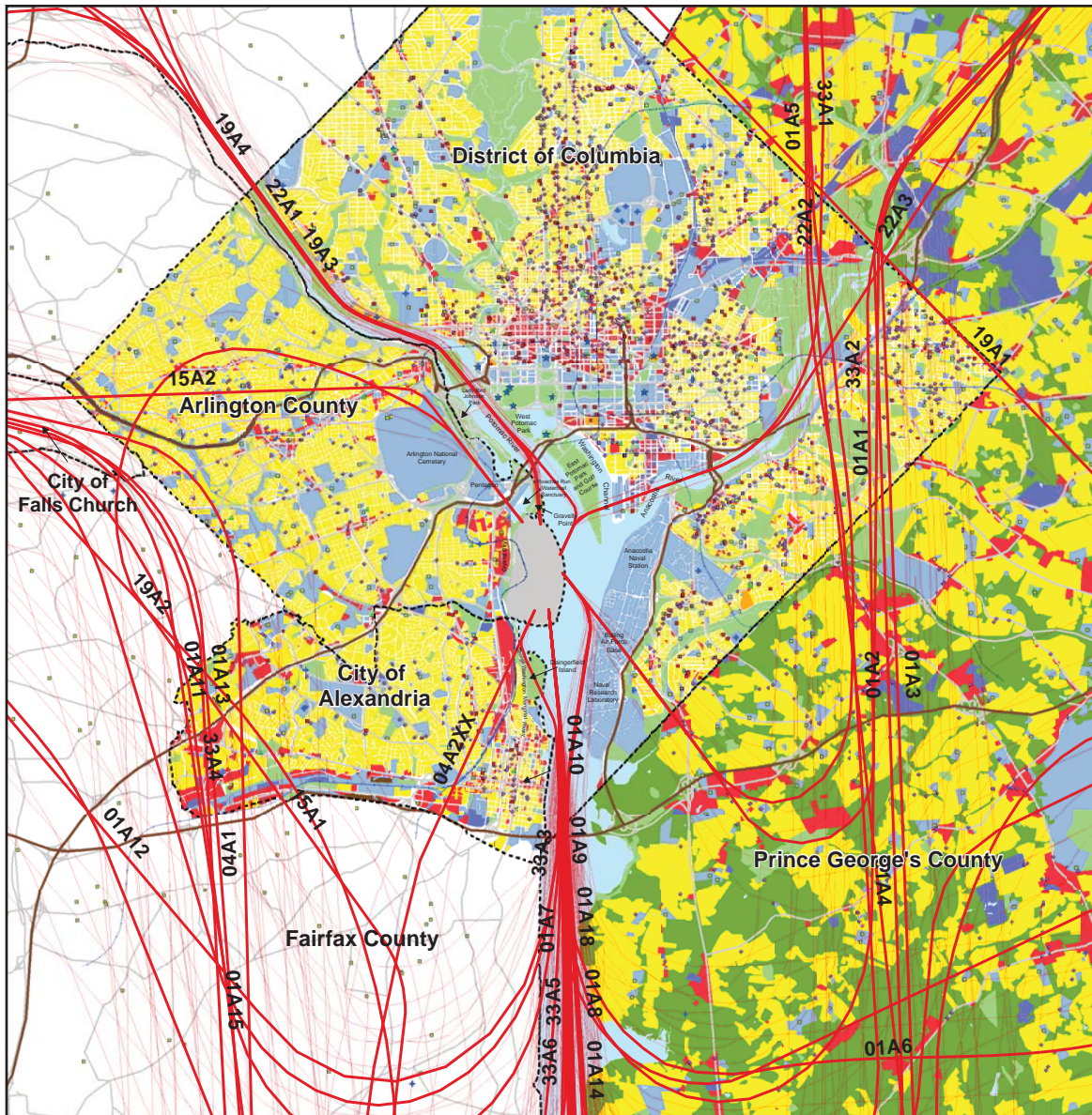
Flight track use data presented in the FAR Part 150 program for the Airport are based on the same October 2002 radar data sample and were confirmed via 2005/2006 GEMS data. Flight track use is constant across individual aircraft categories. These track uses were held constant for all noise analysis scenarios. The Proposed Action is not expected to change the arrival or departure direction of flights or the frequency of such occurrences. Flight track use assumptions for 2007 are presented in **Table D-14**. **Table D-15** presents flight track use data for the 2012 and 2017 analysis years.

D.4.5.3 Other Assumptions

In addition to runway use and flight track information, the following conditions were assumed in developing noise exposure maps for the Airport:

- Departure and approach profiles are those typical of each aircraft given the indicated stage length.
- Noise, thrust, and altitude information for each specific aircraft is as specified in the INM Version 7.0a aircraft database.

In addition, U.S. Geological Survey (USGS) National Elevation Dataset (NED) 1/3-arc-second resolution terrain elevation data were incorporated in the INM model for the Airport. The terrain data were obtained from USGS NED website.



LEGEND

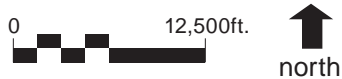
Hospital	Landmark	Runways	Residential	Parks/Recreation	Water
School	Interstate Highway	300 ft. Runway Extension	Commercial	Open Space	Other Roads/Unknown
Day Care	Jurisdictional Boundary	Nominal Arrival Flight Track	Mixed Use	Industrial	Ronald Reagan Washington National Airport
Library	Major Road	Dispersed Arrival Flight Track	Institutional/ Government	Vacant Space	
Religious Facility	Railroad				

Note: Day care and library data for Prince George's County unavailable.

Sources: Arlington County Department of Environmental Services (land use); City of Alexandria Department of Planning & Zoning, 2008 (land use); Maryland Department of Planning (land use), 2002; District of Columbia Office of Planning (land use), 2002; Virginia Economic Development Partnership GIS (point data), 2007.

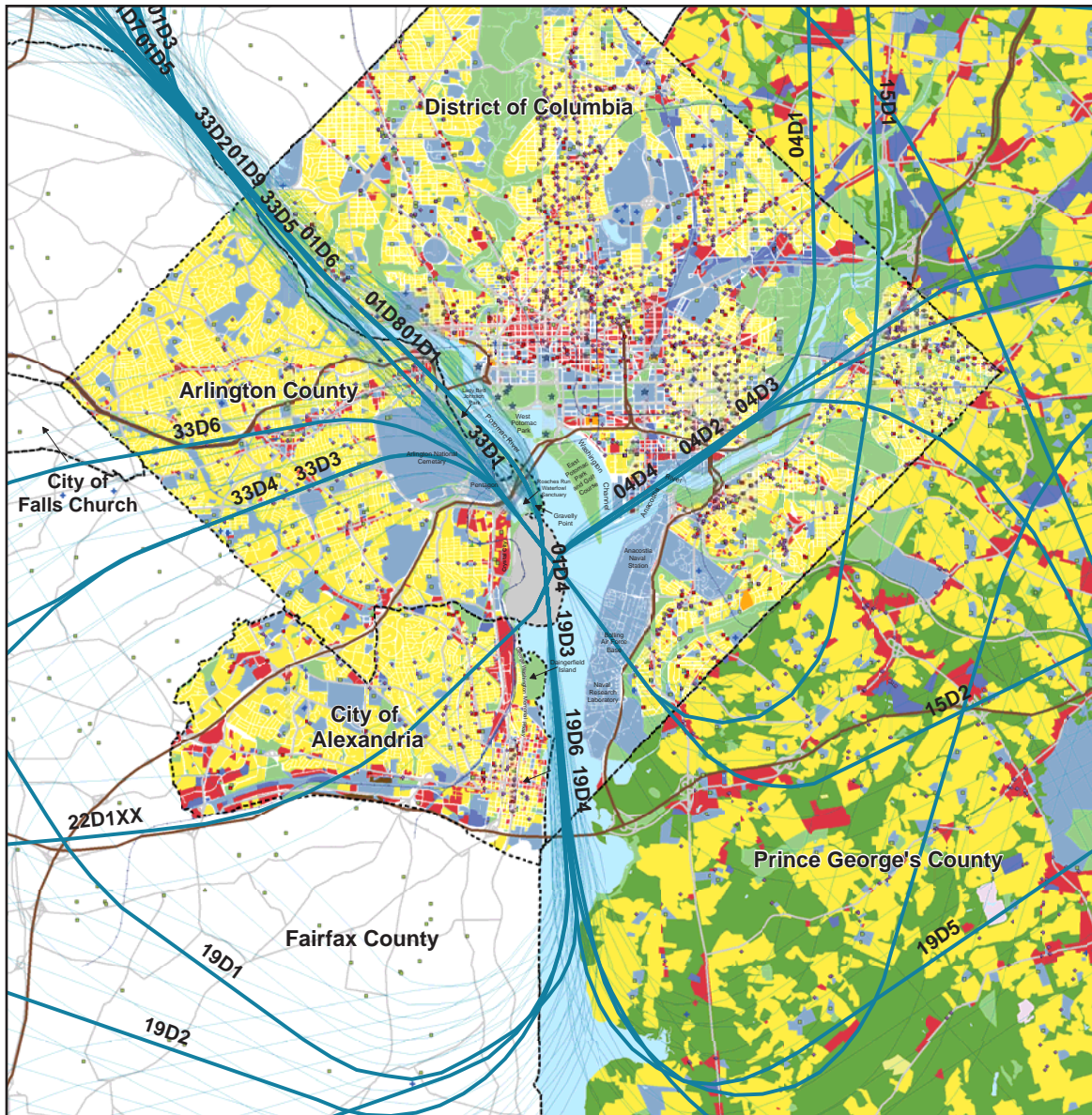
Prepared by: Ricondo & Associates, Inc., 2008.

Exhibit D-2



Generalized Arrival Flight Tracks

THIS PAGE LEFT INTENTIONALLY BLANK



LEGEND

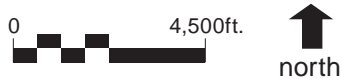
Hospital	Landmark	Runways	Residential	Parks/Recreation	Water
School	Interstate Highway	300 ft. Runway Extension	Commercial	Open Space	Other Roads/Unknown
Day Care	Jurisdictional Boundary	Nominal Arrival Flight Track	Mixed Use	Industrial	Ronald Reagan Washington National Airport
Library	Major Road	Dispersed Arrival Flight Track	Institutional/Government	Vacant Space	
Religious Facility	Railroad				

Note: Day care and library data for Prince George's County unavailable.

Sources: Arlington County Department of Environmental Services (land use); City of Alexandria Department of Planning & Zoning, 2008 (land use); Maryland Department of Planning (land use), 2002; District of Columbia Office of Planning (land use), 2002; Virginia Economic Development Partnership GIS (point data), 2007.

Prepared by: Ricondo & Associates, Inc., 2008.

Exhibit D-3



Generalized Departure Flight Tracks

THIS PAGE LEFT INTENTIONALLY BLANK

Table D-14 (1 of 2)

Flight Track Use – 2007

Runway	Operation	Track	Air Carrier	Regional Jet	Regional Prop	General Aviation Jet	General Aviation Prop
01	Arrivals	1A01	9.2%	15.9%	3.2%	15.9%	3.2%
		1A02	8.1%	19.9%	9.3%	19.9%	9.3%
		1A03	1.4%	2.2%	2.0%	2.2%	2.0%
		1A04	0.0%	0.0%	6.9%	0.0%	6.9%
		1A05	0.0%	0.0%	4.4%	0.0%	4.4%
		1A06	3.7%	5.1%	0.0%	5.1%	0.0%
		1A07	3.4%	5.5%	0.5%	5.5%	0.5%
		1A08	0.8%	0.8%	0.5%	0.8%	0.5%
		1A09	1.2%	2.1%	0.0%	2.1%	0.0%
		1A10	1.3%	3.3%	0.0%	3.3%	0.0%
		1A11	13.9%	10.2%	5.9%	10.2%	5.9%
		1A12	4.9%	2.1%	2.5%	2.1%	2.5%
		1A13	23.6%	13.2%	10.5%	13.2%	10.5%
		1A14	2.5%	1.0%	1.5%	1.0%	1.5%
		1A15	3.8%	2.4%	2.5%	2.4%	2.5%
		1A17	5.6%	3.6%	13.7%	3.6%	13.7%
		1A18	16.5%	12.6%	36.8%	12.6%	36.8%
					100.0%	100.0%	100.0%
01	Departures	1D01	6.5%	0.2%	2.6%	0.2%	2.6%
		1D02	2.6%	3.9%	0.0%	3.9%	0.0%
		1D03	10.9%	14.9%	2.6%	14.9%	2.6%
		1D04	6.5%	12.2%	0.0%	12.2%	0.0%
		1D05	4.5%	8.6%	0.0%	8.6%	0.0%
		1D06	5.6%	5.4%	0.0%	5.4%	0.0%
		1D07	2.0%	2.7%	0.0%	2.7%	0.0%
		1D08	13.3%	17.9%	33.3%	17.9%	33.3%
		1D09	18.9%	14.3%	17.9%	14.3%	17.9%
		1D10	20.9%	13.9%	35.9%	13.9%	35.9%
		1D11	8.4%	5.9%	7.7%	5.9%	7.7%
					100.0%	100.0%	100.0%
4	Arrivals	4A01	100.0%	100.0%	90.0%	100.0%	90.0%
		4A02XX	0.00%	0.00%	10.0%	0.00%	10.0%
			100.0%	100.0%	100.0%	100.0%	100.0%
4	Departures	4D01	25.0%	25.0%	46.7%	25.0%	46.7%
		4D02	25.0%	25.0%	32.1%	25.0%	32.1%
		4D03	25.0%	25.0%	8.0%	25.0%	8.0%
		4D04	25.0%	25.0%	13.1%	25.0%	13.1%
			100.0%	100.0%	100.0%	100.0%	100.0%
15	Arrivals	15A01	50.0%	50.0%	84.6%	50.0%	84.6%
		15A02	50.0%	50.0%	15.4%	50.0%	15.4%
			100.0%	100.0%	100.0%	100.0%	100.0%

Ronald Reagan Washington National Airport

Table D-14 (2 of 2)

Flight Track Use – 2007

Runway	Operation	Track	Air Carrier	Regional Jet	Regional Prop	General Aviation Jet	General Aviation Prop
15	Departures	15D01	33.3%	33.3%	36.4%	33.3%	36.4%
		15D02	33.3%	33.3%	40.9%	33.3%	40.9%
		15D03X	33.3%	33.3%	22.7%	33.3%	22.7%
19	Arrivals		100.0%	100.0%	100.0%	100.0%	100.0%
		19A01	12.2%	24.4%	0.0%	24.4%	0.0%
		19A02	24.6%	12.6%	60.0%	12.6%	60.0%
		19A03	15.2%	43.7%	0.0%	43.7%	0.0%
		19A04	47.9%	19.3%	40.0%	19.3%	40.0%
19	Departures		100.0%	100.0%	100.0%	100.0%	100.0%
		19D01	15.6%	14.2%	17.6%	14.2%	17.6%
		19D02	32.6%	20.1%	47.1%	20.1%	47.1%
		19D03	18.7%	17.2%	17.6%	17.2%	17.6%
		19D04	17.2%	32.1%	0.0%	32.1%	0.0%
		19D05	11.5%	16.4%	11.8%	16.4%	11.8%
		19D06	4.3%	0.0%	5.9%	0.0%	5.9%
22	Arrivals		100.0%	100.0%	100.0%	100.0%	100.0%
		22A01	25.0%	25.0%	4.0%	25.0%	4.0%
		22A02	50.0%	50.0%	70.0%	50.0%	70.0%
22	Departures		100.0%	100.0%	100.0%	100.0%	100.0%
		22A03	25.0%	25.0%	26.0%	25.0%	26.0%
		22D1XX	0.00%	0.00%	100.0%	100.0%	100.0%
33	Arrivals		0.00%	100.0%	100.0%	100.0%	100.0%
		33A01	0.0%	0.0%	32.0%	0.0%	32.0%
		33A02	30.3%	54.5%	35.6%	54.5%	35.6%
		33A03	20.0%	18.2%	8.6%	18.2%	8.6%
		33A04	19.9%	13.6%	6.9%	13.6%	6.9%
		33A05	29.8%	13.6%	16.8%	13.6%	16.8%
33	Departures		100.0%	100.0%	100.0%	100.0%	100.0%
		33D01	30.7%	87.3%	0.9%	87.3%	0.9%
		33D02	51.9%	5.1%	7.4%	5.1%	7.4%
		33D03	0.0%	0.0%	57.9%	0.0%	57.9%
		33D04	0.0%	0.0%	22.0%	0.0%	22.0%
		33D05	17.4%	7.6%	3.6%	7.6%	3.6%
		33D06	0.0%	0.0%	8.3%	0.0%	8.3%

Note: Columns may not add to totals shown because of rounding.

Source: Wyle Laboratories based on radar data samples from October 2002 and Authority Global Environmental Monitoring System (GEMS) data from September 2000 through August 2001, and for 5 months in 2005/2006 (Integrated Noise Model flight track use); and FAA 2007 Terminal Area Forecast aircraft operation levels and aircraft and operation mode frequency, September 2008.
 Prepared by: Ricondo & Associates, Inc. September 2008.

Table D-15 (1 of 2)

Flight Track Use – 2012 and 2017

Runway	Operation	Track	Air Carrier	Regional Jet	Regional Prop	General Aviation Jet	General Aviation Prop
01	Arrivals	1A01	9.2%	15.9%	3.2%	15.9%	3.2%
		1A02	8.1%	19.9%	9.3%	19.9%	9.3%
		1A03	1.4%	2.2%	2.0%	2.2%	2.0%
		1A04	0.0%	0.0%	6.9%	0.0%	6.9%
		1A05	0.0%	0.0%	4.4%	0.0%	4.4%
		1A06	3.7%	5.1%	0.0%	5.1%	0.0%
		1A07	3.4%	5.5%	0.5%	5.5%	0.5%
		1A08	0.8%	0.8%	0.5%	0.8%	0.5%
		1A09	1.2%	2.1%	0.0%	2.1%	0.0%
		1A10	1.3%	3.3%	0.0%	3.3%	0.0%
		1A11	13.9%	10.2%	5.9%	10.2%	5.9%
		1A12	4.9%	2.1%	2.5%	2.1%	2.5%
		1A13	23.6%	13.2%	10.5%	13.2%	10.5%
		1A14	2.5%	1.0%	1.5%	1.0%	1.5%
		1A15	3.8%	2.4%	2.5%	2.4%	2.5%
		1A17	5.6%	3.6%	13.7%	3.6%	13.7%
		1A18	16.5%	12.6%	36.8%	12.6%	36.8%
					100.0%	100.0%	100.0%
01	Departures	1D01	6.5%	0.2%	2.6%	0.2%	2.6%
		1D02	2.6%	3.9%	0.0%	3.9%	0.0%
		1D03	10.9%	14.9%	2.6%	14.9%	2.6%
		1D04	6.5%	12.2%	0.0%	12.2%	0.0%
		1D05	4.5%	8.6%	0.0%	8.6%	0.0%
		1D06	5.6%	5.4%	0.0%	5.4%	0.0%
		1D07	2.0%	2.7%	0.0%	2.7%	0.0%
		1D08	13.3%	17.9%	33.3%	17.9%	33.3%
		1D09	18.9%	14.3%	17.9%	14.3%	17.9%
		1D10	20.9%	13.9%	35.9%	13.9%	35.9%
		1D11	8.4%	5.9%	7.7%	5.9%	7.7%
			100.0%	100.0%	100.0%	100.0%	100.0%
4	Arrivals	4A01	100.0%	100.0%	90.0%	100.0%	90.0%
		4A02XX	0.00%	0.00%	10.0%	0.00%	10.0%
			100.0%	100.0%	100.0%	100.0%	100.0%
4	Departures	4D01	25.0%	25.0%	46.7%	25.0%	46.7%
		4D02	25.0%	25.0%	32.1%	25.0%	32.1%
		4D03	25.0%	25.0%	8.0%	25.0%	8.0%
		4D04	25.0%	25.0%	13.1%	25.0%	13.1%
			100.0%	100.0%	100.0%	100.0%	100.0%
15	Arrivals	15A01	50.0%	50.0%	84.6%	50.0%	84.6%
		15A02	50.0%	50.0%	15.4%	50.0%	15.4%
			100.0%	100.0%	100.0%	100.0%	100.0%

Ronald Reagan Washington National Airport

Table D-15 (2 of 2)

Flight Track Use –2012 and 2017

Runway	Operation	Track	Air Carrier	Regional Jet	Regional Prop	General Aviation Jet	General Aviation Prop
15	Departures	15D01	33.3%	33.3%	36.4%	33.3%	36.4%
		15D02	33.3%	33.3%	40.9%	33.3%	40.9%
		15D03X	33.3%	33.3%	22.7%	33.3%	22.7%
			100.0%	100.0%	100.0%	100.0%	100.0%
19	Arrivals	19A01	12.2%	24.4%	0.0%	24.4%	0.0%
		19A02	24.6%	12.6%	60.0%	12.6%	60.0%
		19A03	15.2%	43.7%	0.0%	43.7%	0.0%
		19A04	47.9%	19.3%	40.0%	19.3%	40.0%
			100.0%	100.0%	100.0%	100.0%	100.0%
19	Departures	19D01	15.6%	14.2%	17.6%	14.2%	17.6%
		19D02	32.6%	20.1%	47.1%	20.1%	47.1%
		19D03	18.7%	17.2%	17.6%	17.2%	17.6%
		19D04	17.2%	32.1%	0.0%	32.1%	0.0%
		19D05	11.5%	16.4%	11.8%	16.4%	11.8%
		19D06	4.3%	0.0%	5.9%	0.0%	5.9%
			100.0%	100.0%	100.0%	100.0%	100.0%
22	Arrivals	22A01	25.0%	25.0%	4.0%	25.0%	4.0%
		22A02	50.0%	50.0%	70.0%	50.0%	70.0%
		22A03	25.0%	25.0%	26.0%	25.0%	26.0%
			100.0%	100.0%	100.0%	100.0%	100.0%
22	Departures	22D1XX	0.0%	0.00%	100.0%	100.0%	100.0%
33	Arrivals	33A01	0.0%	0.0%	32.0%	0.0%	32.0%
		33A02	30.3%	54.5%	35.6%	54.5%	35.6%
		33A03	20.0%	18.2%	8.6%	18.2%	8.6%
		33A04	19.9%	13.6%	6.9%	13.6%	6.9%
		33A05	29.8%	13.6%	16.8%	13.6%	16.8%
		33A06	0.0%	0.0%	6.9%	0.0%	6.9%
			100.0%	100.0%	100.0%	100.0%	100.0%
33	Departures	33D01	30.7%	87.3%	0.9%	87.3%	0.9%
		33D02	51.9%	5.1%	7.4%	5.1%	7.4%
		33D03	0.0%	0.0%	57.9%	0.0%	57.9%
		33D04	0.0%	0.0%	22.0%	0.0%	22.0%
		33D05	17.4%	7.6%	3.6%	7.6%	3.6%
		33D06	0.0%	0.0%	8.3%	0.0%	8.3%
			100.0%	100.0%	100.0%	100.0%	100.0%

Note: Columns may not add to totals shown because of rounding.

Source: Wyle Laboratories based on radar data samples from October 2002 and Authority Global Environmental Monitoring System (GEMS) data from September 2000 through August 2001, and for 5 months in 2005/2006 (Integrated Noise Model flight track use); and FAA 2007 Terminal Area Forecast (TAF) aircraft operation levels and aircraft and operation mode frequency, September 2008.

Prepared by: Ricondo & Associates, Inc. September 2008.

Appendix E. Fish, Wildlife, and Plants

Table E-1

Fish Species of Upper Tidal Potomac River

Common Name	Scientific Name	Common Name	Scientific Name
<input type="checkbox"/> Alewife ^{a/}	<i>Alosa pseudoharengus</i>	Inland Silverside	<i>Menidia beryllina</i>
<input type="checkbox"/> American Eel ^{a/}	<i>Anguilla rostrata</i>	Largemouth Bass	<i>Micropterus salmoides</i>
<input type="checkbox"/> American Shad ^{a/}	<i>Alosa sapidissima</i>	Least Brook Lamprey	<i>Okkelbergia aepyptera</i>
Atlantic Menhaden	<i>Brevoortia tyrannus</i>	Mummichog	<i>Fundulus heteroclitus</i>
Atlantic Silverside	<i>Menidia menidia</i>	Pumpkinseed	<i>Lepomis gibbosus</i>
Atlantic Sturgeon ^{a/}	<i>Acipenser oxyrinchus</i>	Redbreast Sunfish	<i>Lepomis auritus</i>
Banded Killifish	<i>Fundulus diaphanus</i>	Satinfin Shiner	<i>Cyprinella analostana</i>
Black Crappie	<i>Pomoxis nigromaculatus</i>	<input type="checkbox"/> Sea Lamprey	<i>Petromyzon marinus</i>
<input type="checkbox"/> Blueback Herring ^{a/}	<i>Alosa aestivalis</i>	Shorthead Redhorse	<i>Moxostoma macrolepidotum</i>
Bluegill	<i>Lepomis macrochirus</i>	Smallmouth Bass	<i>Micropterus dolomieu</i>
Bluntnose Minnow	<i>Pimephales notatus</i>	Shortnose Sturgeon ^{a/}	<i>Acipenser brevirostrum</i>
Brown Bullhead	<i>Ameiurus nebulosus</i>	Silverjaw Minnow ^{a/}	<i>Notropis buccatus</i>
Bowfin ^{a/}	<i>Amia calva</i>	Spot	<i>Leiostomus xanthurus</i>
Carp	<i>Cyprinus carpio</i>	Spottail Shiner	<i>Notropis hudsonius</i>
Central Stoneroller ^{a/}	<i>Campostoma anomalum</i>	<input type="checkbox"/> Striped Bass	<i>Morone saxatilis</i>
Channel Catfish	<i>Ictalurus punctatus</i>	Tessellated Darter	<i>Etheostoma olmstedii</i>
Eastern Silvery Minnow	<i>Hybognathus regius</i>	Warmouth ^{a/}	<i>Lepomis gulosus</i>
<input type="checkbox"/> Gizzard Shad	<i>Dorosoma cepedianum</i>	White Catfish	<i>Ameiurus catus</i>
Golden Shiner	<i>Notemigonus crysoleucas</i>	<input type="checkbox"/> White Perch	<i>Morone americana</i>
Goldfish	<i>Carassius auratus</i>	White Sucker	<i>Catostomus commersonii</i>
Greenside Darter ^{a/}	<i>Etheostoma blennioides</i>	<input type="checkbox"/> Yellow Perch	<i>Perca flavescens</i>
<input type="checkbox"/> Hickory Shad ^{a/}	<i>Alosa mediocris</i>		

Notes:

Denotes species that use both fresh water and salt water environments during some phase of their life cycles.

a/ District of Columbia "Species of Greatest Conservation Need"

Sources: Federal Highway Administration, Virginia Department of Transportation, Maryland State Highway Administration, and D.C. Department of Public Works, *Woodrow Wilson Bridge Improvement Study Final Environmental Impact Statement/Section 4f Evaluation*, Baltimore, Maryland, 1997; Environmental Center, Martin Marietta Corporation, *Environmental Atlas of the Potomac Estuary*, 1979; Virginia Department of Game and Inland Fisheries, *anad_reaches1783*, Vector digital data, http://www.dgif.state.va.us/gis/gis_data.html, 2002 (accessed July 18, 2006); District of Columbia, Department of the Environment, Fisheries and Wildlife Division, *District of Columbia Wildlife Action Plan*, 2006.

Prepared by: Straughan Environmental Services, Inc., September 2008.

Table E-2**Benthic Macroinvertebrates Collected in Waterways in the Airport Vicinity**

Potomac River		Four Mile Run	
Common Name	Scientific Name	Common Name	Scientific Name
Aquatic Sow Bug	<i>Caecidotea</i>	Crayfish	<i>Decaptera</i>
Black Fly	<i>Stegopterna</i>	Dragonfly	<i>Odonata</i>
Black Fly	<i>Prosimulium</i>	Hellgrammite	<i>Megaloptera</i>
Common Netspinner Caddisfly	<i>Diplectrona</i>	Leech	<i>Hirudinea</i>
Cranefly	<i>Tipula</i>	Mayfly	<i>Ephemoptera</i>
Fingernet Caddisfly	<i>Philopotamidae</i>	Scud	<i>Amphipoda</i>
Minnnow Mayfly	<i>Ameletus</i>	Snail	<i>Gastropoda</i>
Nemourid Stonefly	<i>Amphinemura</i>	Sow Bug	<i>Isopoda</i>
Nemourid Stonefly	<i>Prostoia</i>	Stonefly	<i>Plecoptera</i>
Non-biting Midge	<i>Eukiefferiella</i>	True Fly	<i>Diptera</i>
Non-biting Midge	<i>Parametricnemus</i>	Worm	<i>Oligochaeta</i>
Non-biting Midge	<i>Cricotopus/Orthocladius</i>		
Non-biting Midge	<i>Tanytarsus</i>		
Non-biting Midge	<i>Heterotrissocladius</i>		
Non-biting Midge	<i>Parachaetocladius</i>		
Non-biting Midge	<i>Polypedilum</i>		
Non-biting Midge	<i>Rheocricotopus</i>		
Perlodid Stonefly	PERLODIDAE		
Rolledwinged Stonefly	<i>Leuctra</i>		
Scud	<i>Synurella</i>		
Springtail	<i>Isotomurus</i>		
Trumpetnet and Tubemaking Caddisfly	<i>Polycentropus</i>		
Uenoid Case Maker Caddisfly	<i>Neophylax</i>		
Worm	LUMBRICULIDAE		

Note: Organisms presented for Four Mile Run were collected at Barcroft Park, and are identified as to Order.

Sources: Arlington County Department of Environmental Services, *Volunteer Stream Monitoring Program 2005 Data Report*, 2005, http://www.arlingtonva.us/Departments/EnvironmentalServices/epo/pdf/files/streammon_05.pdf (accessed July 23, 2008); Maryland Department of Natural Resources, *Data Summary for: Upper Tidal Potomac River (Metropolitan Washington Basin)* PRUT-116-R-2001, PRUT-116-R-2001, Maryland Biological Stream Survey, http://mddnr.chesapeakebay.net/mbss/SA_site2k.cfm?siteyr=PRUT-116-R-2001,2001 (accessed July 23, 2008).

Prepared by: Straughan Environmental Services, Inc., September 2008.

Table E-3

Macroinvertebrates Listed as Species of Greatest Conservation Need by the District of Columbia

Common Name	Scientific Name	Common Name	Scientific Name
Alewife Floater	<i>Anodonta implicata</i>	Sphagnum Sprite	<i>Nehalennia gracilis</i>
Brook Floater	<i>Alasmidonta varicosa</i>	Spiny-foot Copepod	<i>Attheyella villosipes</i>
Dwarf Wedgemussel	<i>Alasmidonta heterodon</i>	Tidewater Mucket	<i>Leptodea ochracea</i>
Emerald Spreadwing	<i>Lestes dryas</i>	Tiger Spiketail Dragonfly	<i>Cordulegaster erroneus</i>
Fine-lined Emerald	<i>Somatochlora filosa</i>	Triangle Floater	<i>Alasmidonta undulata</i>
Gray Petaltail	<i>Tachopteryx thoreyi</i>	Unicorn Clubtail Dragonfly	<i>Arigomphus villosipes</i>
Lilypad Forktail Damselfly	<i>Ischnura kellicotti williamsoni</i>	Yellow Lampmussel	<i>Lampsilis cariosa</i>
Regal Fritillary Butterfly	<i>Speyeria idalia</i>	14 Copepod species	<i>various</i>
Sedge Sprite	<i>Nehalennia irene</i>		

Source: District of Columbia, Department of the Environment, Fisheries and Wildlife Division, *District of Columbia Wildlife Action Plan*, 2006. Prepared by: Straughan Environmental Services, Inc., September 2008.

Table E-4

Common Species of Submerged Aquatic Vegetation Found in Upper Tidal Section of the Potomac River

Common Name	Scientific Name	Common Name	Scientific Name
Eurasian watermilfoil ^{a/}	<i>Myriophyllum spicatum</i>	Common elodea	<i>Elodea canadensis</i>
Sago pondweed	<i>Stuckenia pectinata</i>	Coontail	<i>Ceratophyllum demersum</i>
Redhead grass	<i>Potamogeton perfoliatus</i>	Hydrilla ^{a/}	<i>Hydrilla verticillata</i>
Curly pondweed	<i>Potamogeton crispus</i>	Water stargrass	<i>Heteranthera dubia</i>
Slender pondweed	<i>Potamogeton pusillus</i>	Southern naiad ^{a/}	<i>Najas guadalupensis</i>
Horned pondweed	<i>Zannichellia palustris</i>	and other <i>Najas</i> ^{a/} species	
Wild celery	<i>Vallisneria spiralis</i>		

Note:

a/ Hydrilla, Eurasian watermilfoil, and naiad are exotic species in the tidal reaches of the Potomac River. Hydrilla is the most abundant species of submerged aquatic vegetation (SAV) in the upper tidal segment of the Potomac River and can grow intermixed with the species listed above.

Sources: Stevenson and Confer, 1978; Orth et al., 1979; Orth and Moore, 1981, 1983; Moore et al., 2000 in Virginia Institute of Marine Sciences, 2005 *Distribution of Submerged Aquatic Vegetation in the Chesapeake Bay and Tributaries and the Coastal Bays*, <http://www.vims.edu/bio/sav/sav05> (accessed July 22, 2008); Rybicki, N.B., S. Yoon, E. Schenk, and J. Baldizar, U.S. Geological Survey Report to Metropolitan Washington Council of Governments, Potomac Aquatic Plant Management Committee, *Submersed Aquatic Vegetation Distribution in the Fresh and Oligohaline Tidal Potomac River*, 2004.

Prepared by: Straughan Environmental Services, Inc., September 2008.

Table E-5

Mammal, Reptile, and Amphibian Species Likely to Occur in the Airport Vicinity

Mammals			
Common Name	Scientific Name	Common Name	Scientific Name
American Mink ^{a/}	<i>Mustela vison</i>	Norway Rat ^{b/}	<i>Rattus norvegicus</i>
Eastern Chipmunk	<i>Tamias striatus</i>	Opossum ^{a/}	<i>Didelphis virginiana</i>
Eastern Cottontail	<i>Sylvilagus floridanus</i>	Raccoon	<i>Procyon lotor</i>
Eastern Mole	<i>Scalopus aquaticus</i>	River Otter ^{a/}	<i>Lontra canadensis</i>
Gray Fox ^{a/}	<i>Urocyon cinereoargenteus</i>	Striped Skunk	<i>Mephitis mephitis</i>
Gray Squirrel	<i>Sciurus carolinensis</i>	Southern Bog Lemming ^{a/}	<i>Synaptomys cooperi</i>
House Mouse	<i>Mus musculus</i>	White-footed Mouse	<i>Peromyscus leucopus</i>
Meadow Vole	<i>Microtus pennsylvanicus</i>	White-tailed Deer	<i>Odocoileus virginianus</i>
Muskrat	<i>Ondatra zibethicus</i>		
Reptiles			
Common Name	Scientific Name	Common Name	Scientific Name
Black Rat Snake	<i>Elaphe obsoleta</i>	Ground Skink	<i>Scincella lateralis</i>
Common King Snake	<i>Lampropeltis getulus</i>	Mole King Snake	<i>Lampropeltis calligaster</i>
Common Snapping Turtle	<i>Chelydra serpentine</i>	Northern Black Racer	<i>Coluber constrictor</i>
Common Musk Turtle ^{a/}	<i>Sternotherus odoratus</i>	Northern Brown Snake	<i>Storeria dekayi</i>
Eastern Box Turtle	<i>Terrapene carolina</i>	Northern Fence Lizard	<i>Sceloporus undulatus</i>
Eastern Garter Snake	<i>Thamnophis sirtalis</i>	Northern Ringneck Snake	<i>Diadophis punctatus</i>
Eastern Hognose Snake	<i>Heterodon platyrhinos</i>	Northern Water Snake	<i>Nerodia sipedon</i>
Eastern Milk Snake	<i>Lampropeltis triangulum</i>	Queen Snake	<i>Regina septemvittata</i>
Eastern Mud Turtle ^{a/}	<i>Kinosternon subrubrum</i>	Red-bellied Turtle ^{a/}	<i>Pseudemys rubriventris</i>
Eastern Painted Turtle ^{a/}	<i>Chrysemys picta</i>	Rough Green Snake	<i>Opheodrys aestivus</i>
Eastern Worm Snake	<i>Carphophis amoenus</i>	Spotted Turtle ^{a/}	<i>Clemmys guttata</i>
Five-lined Skink	<i>Eumeces fasciatus</i>	Stinkpot	<i>Sternotherus odoratus</i>
Amphibians			
Common Name	Scientific Name	Common Name	Scientific Name
American Toad ^{a/}	<i>Bufo americanus</i>	Wood Frog	<i>Rana sylvatica</i>
Bullfrog ^{a/, c/}	<i>Rana catesbeiana</i>	Pickerel Frog ^{c/}	<i>Rana palustris</i>
Fowler's Toad	<i>Bufo woodhousei</i>	Red-backed Salamander	<i>Plethodon cinereus</i>
Gray Treefrog	<i>Hyla versicolor</i>	Red-spotted Newt	<i>Notophthalmus viridescens</i>
Green Frog ^{c/}	<i>Rana clamitans</i>	Slimy Salamander	<i>Plethodon glutinosus</i>
Green Treefrog	<i>Hyla cinerea</i>	Spotted Salamander	<i>Ambystoma maculatum</i>
Marbled Salamander	<i>Ambystoma opacum</i>	Spring Peeper	<i>Pseudacris crucifer</i>
Northern Cricket Frog	<i>Acris crepitans</i>	Upland Chorus Frog	<i>Pseudacris triseriata</i>
Northern Two-lined Salamander ^{c/}	<i>Eurycea bislineata</i>		

Notes:

- a/ Species of Greatest Conservation Need as identified in *District of Columbia Wildlife Action Plan*.
- b/ Species noted during July 13, 2006, field observations.
- c/ Species collected during 2001 Maryland Biological Stream Survey.

Sources: Federal Highway Administration, Virginia Department of Transportation, Maryland State Highway Administration, and D.C. Department of Public Works, *Woodrow Wilson Bridge Improvement Study Final Environmental Impact Statement/Section 4f Evaluation*, Baltimore, Maryland, 1997; Maryland Department of Natural Resources, *Data Summary for: PRUT-116-R-2001, Maryland Biological Stream Survey*, 2001, http://mddnr.chesapeakebay.net/mbss/SA_site2k.cfm?siteyr=PRUT-116-R-2001 (accessed August 3, 2006); District of Columbia, Department of the Environment, Fisheries and Wildlife Division, *District of Columbia Wildlife Action Plan*, 2006.

Prepared by: Straughan Environmental Services, Inc., September 2008.

Table E-6 (1 of 2)

Bird Species Observed in the Vicinity of the Airport

Common Name	Scientific Name	Common Name	Scientific Name
Acadian Flycatcher ^{a/}	<i>Empidonax virescens</i>	Horned Grebe ^{b/}	<i>Podiceps auritus</i>
American Black Duck ^{a/, b/}	<i>Anas rubripes</i>	Horned Lark ^{b/}	<i>Eremophila alpestris</i>
American Coot ^{b/}	<i>Fulica americana</i>	House Finch ^{b/}	<i>Carpodacus mexicanus</i>
American Crow ^{b/}	<i>Corvus brachyrhynchos</i>	House Sparrow ^{b/}	<i>Passer domesticus</i>
American Golden-Plover ^{b/}	<i>Pluvialis dominica</i>	Killdeer ^{b/}	<i>Charadrius vociferus</i>
American Goldfinch ^{b/}	<i>Carduelis tristis</i>	Laughing Gull ^{b/}	<i>Larus atricilla</i>
American Green-winged Teal ^{b/}	<i>Anas crecca</i>	Least Tern ^{b/}	<i>Sterna antillarum</i>
American Kestrel ^{b/}	<i>Falco sparverius</i>	Lesser Black-backed Gull	<i>Larus fuscus</i>
American Robin ^{b/}	<i>Turdus migratorius</i>	Lesser Scaup ^{b/}	<i>Aythya affinis</i>
American Widgeon ^{b/}	<i>Anas americana</i>	Lesser Yellowlegs ^{b/}	<i>Tringa flavipes</i>
Baird's Sandpiper	<i>Calidris bairdii</i>	Little Blue Heron ^{b/}	<i>Egretta caerulea</i>
Bald Eagle ^{a/, b/}	<i>Haliaeetus leucocephalus</i>	Louisiana Waterthrush ^{a/}	<i>Seiurus motacilla</i>
Bank Swallow ^{b/}	<i>Riparia riparia</i>	Mallard ^{b/}	<i>Anas platyrhynchos</i>
Barn Swallow ^{b/}	<i>Hirundo rustica</i>	Merlin ^{b/}	<i>Falco columbarius</i>
Barred Owl ^{b/}	<i>Strix varia</i>	Mourning Dove ^{b/}	<i>Zenaida macroura</i>
Belted Kingfisher ^{b/}	<i>Ceryle alcyon</i>	Mute Swan ^{b/}	<i>Cygnus olor</i>
Black Scoter ^{b/}	<i>Melanitta nigra</i>	Northern Cardinal ^{b/}	<i>Cardinalis cardinalis</i>
Black-bellied Plover ^{b/}	<i>Pluvialis squatarola</i>	Northern Harrier ^{b/}	<i>Circus cyaneus</i>
Black-crowned Night-heron ^{a/, b/}	<i>Nycticorax nycticorax</i>	Northern Mockingbird ^{b/}	<i>Mimus polyglottos</i>
Blue-winged Teal ^{b/}	<i>Anas discors</i>	Northern Pintail ^{b/}	<i>Anas acuta</i>
Boat-tailed Grackle ^{b/}	<i>Quiscalus major</i>	Northern Rough-winged Swallow ^{b/}	<i>Stelgidopteryx serripennis</i>
Bonaparte's Gull ^{b/}	<i>Larus philadelphia</i>	Northern Shoveler ^{b/}	<i>Anas clypeata</i>
Brown-headed Cowbird ^{b/}	<i>Molothrus ater</i>	Olive-sided Flycatcher ^{b/}	<i>Contopus cooperi</i>
Bufflehead ^{b/}	<i>Bucephala albeola</i>	Osprey ^{b/}	<i>Pandion haliaetus</i>
Canada Goose ^{b/}	<i>Branta canadensis</i>	Parasitic Jaeger	<i>Stercorarius parasiticus</i>
Canvasback ^{b/}	<i>Aythya valisineria</i>	Pectoral Sandpiper	<i>Calidris melanotos</i>
Caspian Tern ^{b/}	<i>Sterna caspia</i>	Peregrine Falcon ^{b/}	<i>Falco peregrinus</i>
Cassin's Sparrow ^{b/}	<i>Aimophila cassinii</i>	Pied-billed Grebe ^{b/}	<i>Podilymbus podiceps</i>
Cattle Egret ^{b/}	<i>Bubulcus ibis</i>	Piping Plover	<i>Charadrius melodus</i>
Chimney Swift ^{b/}	<i>Chaetura pelagica</i>	Purple Martin ^{b/}	<i>Progne subis</i>
Cliff Swallow ^{b/}	<i>Petrochelidon pyrrhonota</i>	Red-breasted Merganser ^{b/}	<i>Mergus serrator</i>
Common Grackle ^{b/}	<i>Quiscalus quiscula</i>	Redhead ^{b/}	<i>Aythya americana</i>
Common Ground-Dove ^{b/}	<i>Columbina passerina</i>	Red-neck Grebe	<i>Podiceps grisegena</i>
Common Loon ^{b/}	<i>Gavia immer</i>	Red-shouldered Hawk ^{b/}	<i>Buteo lineatus</i>
Common Merganser ^{b/}	<i>Mergus merganser</i>	Red-tailed Hawk ^{b/}	<i>Buteo jamaicensis</i>
Common Moorhen	<i>Gallinula chloropus</i>	Red-winged Blackbird ^{b/}	<i>Agelaius phoeniceus</i>
Common Tern ^{b/}	<i>Sterna hirundo</i>	Ring-billed Gull ^{b/}	<i>Larus delawarensis</i>
Cooper's Hawk ^{b/}	<i>Accipiter cooperii</i>	Ring-necked Duck ^{b/}	<i>Aythya collaris</i>

Table E-6 (2 of 2)

Bird Species Observed in the Vicinity of the Airport

Common Name	Scientific Name	Common Name	Scientific Name
Double-crested Cormorant ^{b/}	<i>Phalacrocorax auritus</i>	Rock Dove ^{b/}	<i>Columba livia</i>
Dunlin ^{b/}	<i>Calidris alpina</i>	Ruddy Duck ^{b/}	<i>Oxyura jamaicensis</i>
Eared Grebe ^{b/}	<i>Podiceps nigricollis</i>	Ruddy Turnstone ^{b/}	<i>Arenaria interpres</i>
Eastern Kingbird ^{b/}	<i>Tyrannus tyrannus</i>	Sanderling	<i>Calidris alba</i>
Eastern Meadowlark ^{b/}	<i>Sturnella magna</i>	Savannah Sparrow ^{b/}	<i>Passerculus sandwichensis</i>
Eurasian Bullfinch ^{b/}	<i>Pyrrhula pyrrhula</i>	Sharp-shinned Hawk ^{b/}	<i>Accipiter striatus</i>
European Starling ^{b/}	<i>Sturnus vulgaris</i>	Short-eared Owl ^{b/}	<i>Asio flammeus</i>
Forster's Tern ^{b/}	<i>Sterna forsteri</i>	Snow Bunting ^{b/}	<i>Plectrophenax nivalis</i>
Gadwall ^{b/}	<i>Anas strepera</i>	Song Sparrow ^{b/}	<i>Melospiza melodia</i>
Gray Catbird ^{b/}	<i>Dumetella carolinensis</i>	Spotted Sandpiper ^{b/}	<i>Actitis macularius</i>
Great Black-backed Gull ^{b/}	<i>Larus marinus</i>	Stilt Sandpiper	<i>Calidris himantopus</i>
Great Blue Heron ^{b/, c/}	<i>Ardea herodias</i>	Swamp Sparrow ^{b/}	<i>Melospiza georgiana</i>
Great Cormorant	<i>Phalacrocorax carbo</i>	Tree Swallow ^{b/}	<i>Tachycineta bicolor</i>
Great Egret ^{b/}	<i>Ardea alba</i>	Tufted Duck	<i>Aythya fuligula</i>
Great Horned Owl ^{a/}	<i>Bubo virginianus</i>	Tundra Swan ^{b/}	<i>Cygnus columbianus</i>
Greater Scaup ^{b/}	<i>Aythya marila</i>	Turkey Vulture ^{b/}	<i>Cathartes aura</i>
Greater Yellowlegs ^{b/}	<i>Tringa melanoleuca</i>	Upland Sandpiper ^{b/}	<i>Bartramia longicauda</i>
Green Heron ^{b/}	<i>Butorides virescens</i>	Western Grebe ^{b/}	<i>Aechmophorus occidentalis</i>
Green-winged Teal	<i>Anas crecca</i>	White-rumped Sandpiper	<i>Calidris fuscicollis</i>
Guinea Fowl ^{b/}	<i>Numida meleagris</i>	Willet	<i>Catoptrophorus semipalmatus</i>
Herring Gull ^{b/}	<i>Larus argentatus</i>	Wood duck ^{a/, b/}	<i>Aix sponsa</i>
Hooded Merganser ^{b/}	<i>Lophodytes cucullatus</i>	Northern Flicker ^{b/}	<i>Colaptes auratus</i>

Note:

- a/ Species of Greatest Conservation Need as identified in *District of Columbia Wildlife Action Plan*.
- b/ Species included on U.S. Department of Agriculture Wildlife Services bird survey data from the Airport: January 1997-August 2006.
- c/ Species noted during July 13, 2006, field observation.

Sources: Kane, P, *Roaches Run Waterfowl Sanctuary*, 2006, <http://homepage.mac.com/pmkane/RoachesRunWaterfowlSanctuary.html> (accessed July 25, 2006); Kitchens, Val, *Osprey and Eagle at Roaches Run, Arlington, Free Lists/VA-Bird*, 2003, <http://www.freelists.org/archives/va-bird/02-2003/msg00072.html> (accessed July 25, 2006); Keller, Jay, *Roaches Run Waterfowl Sanctuary, Arlington, Free Lists/VA-Bird*, 2006, <http://www.freelists.org/archives/va-bird/01-2006/msg00145.html> (accessed July 25, 2006); Maryland Ornithological Society, *The Potomac River Viewing Corridor – Birdwatching in the District of Columbia from the Virginia Shore*, 2006, <http://www.mdbirds.org/sites/dcsites/pocorridor.html> (accessed August 1, 2006); U.S. Department of Agriculture Wildlife Services bird survey data from the Airport, January 1997-August 2006, data provided by D. Allaben, Metropolitan Washington Airports Authority; District of Columbia, Department of the Environment, Fisheries and Wildlife Division, *District of Columbia Wildlife Action Plan*, 2006.

Prepared by: Straughan Environmental Services, Inc., September 2008.

Table E-7

Virginia Threatened, Endangered, and Species of Concern^{a/} within a 3-Mile Radius of the Airport

Common Name	Scientific Name	Status
Bald Eagle	<i>Haliaeetus leucocephalus</i>	State Threatened
Loggerhead Shrike (North American subspecies)	<i>Lanius ludovicianus migrans</i>	Federal Species of Concern, State Threatened
Brook Floater	<i>Alasmidonta varicosa</i>	Federal Species of Concern, State Endangered
Appalachian Grizzled Skipper	<i>Pyrgus wyandot (=centaureae wyandot)</i>	Federal Species of Concern, State Threatened
Wood Turtle	<i>Glyptemys insculpta</i>	State Threatened
Upland Sandpiper	<i>Bartramia longicauda</i>	State Threatened

Note:

a/ Species of Concern is not a legal status

Source: Virginia Fish and Wildlife Information Service, *List of species known or likely to occur within a 3 mile radius of (at 28,51,06 77,02,11) in 013 Arlington, 510 Alexandria City, Virginia*, 2006, <http://vafwis.org/wis/visitor/home.asp?ln=V&sID=97505&nav=home> (accessed August 1, 2006).

Prepared by: Straughan Environmental Services, Inc., September 2008.

THIS PAGE LEFT INTENTIONALLY BLANK

Appendix F. Air Quality Analysis

The methods used to calculate emissions of carbon monoxide (CO), volatile organic compounds (VOCs), oxides of nitrogen (NO_x), sulfur oxides (SO_x), particulate matter less than 10 microns (PM₁₀), and fine particulate matter (PM_{2.5}) from construction-related sources of air pollutant emissions at the Airport are documented in this appendix. The emissions analysis was conducted to develop emissions inventories pursuant to the National Environmental Policy Act of 1969 (NEPA), and to determine whether emissions associated with the Proposed Action would exceed applicable *de minimis* thresholds as documented in the U.S. Environmental Protection Agency's (EPA's) general conformity regulations.

Estimates of construction-related emissions were developed for the Proposed Action using standard industry methodologies and techniques. Construction activities are anticipated to begin in 2010 and to be completed in 2011; however, for the purposes of the air quality analysis, it was conservatively assumed that all construction activities would occur in 2010.

Airport operational emissions inventories were not developed for the two future years evaluated in the EA (2012 and 2017) because aircraft activity and operating characteristics would be the same under the Proposed Action and No Action alternative.

F.1 Construction Emissions

Pollutant emissions resulting from construction of the Runway Safety Area (RSA) and other airfield improvements at the Airport were estimated using standard industry methodologies and techniques. Construction emissions were not estimated for the No Action alternative because no construction activity would be associated with the No Action alternative.

Potential sources of construction emissions include construction vehicles and equipment, land development activities, and asphalt paving activities. Concrete and asphalt would be batched offsite at batch plant facilities operating under stationary source permits. As a result, emissions were not estimated separately for batch plants. Construction equipment emissions are generally estimated using two basic methodologies (nonroad and on-road) depending on the type of construction equipment. Nonroad construction equipment (e.g., bulldozers, backhoes, front end loaders) are generally operated off road and on the construction site. On-road construction equipment (e.g., semi-trucks for material hauling), in contrast, can be operated on public roads. Emissions for on-road construction equipment and nonroad construction equipment were estimated separately, following standard industry practices.

F.1.1 On-road Construction Equipment

Emissions from on-road construction vehicles/equipment were calculated using the methodologies outlined in U.S. EPA AP-42, *Compilation of Air Pollutant Emission Factors Fourth Edition, Volume II: Mobile Sources*.¹ On-road construction vehicle trips include construction employee vehicle trips to and from the job site, off-site hauling trips, and material delivery trips.

The first step in calculating total on-road construction equipment emissions was to determine total vehicle miles traveled (VMT) during the construction period (calendar year 2010). VMT is

¹ U.S. Environmental Protection Agency. *Compilation of Air Pollutant Emission Factors AP-42, Volume II: Mobile Sources*, 1989.

Ronald Reagan Washington National Airport

calculated by multiplying the total number of vehicle trips by the trip distance. Trip data were estimated by Ricondo & Associates, Inc. The VMT data were then multiplied by appropriate emissions factors to calculate potential emissions. The emissions factor data were developed using the MOBILE6.2 module in the Emissions and Dispersion Modeling System (EDMS) 5.0.2, and take into account local characteristics such as fuel mixture and vehicle fleet mix. **Table F-1** presents the MOBILE6.2 emission factors used to calculate emissions for on-road construction equipment at the Airport. **Table F-2** presents emissions estimates for on-road construction equipment for the Proposed Action.

Table F-1

On-Road Construction Equipment Emissions Factors, 2010

Year/Source	Emissions Factors (grams per vehicle-mile) ^{a/}					
	CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5}
Hauling Trips/Material Deliveries	0.958	0.228	4.934	0.007	0.113	0.090
Employee Vehicle Trips	8.454	0.279	0.390	0.009	0.025	0.011

Note:

a/ Assuming an average speed of 45 miles per hour.

Source: Ricondo & Associates, Inc. based on output from the Federal Aviation Administration's Emissions and Dispersion Modeling System, Version 5.0.2.

Prepared by: Ricondo & Associates, Inc., September 2008.

Table F-2

On-Road Construction Equipment Emissions, 2010 – Proposed Action

Year/Source	Trips per Year	VMT ^{a/}	Emissions (tons per year)					
			CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5}
Hauling Trips/Material Deliveries	12,130	187,700	0.198	0.047	1.021	0.001	0.023	0.018
Employee Vehicle Trips	7,410	74,100	0.691	0.023	0.032	0.001	0.002	0.001
Total			0.889	0.070	1.053	0.002	0.025	0.019

Note:

a/ The trip length for construction employees is 10 miles. The trip length for hauling and deliveries varies.

Source: Ricondo & Associates, Inc., using information provided by the Metropolitan Washington Airports Authority.

Prepared by: Ricondo & Associates, Inc., November 2008.

F.1.2 Nonroad Construction Equipment

Nonroad construction equipment includes bulldozers, loaders, sweepers, and other heavy-duty construction equipment that does not travel on roadways. Emissions for nonroad vehicles equipped with diesel-powered engines are regulated under 40 CFR Part 89.112,² *Oxides of nitrogen, carbon monoxide, hydrocarbon, and particulate matter exhaust emission standards*. Emission factors associated with diesel engines vary by engine year and horsepower according to Tier 1, Tier 2, Tier 3, and Tier 4 emissions standards, as presented in Table 1 of the U.S. EPA report NR-009c, *Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling – Compression-Ignition*.³

Nonroad construction equipment emissions in 2010 under the Proposed Action were calculated based on the engine horsepower, hours of equipment use, load factor, and the average age of the equipment. The U.S. EPA recommends the methodology shown in **Equation F-1** for calculating emissions from nonroad construction equipment.

Equation F-1

Nonroad Construction Equipment Emissions Calculation Equation

$$M_i = (N)(HRS)(HP)(LF/100)(EF_i)$$

where:

- M_i = mass of emissions of i^{th} pollutants during the inventory period;
- N = source population (units);
- HRS = annual hours of use;
- HP = average rated horsepower;
- LF = typical load factor;
- EF_i = average emissions of i^{th} pollutant per unit of use (e.g., pounds per horsepower-hour).

Source: U.S. Environmental Protection Agency. *Nonroad Engine and Vehicle Emission Study—Report*, November 1991.
Prepared by: Ricondo & Associates, Inc., February 2008.

Emissions factors associated with diesel engines vary by the year the engine was manufactured and by horsepower. The fleet age of the diesel equipment that would be used for construction of the airfield and landside improvements was estimated to range over 8 years – for the 2010 construction year, it was assumed that the oldest piece of equipment on-site would have been manufactured in 2003. Through the use of the vehicle age spread, a weighted average of Tier 1, Tier 2, Tier 3, and Tier 4 emissions standards was developed for each equipment type and horsepower range. This methodology is the most representative approach for calculating pollutant emissions for nonroad construction equipment equipped with diesel engines.

The data used to estimate emissions from nonroad construction equipment in 2010, as well as total emissions by equipment type, are presented in **Table F-3**.

² U.S. Environmental Protection Agency, *Control of Emissions from New and In-Use Nonroad Compression-Ignition Engines, Oxides of nitrogen, carbon monoxide, hydrocarbon, and particulate matter exhaust emission standards*. 40 CFR Part 89.112.

³ U.S. Environmental Protection Agency, Office of Mobile Sources, *Exhaust Emission Factors for Nonroad Engine Modeling – Compression-Ignition*, Report No. NR-009c, April 2004

THIS PAGE LEFT INTENTIONALLY BLANK

Table F-3 (1 of 3)

2010 Nonroad Construction Equipment Emissions – Proposed Action

Activity and Equipment Type	Fuel Type	Load Factor ^{c/}	Brake Horsepower	Total Hours	Emissions Factors (pounds per horsepower-hour) ^{a/}						Conversion Factor ^{d/}	Pollutant Emissions (tons per year) ^{b/}					
					CO	VOC	NO _x	SO _x	PM ₁₀	Fugitive Dust		CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^{e/}
1. Runway 1-19 Resurfacing																	
Paver – Asphalt	Diesel	0.59	200	186	0.0019	0.0004	0.0070	0.0003	0.0003	0.1448	0.0005	0.020	0.004	0.077	0.003	0.017	0.003
Compactors	Diesel	0.55	80	40	0.0019	0.0006	0.0073	0.0003	0.0004	0.1448	0.0005	0.002	0.001	0.006	0.000	0.003	0.000
Roller	Diesel	0.62	99	53	0.0019	0.0006	0.0073	0.0003	0.0004	0.1448	0.0005	0.003	0.001	0.012	0.000	0.005	0.001
Signal Boards	Diesel	0.43	6	1,787	0.0048	0.0010	0.0098	0.0003	0.0006	0.0000	0.0005	0.011	0.002	0.023	0.001	0.001	0.001
Excavator	Diesel	0.59	222	27	0.0019	0.0004	0.0070	0.0003	0.0003	0.0435	0.0005	0.003	0.001	0.012	0.000	0.001	0.001
Concrete Saw	Diesel	0.78	56	27	0.0019	0.0006	0.0073	0.0003	0.0004	0.0000	0.0005	0.001	0.000	0.004	0.000	0.000	0.000
Graders	Diesel	0.59	172	53	0.0016	0.0005	0.0068	0.0003	0.0003	0.9223	0.0005	0.004	0.001	0.018	0.001	0.025	0.001
Crusher	Diesel	0.43	172	186	0.0016	0.0005	0.0068	0.0003	0.0003	0.1448	0.0005	0.011	0.003	0.046	0.002	0.016	0.002
Backhoe	Diesel	0.21	250	744	0.0019	0.0004	0.0070	0.0003	0.0003	0.2709	0.0005	0.036	0.007	0.137	0.005	0.107	0.006
Skid Steer Loader	Diesel	0.21	50	744	0.0052	0.0007	0.0092	0.0003	0.0006	0.2709	0.0005	0.020	0.003	0.036	0.001	0.103	0.002
2. Hold Apron Expansion																	
Plate Compactors	Diesel	0.55	80	37	0.0019	0.0006	0.0073	0.0003	0.0004	0.1448	0.0005	0.002	0.000	0.006	0.000	0.003	0.000
Concrete Pavers	Diesel	0.59	460	30	0.0029	0.0004	0.0068	0.0003	0.0003	0.1448	0.0005	0.012	0.001	0.028	0.001	0.003	0.001
Rollers	Diesel	0.59	99	40	0.0019	0.0006	0.0073	0.0003	0.0004	0.1448	0.0005	0.002	0.001	0.009	0.000	0.003	0.001
Paving Equipment	Diesel	0.59	99	26	0.0019	0.0006	0.0073	0.0003	0.0004	0.1448	0.0005	0.001	0.000	0.006	0.000	0.002	0.000
Trenchers	Diesel	0.59	60	150	0.0019	0.0006	0.0073	0.0003	0.0004	0.1448	0.0005	0.005	0.002	0.019	0.001	0.012	0.001
Bore/Drill Rigs	Diesel	0.43	209	75	0.0019	0.0004	0.0070	0.0003	0.0003	0.1448	0.0005	0.006	0.001	0.024	0.001	0.006	0.001
Excavators	Diesel	0.59	222	250	0.0019	0.0004	0.0070	0.0003	0.0003	0.0435	0.0005	0.030	0.006	0.115	0.004	0.011	0.005
Concrete/Industrial Saw	Diesel	0.78	56	37	0.0019	0.0006	0.0073	0.0003	0.0004	0.0000	0.0005	0.002	0.000	0.006	0.000	0.000	0.000
Cranes	Diesel	0.43	200	19	0.0019	0.0004	0.0070	0.0003	0.0003	0.1448	0.0005	0.002	0.000	0.006	0.000	0.002	0.000
Graders	Diesel	0.59	172	50	0.0016	0.0005	0.0068	0.0003	0.0003	0.9223	0.0005	0.004	0.001	0.017	0.001	0.024	0.001
Off-Highway Trucks	Diesel	0.59	489	70	0.0029	0.0004	0.0068	0.0003	0.0003	0.1448	0.0005	0.030	0.004	0.069	0.003	0.008	0.003
Rubber Tired Loaders	Diesel	0.21	195	15	0.0019	0.0004	0.0070	0.0003	0.0003	0.2709	0.0005	0.001	0.000	0.002	0.000	0.002	0.000
Backhoe	Diesel	0.21	250	1,092	0.0019	0.0004	0.0070	0.0003	0.0003	0.2709	0.0005	0.053	0.011	0.202	0.007	0.157	0.009
Dumpers/Tenders	Diesel	0.21	360	2,497	0.0029	0.0004	0.0068	0.0003	0.0003	0.1448	0.0005	0.276	0.035	0.645	0.025	0.211	0.030
Other Construction Equipment	Diesel	0.59	161	30	0.0016	0.0005	0.0068	0.0003	0.0003	0.0000	0.0005	0.002	0.001	0.010	0.000	0.000	0.000

THIS PAGE LEFT INTENTIONALLY BLANK

Table F-3 (2 of 3)

2010 Nonroad Construction Equipment Emissions – Proposed Action

Activity and Equipment Type	Fuel Type	Load Factor ^{c/}	Brake Horsepower	Total Hours	Emission Factors (pounds per horsepower-hour) ^{a/}						Conversion Factor ^{d/}	Pollutant Emissions (tons per year) ^{b/}					
					CO	VOC	NO _x	SO _x	PM ₁₀	Fugitive Dust		CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^{e/}
3. Service Road Rerouting																	
Scraper	Diesel	0.59	361	380	0.0029	0.0004	0.0068	0.0003	0.0003	1.3763	0.0005	0.118	0.015	0.277	0.011	0.274	0.013
Bulldozer	Diesel	0.59	170	212	0.0016	0.0005	0.0068	0.0003	0.0003	0.1448	0.0005	0.018	0.005	0.072	0.003	0.019	0.003
Grader	Diesel	0.59	215	85	0.0019	0.0004	0.0070	0.0003	0.0003	0.9223	0.0005	0.010	0.002	0.038	0.001	0.041	0.002
Compactor	Diesel	0.55	80	85	0.0019	0.0006	0.0073	0.0003	0.0004	0.1448	0.0005	0.004	0.001	0.014	0.000	0.007	0.001
Roller	Diesel	0.62	99	106	0.0019	0.0006	0.0073	0.0003	0.0004	0.1448	0.0005	0.006	0.002	0.024	0.001	0.009	0.001
Dump Truck	Diesel	0.21	360	132	0.0029	0.0004	0.0068	0.0003	0.0003	0.1448	0.0005	0.015	0.002	0.034	0.001	0.011	0.002
Front Loader	Diesel	0.21	400	43	0.0029	0.0004	0.0068	0.0003	0.0003	0.2709	0.0005	0.005	0.001	0.012	0.000	0.006	0.001
Paver	Diesel	0.59	200	11	0.0019	0.0004	0.0070	0.0003	0.0003	0.1448	0.0005	0.001	0.000	0.005	0.000	0.001	0.000
4. Runway Extension and Taxiway J Extension																	
<i>A. Grading</i>																	
Scraper	Diesel	0.59	361	740	0.0029	0.0004	0.0068	0.0003	0.0003	1.3763	0.0005	0.231	0.029	0.539	0.020	0.534	0.025
Bulldozer	Diesel	0.59	170	370	0.0016	0.0005	0.0068	0.0003	0.0003	0.1448	0.0005	0.031	0.009	0.125	0.005	0.033	0.006
Grader	Diesel	0.59	215	123	0.0019	0.0004	0.0070	0.0003	0.0003	0.9223	0.0005	0.014	0.003	0.055	0.002	0.059	0.002
Compactor	Diesel	0.55	80	123	0.0019	0.0006	0.0073	0.0003	0.0004	0.1448	0.0005	0.005	0.002	0.020	0.001	0.010	0.001
Roller	Diesel	0.62	99	123	0.0019	0.0006	0.0073	0.0003	0.0004	0.1448	0.0005	0.007	0.002	0.027	0.001	0.011	0.002
<i>B. Clearing/Grubbing</i>																	
Grader	Diesel	0.59	215	43	0.0019	0.0004	0.0070	0.0003	0.0003	0.9223	0.0005	0.005	0.001	0.019	0.001	0.021	0.001
Pickup Truck	Diesel	0.59	130	43	0.0016	0.0005	0.0068	0.0003	0.0003	0.0252	0.0005	0.003	0.001	0.011	0.000	0.001	0.001
Skid Steer	Diesel	0.21	50	86	0.0019	0.0006	0.0073	0.0003	0.0004	0.2709	0.0005	0.001	0.000	0.003	0.000	0.012	0.000
Front Loader	Diesel	0.21	400	43	0.0029	0.0004	0.0068	0.0003	0.0003	0.2709	0.0005	0.005	0.001	0.012	0.000	0.006	0.001
<i>C. Pavement Subbase</i>																	
Dump Truck	Diesel	0.21	360	241	0.0029	0.0004	0.0068	0.0003	0.0003	0.1448	0.0005	0.027	0.003	0.062	0.002	0.020	0.003
Bulldozer	Diesel	0.59	170	60	0.0016	0.0005	0.0068	0.0003	0.0003	0.1448	0.0005	0.005	0.002	0.020	0.001	0.005	0.001
Front Loader	Diesel	0.21	400	60	0.0029	0.0004	0.0068	0.0003	0.0003	0.2709	0.0005	0.007	0.001	0.017	0.001	0.009	0.001
Compactor	Diesel	0.55	80	60	0.0019	0.0006	0.0073	0.0003	0.0004	0.1448	0.0005	0.003	0.001	0.010	0.000	0.005	0.001
Roller	Diesel	0.62	99	60	0.0019	0.0006	0.0073	0.0003	0.0004	0.1448	0.0005	0.004	0.001	0.013	0.000	0.005	0.001
Grader	Diesel	0.59	215	60	0.0019	0.0004	0.0070	0.0003	0.0003	0.9223	0.0005	0.007	0.001	0.027	0.001	0.029	0.001

THIS PAGE LEFT INTENTIONALLY BLANK

Table F-3 (3 of 3)

2010 Nonroad Construction Equipment Emissions – Proposed Action

Activity and Equipment Type	Fuel Type	Load Factor ^{c/}	Brake Horsepower	Total Hours	Emission Factors (pounds per horsepower-hour) ^{a/}						Conversion Factor ^{d/}	Pollutant Emissions (tons per year) ^{b/}					
					CO	VOC	NO _x	SO _x	PM ₁₀	Fugitive Dust		CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5} ^{e/}
<i>D. Asphalt Paving</i>																	
Paver	Diesel	0.59	200	29	0.0019	0.0004	0.0070	0.0003	0.0003	0.1448	0.0005	0.003	0.001	0.012	0.000	0.003	0.001
Roller	Diesel	0.62	80	88	0.0019	0.0006	0.0073	0.0003	0.0004	0.1448	0.0005	0.004	0.001	0.016	0.001	0.007	0.001
Dump Truck	Diesel	0.21	360	293	0.0029	0.0004	0.0068	0.0003	0.0003	0.1448	0.0005	0.032	0.004	0.076	0.003	0.025	0.003
Front Loader	Diesel	0.21	400	59	0.0029	0.0004	0.0068	0.0003	0.0003	0.2709	0.0005	0.007	0.001	0.017	0.001	0.009	0.001
<i>E. Utilities</i>																	
Excavator	Diesel	0.59	222	24	0.0019	0.0004	0.0070	0.0003	0.0003	0.0435	0.0005	0.003	0.001	0.011	0.000	0.001	0.000
Dump Truck	Diesel	0.21	360	48	0.0029	0.0004	0.0068	0.0003	0.0003	0.1448	0.0005	0.005	0.001	0.012	0.000	0.004	0.001
Backhoe	Diesel	0.21	250	24	0.0019	0.0004	0.0070	0.0003	0.0003	0.2709	0.0005	0.001	0.000	0.004	0.000	0.003	0.000
Compactor	Diesel	0.55	80	48	0.0019	0.0006	0.0073	0.0003	0.0004	0.1448	0.0005	0.002	0.001	0.008	0.000	0.004	0.000
Front Loader	Diesel	0.21	400	24	0.0029	0.0004	0.0068	0.0003	0.0003	0.2709	0.0005	0.003	0.000	0.007	0.000	0.004	0.000
<i>F. Airfield Lighting</i>																	
Backhoe	Diesel	0.21	250	48	0.0019	0.0004	0.0070	0.0003	0.0003	0.2709	0.0005	0.002	0.000	0.009	0.000	0.007	0.000
Total											1.136	0.182	3.143	0.118	1.919	0.148	

Notes:

Columns may not add to totals shown because of rounding.

a/ Emission factors were derived from Tier standards and an 8-year spread for construction equipment was used to create a weighted average emission factor.

b/ Vehicle emissions are calculated by multiplying the annual hours, load factor, horsepower, emission factor, usage factor, and conversion factor to create a value of tons per year for each piece of equipment.

c/ Load factor is defined as the average fraction of rated power (horsepower) used in a duty cycle.

d/ The conversion factor is the number of pounds per ton – 1 ton/ 2,000 pounds = 0.0005.

e/ For nonroad construction equipment, PM_{2.5} emissions were assumed to be equal to PM₁₀ emissions but do not include fugitive dust.

Source: Ricondo & Associates, Inc., based on the sources listed above and information provided by the Metropolitan Washington Airports Authority.

Prepared by: Ricondo & Associates, Inc., September 2008.

THIS PAGE LEFT INTENTIONALLY BLANK

F.1.3 Land Development

Earth moving activities during construction and wind erosion are sources of fugitive dust (PM₁₀) emissions. PM₁₀ emissions caused by earth moving and wind erosion were calculated using the methodologies outlined in Section 13.2.3, “Heavy Construction Operations”, of AP-42⁴.

F.1.3.1 Earth Moving Emissions

Fugitive dust from nonroad vehicles includes entrained road dust as well as particulates resulting from grading, loading, and unloading activities. Emissions factors for fugitive dust resulting from entrained road dust and earth moving activity are provided in Section 13.2.3, “Heavy Construction Operations”, of AP-42. For purposes of the air quality analysis, it was assumed that water would be applied to the construction site soil approximately three to four times per day to reduce PM₁₀ emissions caused by earth moving. Adequate watering of the construction site as a control measure would be expected to reduce PM₁₀ emissions by 50 percent. PM₁₀ emissions resulting from fugitive dust sources were calculated on an equipment type basis and incorporated into the nonroad equipment emissions estimates presented previously.

F.1.3.2 Wind Erosion Emissions

Dirt piles, areas of bare soils, and newly paved portions of a construction site can be sources of wind blown PM₁₀. Emissions factors for wind erosion were derived from Section 11.9, “Western Surface Coal Mining”, of AP-42⁵. Coal mining emissions factors were used in the analysis where AP-42 dust factors were not provided. PM₁₀ emissions associated with wind erosion were calculated: (a) for the period of time when the area of disturbance would have exposed soil and (b) for the period of time after the area of disturbance would be paved. Wind blown PM₁₀ emissions are estimated separately for prepaving and postpaving because of the different control efficiencies possible before and after an area has been paved.

Wind erosion emissions are calculated by determining the acreage affected by land development activities and multiplying the acreage amount by the appropriate emissions factor and control efficiency factor. The methodology used to calculate wind erosion emissions is presented in **Equation F-2**.

⁴ U.S. Environmental Protection Agency, *Compilation of Air Pollutant Emission Factors*, AP-42, Fifth Edition, Volume I: *Stationary Point and Area Sources*, Section 13.2.3, “Heavy Construction Operations”, January 1995.

⁵ U.S. Environmental Protection Agency, *Compilation of Air Pollutant Emission Factors*, AP-42, Fifth Edition, Volume I: *Stationary Point and Area Sources*, Section 11.9, “Western Surface Coal Mining”, October 1998.

Equation F-2

Wind Erosion Emissions Calculation Equation

$$M_i = (A)(YR)(1-CE)(EF_i)$$

where:

- M_i** = mass of emissions of ith pollutants during inventory period;
- A** = area of land affected (acres);
- YR** = percentage of year that operations are occurring;
- CE** = control efficiency of mitigation measures taken (watering, covering, etc.);
- EF_i** = average emissions of ith pollutant per unit of use (tons per acre per year).

Source: U.S. Environmental Protection Agency. *Compilation of Air Pollutant Emission Factors AP-42*, Fifth Edition, Volume I: *Stationary Point and Area Sources*, Section 13.2.3, "Heavy Construction Operations", January 1995.
Prepared by: Ricondo & Associates, Inc., February 2008.

PM₁₀ emissions associated with wind erosion were calculated: (a) for the period of time when the area of disturbance would have exposed soil and (b) for the period of time after the area of disturbance would be paved and construction is still ongoing. Wind blown PM₁₀ emissions were estimated separately for prepaving and postpaving because of the different control efficiencies possible before and after an area has been paved. The control efficiencies used in this analysis were based on professional judgment and experience.

For purposes of the wind erosion analysis, it was assumed that adequate watering would occur at the construction site *before* paving. It was assumed that water would be applied to the construction site soil approximately three to four times per day to reduce PM₁₀ emissions caused by wind erosion. It was also assumed that a speed limit of 15 miles per hour would be instituted at the construction site to reduce wind erosion emissions. According to the methodology outlined in Table 13.2.1-1 "Recommended Emission Factors for Construction Operations" in Section 13.2.3 of AP-42, the combination of these two control methods create a total control efficiency of 63 percent. It was assumed that infrequent cleanup (approximately once per week) of the paved ground would occur at the construction site *after* paving, reducing emissions by 85 percent.

Table F-4 presents the results of the wind erosion emissions analysis for 2010 under the Proposed Action.

Table F-4

Land Development and Wind Erosion Emissions—2010 Proposed Action

Land Development Source	Total Area Affected (acres) ^{a/}	Area Affected per Day (acres)	TSP Emission Factor (tons/acre/year) ^{b/,c/}	PM ₁₀ Fraction ^{c/}	Months of Earthmoving	Control Efficiency ^{d/}	Total PM ₁₀ Emissions (tons)
Wind Erosion							
Before Paving	15	n.a.	0.38	0.5	n.a.	63%	0.264
After Paving	15	n.a.	0.38	0.5	n.a.	85%	0.107
Total							0.371

TSP = Total suspended particulates

Notes:

- a/ Acres and schedule information were developed using data provided by the Metropolitan Washington Airports Authority.
- b/ Emissions factors for wind erosion are provided in U.S. Environmental Protection Agency, *Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources*, Section 11.9 "Western Surface Coal Mining", October 1998.
- c/ Emissions factors for TSP were converted to PM₁₀ emissions factors. It was assumed that PM₁₀ represents 50 percent of TSP.
- d/ The control efficiencies were calculated assuming that the area of disturbance would be watered three to four times per day and that a 15 miles per hour (mph) speed limit would be enforced on site. It was assumed that the paved area would be swept once per week after the paving operations are completed.

Source: Ricondo & Associates, Inc. based on the sources listed above.

Prepared by: Ricondo & Associates, Inc., September 2008.

F.1.3.3 Asphalt Paving

Asphalt surfaces and pavements are composed of compacted aggregate and an asphalt binder. Aggregate materials are produced from rock quarries as manufactured stone or are obtained from natural gravel or soil deposits. Asphalt binders take the form of asphalt cement (the residue of the distillation of crude oils) and liquefied asphalts. Asphalt cement, which is semi-solid, must be heated prior to mixing with aggregate.

Asphalt paving operations can be a source of VOC emissions. VOC emissions are created by the evaporation of the petroleum distillate solvent, or diluent, used to liquefy asphalt cement. Emissions from asphalt paving activities were calculated for the Proposed Action using the methodologies presented in Section 4.5, "Asphalt Paving Operations" of AP-42, Fifth Edition, Volume I. The formula used to calculate VOC emissions caused by asphalt paving operations is presented in **Equation F-3**.

Equation F-3

Asphalt Paving Emissions Calculation Equation

$$M_i = (A)(AR)(VD)(EF)(D)$$

where:

- M_i*** = mass of emissions of *i*th pollutants during inventory period;
- A*** = area of land affected (square meters);
- AR*** = application rate of liquefied asphalt over area (liters per square meter);
- VD*** = percent, by volume, of diluent in liquefied asphalt (percentage);
- EF*** = percent of diluent (mass) that evaporates and becomes VOC (percentage);
- D*** = density of solvent used (pounds per liter).

Source: U.S. Environmental Protection Agency, *Compilation of Air Pollutant Emission Factors*, AP-42, Fifth Edition, Volume I: *Stationary Point and Area Sources*, Section 4.5 "Asphalt Paving Operations", January 1995.
Prepared by: Ricondo & Associates, Inc., September 2008.

The following assumptions were used to estimate VOC emissions associated with asphalt paving operations:

- The asphalt would be put down in two lifts (layers). The asphalt paving process would include two tack coats (one tack coat for each lift). There would be no prime coat paving.
- Asphalt paving operations were assumed to include liquefied asphalts as the asphalt binder. Liquefied asphalts would include emulsified asphalts. No cutback asphalts would be used for the project. Emulsified asphalts were assumed to be 3 percent VOC by volume.
- The application rate for the tack coat would be 0.4528 liter of emulsified asphalts per square meter of paving.

Table F-5 presents a summary of VOC emissions associated with asphalt paving activities for the Proposed Action.

Table F-5

2010 Asphalt Paving Emissions

Alternative and Year	Paved Area (m ²) ^{a/}	Solvent Density (lb/l) ^{b/}	Application Rate (l/m ²) ^{c/}	Percent VOC Emitted ^{d/}	Conversion Factor (tons/lb)	Total VOC Emissions (tons)
Proposed Action						
Tack Coat	109,008	1.8	0.38	3%	1/2000	2.667

Notes:

m = meter.

l = liter.

lb = pound.

a/ The areas to be paved were derived from Airport layout drawings and information provided by the Metropolitan Washington Airports Authority.

b/ Solvent density is for kerosene. It is standard industry practice to use kerosene to liquefy asphalt cement.

c/ Application rates are consistent with standard industry practice.

d/ The percent VOC emitted for the tack coat is consistent with the use of emulsified asphalt.

Source: Ricondo & Associates, Inc., using the sources noted above.

Prepared by: Ricondo & Associates, Inc., September 2008.

F.1.3.4 Summary of Construction Emissions Analysis

A summary of total construction-related emissions for the Proposed Action in 2010 (the construction year defined for this EA) is presented in **Table F-6**.

Table F-6

Construction Emissions Summary – 2010 Proposed Action

Source	Pollutant Emissions (tons per year)					
	CO	VOC	NO _x	SO _x	PM ₁₀	PM _{2.5}
On-Road Equipment	0.889	0.070	1.053	0.002	0.025	0.019
Nonroad Equipment	1.136	0.182	3.143	0.118	1.919	0.148
Land Development	0.000	0.000	0.000	0.000	0.371	0.000
Asphalt Paving	0.000	2.667	0.000	0.000	0.000	0.000
Total	2.024	2.918	4.195	0.120	2.315	0.168

Note:

Columns may not add to totals shown because of rounding.

Source: Ricondo & Associates, Inc.

Prepared by: Ricondo & Associates, Inc., November 2008.

THIS PAGE LEFT INTENTIONALLY BLANK

**Appendix G. Water Quality Assessment Report and River Sediment
Quality Assessment Report**

Water Quality Assessment Report

**THE DISTRICT OF COLUMBIA
WATER QUALITY ASSESSMENT**

2008 INTEGRATED REPORT TO THE ENVIRONMENTAL PROTECTION AGENCY
AND U.S. CONGRESS PURSUANT TO
SECTIONS 305(b) AND 303(d) CLEAN WATER ACT (P.L. 97-117)

District Department of the Environment
Natural Resources Administration
Water Quality Division

Government of the
District of Columbia
Adrian M. Fenty, Mayor



Detail Report for POTOMAC DC

ID: DCPMS00E_01

State: DC - 2008

Single Cat.(User Cat.): 5(N/A)

Water Information:	POTOMAC DC	
	Location: HAINES POINT TO WOODROW WILSON BRIDGE (PRINCE GEORGE'S COUNTY MARYLAND LINE) (PMS29 TO PMS44), TIDAL FRESHWATER. RIVER PASSES THROUGH AN URBAN AREA OF COMMERCIAL BUILDINGS, MILITARY BASES AND MUNICIPAL FACILITIES.	Water Type: ESTUARY Size: 3.05 SQUARE MILES Next Scheduled Monitoring Date: N/A
Use Information		
Assessed:	Attainment Status	Uses
	Fully Supporting	Navigation Protection and Propagation of Fish, Shellfish and Wildlife Secondary Contact Recreation and Aesthetic Enjoyment
	Not Supporting	Primary Contact Recreation Protection of Human Health related to Consumption of Fish and Shellfish

Types of Assessment

Assessment Type	Uses	Assessment Confidence
HABITAT	Navigation	GOOD
PHYSICAL/CHEMICAL	Protection and Propagation of Fish, Shellfish and Wildlife	GOOD
	Protection of Human Health related to Consumption of Fish and Shellfish	GOOD
PATHOGEN INDICATORS	Primary Contact Recreation	GOOD
	Secondary Contact Recreation and Aesthetic Enjoyment	GOOD

Cause Information

Causes	Associated Uses	Pollutant?	Confidence
Fecal Coliform	Primary Contact Recreation	Yes	

Source Information

Sources	Associated Causes	Confirmed?
Combined Sewer Overflows	Fecal Coliform	
Discharges from Municipal Separate Storm Sewer Systems	Fecal Coliform	

(MS4)

Municipal Point Source
Discharges

Fecal Coliform

Comments On:

Overall Assessment

THE POTOMAC ESTUARY SEGMENT UNDER REVIEW EXTENDS FROM HAINS POINT TO WOODROW WILSON BRIDGE. THIS SEGMENT IS AFFECTED BY HIGH FECAL COLIFORM LEVELS, BLUE PLAINS OUTFALL LOADINGS, AND OCCASIONAL MAINTENANCE ACTIVITIES AT WOODROW WILSON BRIDGE. AMBIENT MONITORING DATA FROM 2003 TO 2007 WERE ANALYZED FOR THE USE SUPPORT DETERMINATIONS.

FOR THE PERIOD UNDER STUDY, TEMPERATURE, DISSOLVED OXYGEN, AND PH OBSERVATIONS MET AQUATIC LIFE USE SUPPORT CRITERIA. A REVIEW OF THE DATA FOR THIS SEGMENT SHOWED THAT 9.6% OF THE TIME PH OBSERVATIONS WERE IN VIOLATION OF ITS AQUATIC LIFE SUPPORT STANDARD. ELEVATED PH COULD BE ATTRIBUTED TO EITHER ITS SEASONAL PATTERN OR THE INTERACTION OF ELEVATED TEMPERATURES AND INCREASED PHYTOPLANKTON ACTIVITY. DISSOLVED OXYGEN AND TEMPERATURE OBSERVATIONS WERE GENERALLY IN FULL COMPLIANCE WITH WATER QUALITY STANDARDS.

SIMILARLY, 26.5% OF FECAL COLIFORM BACTERIA LEVELS WERE IN VIOLATION OF THE STANDARD FOR THE PRIMARY CONTACT RECREATION USE (SWIMMABLE) 200 MPN/100 ML, AND 2.6% IN VIOLATION OF THE SECONDARY CONTACT RECREATION STANDARD OF 1000 MPN/100ML. AS A RESULT THIS POTOMAC SEGMENT DID NOT SUPPORT ITS SWIMMABLE USE AND FULLY SUPPORTED ITS SECONDARY CONTACT RECREATION USE. EVENTS THAT COULD ACCOUNT FOR THE NON-COMPLIANCE IN FECAL COLIFORM BACTERIA INCLUDE COMBINED SEWER OVERFLOWS AND URBAN RUNOFF.

EVENTS DURING THE REVIEW PERIOD WITH POTENTIAL INFLUENCE ON THIS WATERBODY SEGMENT OF THE POTOMAC WATER QUALITY INCLUDE: THE BNR IMPLEMENTATION AT BLUE PLAINS, AND MARINA ACTIVITIES.

DETERMINATION OF THE FISH CONSUMPTION USE WAS BASED ON A PUBLIC HEALTH ADVISORY ISSUED ON NOVEMBER 15, 1994, BY THE D.C. COMMISSIONER OF PUBLIC HEALTH. THE ADVISORY URGES NON-CONSUMPTION OF CATFISH, CARP OR EEL AND LIMITED CONSUMPTION OF OTHER FISH CAUGHT IN ALL DISTRICT OF COLUMBIA WATERS.

BECAUSE OF THE ABOVE USE SUPPORT DECISIONS, THIS SEGMENT OF THE POTOMAC DID NOT SUPPORT ITS OVERALL USE FOR WATERS WITH MULTIPLE USES.

REPORTS WITH MORE INFORMATION INCLUDE:

* IMPACT OF DREDGING, ICPRB, FISH TISSUE SURVEY, ICPRB, SEDIMENT TOXICITY SURVEY, ICPRB; WETLAND ASSESSMENT, MWCOG, PETROLEUM OIL SPILL, VERSAR

* A DISSOLVED OXYGEN STUDY OF THE UPPER POTOMAC ESTUARY-FINAL REPORT, MWCOG; POTOMAC RIVER WATER QUALITY 1982-1986 - TRENDS AND ISSUES IN THE METROPOLITAN WASHINGTON AREA, MWCOG.

* AWRC. 1997. DRAFT ANACOSTIA WATERSHED RESTORATION PROGRESS AND

CONDITIONS REPORT 1990-1996. DEPT. OF ENVIRONMENTAL PROGRAM, MWCOG.
WASH., DC.

* SEDIMENT CONTAMINATION STUDIES OF THE POTOMAC AND ANACOSTIA RIVER
AROUND THE DISTRICT OF COLUMBIA, ICPRB, 1992.

* FISH TISSUE SURVEY, ICPRB, VELINSKY, 1993.

* EMERGENT WETLAND ESTABLISHMENT UNDER DIFFERING HABITAT CONDITIONS
IN THE ANACOSTIA AND POTOMAC RIVER BASIN, HORN POINT ENVIRONMENTAL
LABORATORY, CEES AND MWCOG, 1991.

Detail Report for POTOMAC DC

ID: DCPMS00E_02

State: DC - 2008

Single Cat.(User Cat.): 5(N/A)

Water Information:	POTOMAC DC	
	Location: KEY BRIDGE, GEORGETOWN, TO HAINS POINT (PMS10 TO PMS 29), TIDAL FRESHWATER. RIVER PASSES THROUGH AN URBAN AREA OF COMMERCIAL AND RESIDENTIAL BUILDINGS AND NATIONAL PARK SERVICE LAND.	Water Type: ESTUARY Size: 1.38 SQUARE MILES Next Scheduled Monitoring Date: N/A
Use Information		
	Attainment Status	Uses
Assessed:	Fully Supporting	Navigation Secondary Contact Recreation and Aesthetic Enjoyment
	Not Supporting	Primary Contact Recreation Protection and Propagation of Fish, Shellfish and Wildlife Protection of Human Health related to Consumption of Fish and Shellfish

Types of Assessment

Assessment Type	Uses	Assessment Confidence
HABITAT	Navigation	GOOD
PHYSICAL/CHEMICAL	Protection and Propagation of Fish, Shellfish and Wildlife	GOOD
	Protection of Human Health related to Consumption of Fish and Shellfish	GOOD
PATHOGEN INDICATORS	Primary Contact Recreation	GOOD
	Secondary Contact Recreation and Aesthetic Enjoyment	GOOD

Cause Information

Causes	Associated Uses	Pollutant?	Confidence
Fecal Coliform	Primary Contact Recreation	Yes	

Source Information

Sources	Associated Causes	Confirmed?
Combined Sewer Overflows	Fecal Coliform	
Discharges from Municipal Separate Storm Sewer Systems	Fecal Coliform	

(MS4)

Municipal Point Source Discharges Fecal Coliform

Source Unknown Fecal Coliform

Comments On:

Overall Assessment

THE MID-TIDAL POTOMAC WATERBODY SEGMENT EXTENDS FROM KEY BRIDGE TO HAINES POINT. THIS SEGMENT OF THE POTOMAC IS INFLUENCED BY HIGH FECAL COLIFORM BACTERIA LEVELS, OCCASSIONAL HIGH PH LEVELS, AND CONTAMINATED FISH TISSUE. FECAL AMBIENT MONITORING DATA FROM 2003 TO 2007 WERE ANALYZED TO MAKE USE SUPPORT DETERMINATIONS FOR THE PERIOD UNDER REVIEW.

THIS SEGMENT OF THE POTOMAC IS NOT SUPPORTING ITS AQUATIC LIFE USE. DIURNAL MONITORING DATA COLLECTED DURING 2003-2007 WAS USED TO DETERMINE USE SUPPORT. pH WAS VIOLATED 14.5% , D.O AND TEMPERATURE WERE NOT VIOLATED AND DURING THE ASSESSMENT PERIOD.

23.7% OF FECAL COLIFORM LEVELS WERE IN VIOLATION OF THE PRIMARY CONTACT RECREATION (SWIMMABLE) STANDARD OF 200 MPN/100 ML, AND 8.8% WERE IN VIOLATION OF THE SECONDARY CONTACT RECREATION STANDARD OF 1000 MPN/100 ML. SECONDARY CONTACT USE IS SUPPORTED.

THIS POTOMAC SEGMENT DID NOT SUPPORT THE FISH CONSUMPTION USE. DETERMINATION OF THE FISH CONSUMPTION USE WAS BASED ON A PUBLIC HEALTH ADVISORY ISSUED ON NOVEMBER 15, 1994, BY THE D.C. COMMISSIONER OF PUBLIC HEALTH. THE ADVISORY URGES NON-CONSUMPTION OF CATFISH, CARP OR EEL AND LIMITED CONSUMPTION OF OTHER FISH CAUGHT IN ALL DISTRICT OF COLUMBIA WATERS.

SEGMENT #2 FULLY SUPPORTED ITS NAVIGATION USE.

BECAUSE OF THE ABOVE USE SUPPORT DECISIONS, THE MID-TIDAL POTOMAC DID NOT SUPPORT ITS OVERALL SUPPORT USE CLASSIFICATION.

SIMILARLY, SURVEYS CONDUCTED DURING THE PERIOD UNDER REVIEW REVEAL THE PRESENCE OF TOXICS IN SEDIMENTS. FISH TISSUE OF SAMPLES OF CERTAIN SPECIES SHOW ELEVATED LEVELS OF CONTAMINANTS, INCLUDING CHLORDANE AND PCBs. BIOLOGICAL SAMPLES FROM THE SITE SUGGEST A SEVERELY STRESSED BENTHIC COMMUNITY. STRESSED CONDITIONS COULD BE ATTRIBUTED TO URBAN RUNOFFS FROM UPSTREAM AND POLLUTED STREAMS, CSO EVENTS AND IMPACT FROM ADJACENT INDUSTRIAL FACILITIES.

REPORTS CONTAINING MORE INFORMATION INCLUDE: POTOMAC RIVER WATER QUALITY 1982-1986 - TRENDS AND ISSUES IN THE METROPOLITAN WASHINGTON, D.C.; IMPACT OF DREDGING, ICPRB; FISH TISSUE SURVEY, ICPRB; SEDIMENT TOXICITY SURVEY, ICPRB; WETLAND ASSESSMENT, MWCOG; PETROLEUM OIL SPILL, VERSAR.

REPORTS WITH MORE INFORMATION INCLUDE:

* SEDIMENT CONTAMINATION STUDIES OF THE POTOMAC AND ANACOSTIA RIVER

AROUND THE DISTRICT OF COLUMBIA, ICPRB, 1992.
* FISH TISSUE SURVEY, ICPRB, VELINSKY, 1993.
* EMERGENT WETLAND ESTABLISHMENT UNDER DIFFERING HABITAT CONDITIONS
IN THE ANACOSTIA AND POTOMAC RIVER BASIN, HORN POINT ENVIRONMENTAL
LABORATORY, CEES AND MWCOG, 1991.

Detail Report for POTOMAC DC

ID: DCPMS00E_03

State: DC - 2008

Single Cat.(User Cat.): 5(N/A)

Water Information:	POTOMAC DC	
	Location: CHAIN BRIDGE (MONTGOMERY COUNTY MARYLAND LINE), JUST BELOW FALL LINE, TO KEY BRIDGE (PMS01 TO PMS10), TIDAL FRESHWATER. BORDERED BY NATIONAL PARK SERVICE LAND.	Water Type: ESTUARY Size: 0.4 SQUARE MILES Next Scheduled Monitoring Date: N/A
Use Information		
Assessed:	Attainment Status	Uses
	Fully Supporting	Navigation Secondary Contact Recreation and Aesthetic Enjoyment
	Not Supporting	Primary Contact Recreation Protection and Propagation of Fish, Shellfish and Wildlife Protection of Human Health related to Consumption of Fish and Shellfish

Types of Assessment

Assessment Type	Uses	Assessment Confidence
HABITAT	Navigation	GOOD
PHYSICAL/CHEMICAL	Protection and Propagation of Fish, Shellfish and Wildlife	GOOD
	Protection of Human Health related to Consumption of Fish and Shellfish	GOOD
PATHOGEN INDICATORS	Primary Contact Recreation	GOOD
	Secondary Contact Recreation and Aesthetic Enjoyment	GOOD

Cause Information

Causes	Associated Uses	Pollutant?	Confidence
Fecal Coliform	Primary Contact Recreation	Yes	

Source Information

Sources	Associated Causes	Confirmed?
Combined Sewer Overflows	Fecal Coliform	
Municipal (Urbanized High Density Area)	Fecal Coliform	

Comments On:

Overall Assessment

THIS WATERBODY SEGMENT INCLUDES THE UPPER TIDAL POTOMAC FROM CHAIN BRIDGE, D.C. BORDER, TO KEY BRIDGE (GEORGETOWN). THIS SEGMENT IS AFFECTED BY HIGH COLIFORM BACTERIA LEVELS, TOXICS IN SEDIMENTS, AND FISH CONTAMINATED WITH TOXICS. FECAL AMBIENT WATER QUALITY DATA FROM 2003 TO 2007 WERE ANALYZED FOR USE SUPPORT DETERMINATIONS.

A REVIEW OF THE DATA FOR THIS SEGMENT SHOWED THAT 13.7% OF THE TIME PH OBSERVATIONS WERE IN VIOLATION OF ITS AQUATIC LIFE SUPPORT STANDARD. ELEVATED PH COULD BE ATTRIBUTED TO EITHER ITS SEASONAL PATTERN OR THE INTERACTION OF ELEVATED TEMPERATURES AND INCREASED PHYTOPLANKTON ACTIVITY. DISSOLVED OXYGEN AND TEMPERATURE OBSERVATIONS WERE IN FULL COMPLIANCE OF WATER QUALITY STANDARDS.

FECAL COLIFORM BACTERIA OBSERVATIONS DID NOT SUPPORT THE PRIMARY CONTACT RECREATION (SWIMMABLE) USE OF 200 MPN/100ML BECAUSE IT VIOLATED THIS STANDARD 15.7% OF THE TIME. THIS SEGMENT SUPPORTED ITS SECONDARY CONTACT RECREATION USE OF 1000 MPN/100ML AT 3.9%. ELEVATED FECAL COLIFORM BACTERIA LEVELS COULD BE THE RESULT OF URBAN RUNOFF AND COMBINED SEWER OVERFLOWS.

SEGMENT #3 DID NOT SUPPORT THE FISH CONSUMPTION USE. DETERMINATION OF THE FISH CONSUMPTION USE WAS BASED ON A PUBLIC HEALTH ADVISORY ISSUED ON NOVEMBER 15, 1994, BY THE D.C. COMMISSIONER OF PUBLIC HEALTH. THE ADVISORY URGES NON-CONSUMPTION OF CATFISH, CARP OR EEL AND LIMITED CONSUMPTION OF OTHER FISH CAUGHT IN ALL DISTRICT OF COLUMBIA WATERS.

SURVEYS CONDUCTED OVER THE PERIOD OF REVIEW REVEAL THE PRESENCE OF TOXICS IN SEDIMENT. FISH TISSUE OF SAMPLES OF CERTAIN SPECIES SHOWED ELEVATED LEVELS OF CONTAMINANTS INCLUDING CHLORDANE AND PCBS. BIOLOGICAL SAMPLES FROM SELECTED SITES SUGGEST A SEVERELY STRESSED BENTHIC COMMUNITY. THE STRESSED CONDITION COULD BE ATTRIBUTED TO URBAN STORM WATER RUNOFFS FROM UPSTREAM AND POLLUTED STREAMS, CSO EVENTS AND IMPACT FROM ADJACENT INDUSTRIAL FACILITIES.

REPORTS WITH MORE INFORMATION INCLUDE:

- * SEDIMENT CONTAMINATION STUDIES OF THE POTOMAC AND ANACOSTIA RIVER AROUND THE DISTRICT OF COLUMBIA, ICPRB, 1992.
 - * FISH TISSUE SURVEY, ICPRB, VELINSKY, 1993.
 - * EMERGENT WETLAND ESTABLISHMENT UNDER DIFFERING HABITAT CONDITIONS IN THE ANACOSTIA AND POTOMAC RIVER BASIN, HORN POINT ENVIRONMENTAL LABORATORY, CEES AND MWCOC, 1991.
-

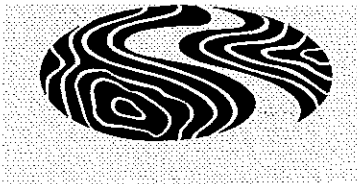
River Sediment Quality Assessment Report

**River Sediment Quality Assessment Report
Runway 15-33 and 4-22 Safety Area Study
Ronald Reagan Washington National Airport
Arlington County, Virginia**

Prepared for:

Metropolitan Washington Airports Authority

Prepared by:



**STRAUGHAN
ENVIRONMENTAL
SERVICES, INC.**

9135 Guilford Road, Suite 100
Columbia, Maryland 21046

In Association with:

Ricondo & Associates, Inc.
277 S. Washington Street, Suite 120
Alexandria, Virginia 22314

Revised July 2007

CONTENTS

Section	Page
1 INTRODUCTION	1
1.1 PROJECT DESCRIPTION AND PURPOSE	1
1.2 STUDY AREA DESCRIPTION	1
2 METHODS	1
2.1 AMBIENT WATER QUALITY ASSESSMENT METHODS	2
2.1.1 <i>Water Quality Data Collection</i>	2
2.1.2 <i>Water Quality Criteria</i>	2
2.2 SEDIMENT SAMPLING METHODS	5
2.2.1 <i>Sediment Grain Size Methods</i>	5
2.2.2 <i>Sediment Chemical Analysis Methods</i>	5
2.2.3 <i>Volatile Organic Compounds Methods</i>	7
3 FINDINGS	7
3.1 AMBIENT WATER QUALITY ASSESSMENT	7
3.2 SEDIMENT QUALITY ASSESSMENT	9
3.2.1 <i>Sediment Grain Size</i>	9
3.2.2 <i>Pollutant Metals</i>	10
3.2.3 <i>Volatile Organic Compounds (VOC's)</i>	10
3.2.4 <i>Semivolatile Organic Compounds</i>	11
3.2.5 <i>Dioxins/Furans</i>	11
3.2.6 <i>Pesticides and PCB's</i>	11
3.2.7 <i>Petroleum Hydrocarbons</i>	11
3.2.8 <i>TriButyl Tin</i>	11
4 CONCLUSIONS	13
5 REFERENCES	14

TABLES

2-1	Water Quality Criteria	2
2-2	Sediment Sample Analysis Details	5
3-1	Water Quality Assessment, Potomac River	8
3-2	Additional Observations and Physical Characterizations at B-33-4	8
3-3	Summary of Grain Size Analysis	9
3-4	List of Notable Chemical Lab Results	12

FIGURES

1-1	Site Vicinity	3
1-2	Study Area	4
2-1	Boring Locations	6
3-1	Hjulström Diagram	9

APPENDICES

- A Lab Results: Grain Size Analyses
- B Lab Results: Chemical Analyses
- C Possum Point Virginia DEQ Dredge Spoil Permit Parameters

1 INTRODUCTION

1.1 PROJECT DESCRIPTION AND PURPOSE

The Metropolitan Washington Airports Authority (MWAA) is studying possible Runway Safety Area (RSA) improvements at Ronald Reagan Washington National Airport (DCA), which is shown on Figure 1-1 (Site Vicinity). Crosswind runways 15-33 and 4-22 do not currently meet Federal Aviation Administration (FAA) design standards for RSAs (FAA Order 5200.8, *Runway Safety Area Program*, October 1, 1999). The design standards specify RSA dimensions beyond the runway ends to ensure the safety of airplanes which undershoot, overrun, or veer off the runway, and it provides greater accessibility for firefighting and rescue equipment during such incidents.

Straughan Environmental Services, Inc. (SES), under contract to Ricondo & Associates, Inc., conducted a sediment sampling study in the area of two of the four runway ends where possible RSA improvements could occur in the water. The purpose of this study is to assist MWAA in determining potential impacts to water quality in the Potomac River or potential difficulties in disposal of dredged sediment associated with construction.

1.2 STUDY AREA DESCRIPTION

The Airport is located on a peninsula in the Potomac River in Arlington County, Virginia and operates three runways. The Airport is surrounded by the Potomac River to the east and south. Roaches Run and Roaches Run Waterfowl Sanctuary are to the north. Four Mile Run is located south of the study area and reaches its confluence with the Potomac River in the vicinity of Runway 4. The Potomac River is a tributary to the Chesapeake Bay and receives tidal influences in the reach abutting the Airport. The Airport contains a large amount of impervious surface, including parking lots, airport terminals, office buildings, aircraft ramps, and the runway/taxiway system. Figure 1-2 (Study Area) illustrates the conditions described.

2 METHODS

SES conducted a sediment sampling study in the Potomac River at the eastern end of two of the runways, Runways 15-33 and 4-22. The runway ends in the Potomac are referred to in this report as either Runway End 33 or 22, depending on the runway nearest the area of interest. Runway End 22 is upstream and north of Runway End 33, as shown on Figure 1-2.

Thomas L. Brown Associates (TLB), in conjunction with MWAA, determined a total of eight borehole locations in the Potomac River, at Runway Ends 22 and 33 (Figure 2-1), for initial geotechnical analysis. Sediment samples were collected from the top 15 feet of six of the eight boreholes and provided to SES for laboratory analysis. SES accompanied TLB and conducted a field investigation on August 31, 2006, to collect ambient water quality information from the Potomac River and to measure for Volatile Organic Compounds (VOC's) levels in the sample collected at boring location B-33-4. VOC's for the other five sediment samples were measured by TLB. As described in the following paragraphs, a complete chemical analysis was performed on two of the six samples, a partial chemical analysis was performed on one (due to improper

storage of sample) and the remaining three were analyzed for grain size.

2.1 Ambient Water Quality Assessment Methods

2.1.1 Water Quality Data Collection

SES measured the following parameters on August 31, 2006:

Dissolved Oxygen and Temperature. Dissolved oxygen is the amount of oxygen in surface water available to aquatic life. The amount of dissolved oxygen decreases as the water temperature rises. SES used a YSI, Inc., Model 55 dissolved oxygen meter to measure the dissolved oxygen content in milligrams per liter (mg/l) and temperature in degrees Celsius (°C). The instrument was calibrated in accordance with the manufacturer's specifications.

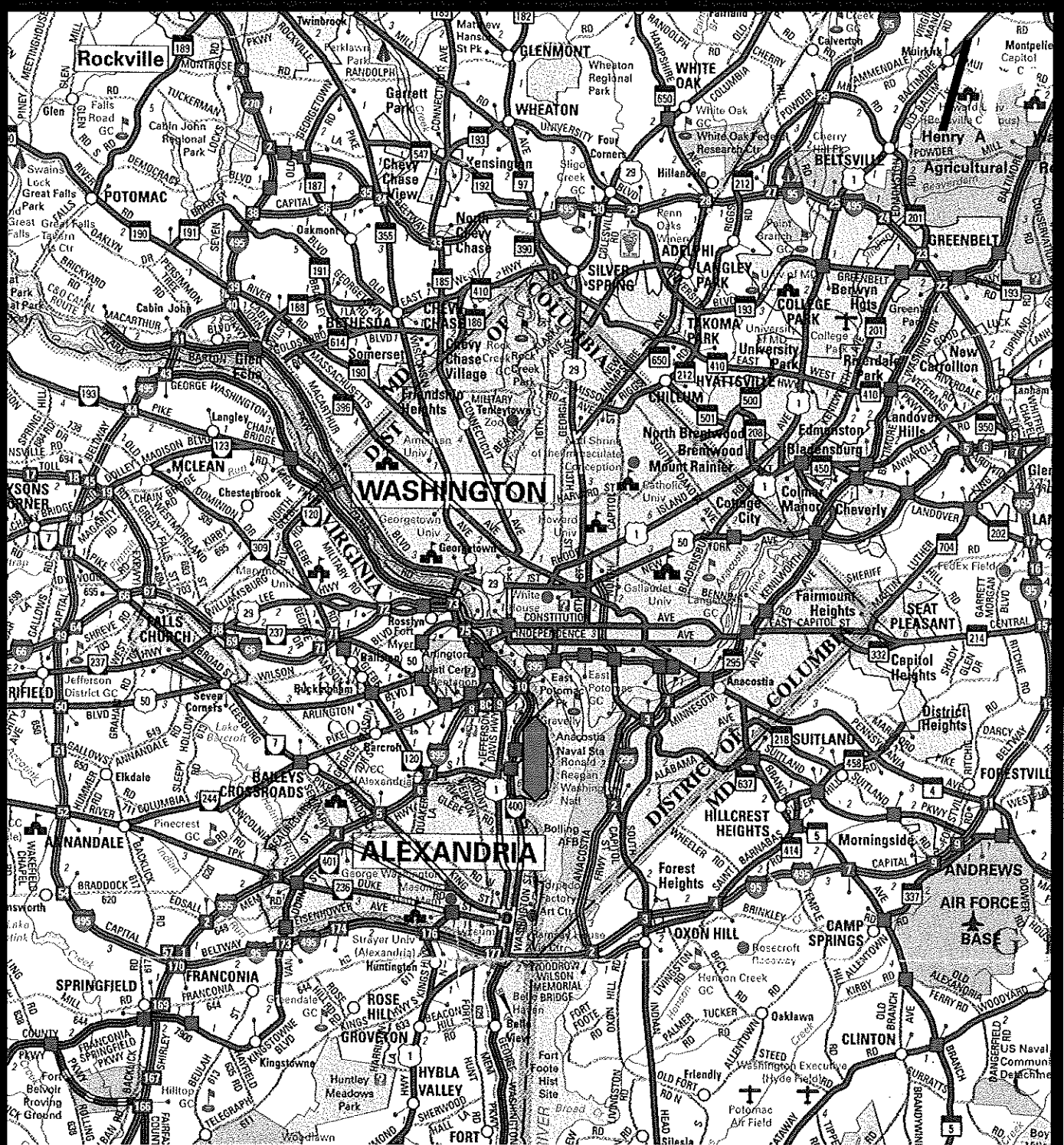
Conductivity, Salinity, and TDS. Conductivity is the measurement of electrical current that can be carried by water. It is an environmental indicator of the amount of total dissolved solids (TDS) present. TDS includes all solids dissolved in water, and these solids are usually mineral salts. A greater concentration of salts leads to greater conductivity. Pure water has a very low electrical conductivity when absent of salts and minerals. High levels of total dissolved solids in water can cause aquatic plant mortality and corrode metals (such as pipes). SES used a Hach CO150 Model 50150 conductivity meter to measure conductivity and temperature at each sample station. The instrument measures conductivity, or the ability of the water to carry an electric current, as MicroSiemens per centimeter ($\mu\text{S}/\text{cm}$) and temperature in degrees Celcius (°C). The instrument was calibrated in accordance with the manufacturer's specifications. The conductivity meter also measures salinity in parts per thousand (ppt or ‰) and converts conductivity to TDS in milligrams per liter (mg/L).

Additional Observations and Physical Characterizations. Concurrent with instrument measurements, SES recorded additional physical characterization and observations. Weather conditions during the sampling event were recorded because they may have had an impact on water quality. For example, recent storm events may increase the turbidity of some streams. Other parameters recorded include water sampling depth and depth to river bottom.

2.1.2 Water Quality Criteria

SES compared water quality field data to the Water Quality Criteria for Class III Waters defined in the Code of Virginia, Water Quality Standards, and for Class C Waters defined in the District of Columbia Municipal Regulations, to evaluate current water quality in the Potomac River. These standards are shown in Table 2-1.

Parameter	Virginia Class III Waters	D.C. Class C Waters
pH	Between 6.0 and 9.0	Between 6.0 and 8.5
Dissolved Oxygen	Minimum 4.0 mg/l – Daily Average 5.0 mg/l	Minimum Daily Average of 5.0 mg/l
Temperature	Maximum Temperature of 32°C	Maximum Temperature of 32.2°C



**STRAUGHAN
ENVIRONMENTAL
SERVICES, INC.**

**Figure 1-1:
Site Vicinity**

Ronald Reagan Washington
National Airport
Arlington County, Virginia

Legend:

■ Ronald Reagan Washington
National Airport

Approximate Scale:

1 inch = 3 miles






**STRAUGHAN
ENVIRONMENTAL
SERVICES, INC.**

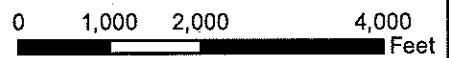
**Figure 1-2:
Study Area**

Ronald Reagan Washington
National Airport
Arlington County, Virginia

Legend:

-  Approximate Study Area Boundary
- 15 Runway designation

Scale: 1 inch equals 2,000 feet



Source: USGS. 1994. *Color Infrared Digital Orthophoto for Washington West and Alexandria*. Menlo Park, CA.

2.2 SEDIMENT SAMPLING METHODS

Sediment samples were collected by TLB and transferred to SES for processing and analysis. A split spoon drill collected the sediment borings into several 2-foot long plastic tubes. Each Split Spoon Tube was labeled with location and depth. Following the VOC's grab sample collection, the sediment from all of the tubes collected at one sampling location were combined in a stainless steel bowl and mixed with stainless steel utensils to create one composite sample for that location. Stainless steel bowls and utensils were thoroughly washed with distilled water before and after mixing each composite sample. Composite samples were subdivided and placed into jars for laboratory analysis. Sample jars were kept on ice in coolers during transport to the lab. Severn Trent Laboratories, Inc. (STL) performed all of the grain size and chemical analyses. Details about sample collection and transmittal are displayed in Table 2-2. Boring locations are shown on Figure 2-1.

Sample ID	Depth Intervals Below Surface of River Bottom (feet)	Sample Location	Date of Collection	Type of Analysis Performed	Date Sent to Lab
Composite-1	0-15	B-22-4A	8/18/06	Grain Size	8/23/06
Composite-2	0-2; 5-7; 10-12	B-22-2	8/21/06	Grain Size	8/23/06
Composite-3	5-7; 10-12	B-33-4	8/31/06	Full Chemical	8/31/06
VOC-3	10	B-33-4	8/31/06	VOC	8/31/06
Composite-4	5-6.5; 10-12	B-22-1	8/23/06	Partial Chemical	9/8/06
Composite-5	0-2; 3-5; 8-10; 13-15	B-33-1	9/6/06	Grain Size	9/8/06
Composite-6	0-2; 3-5; 8-10; 13-15	B-33-3	9/7/06	Full Chemical	9/8/06

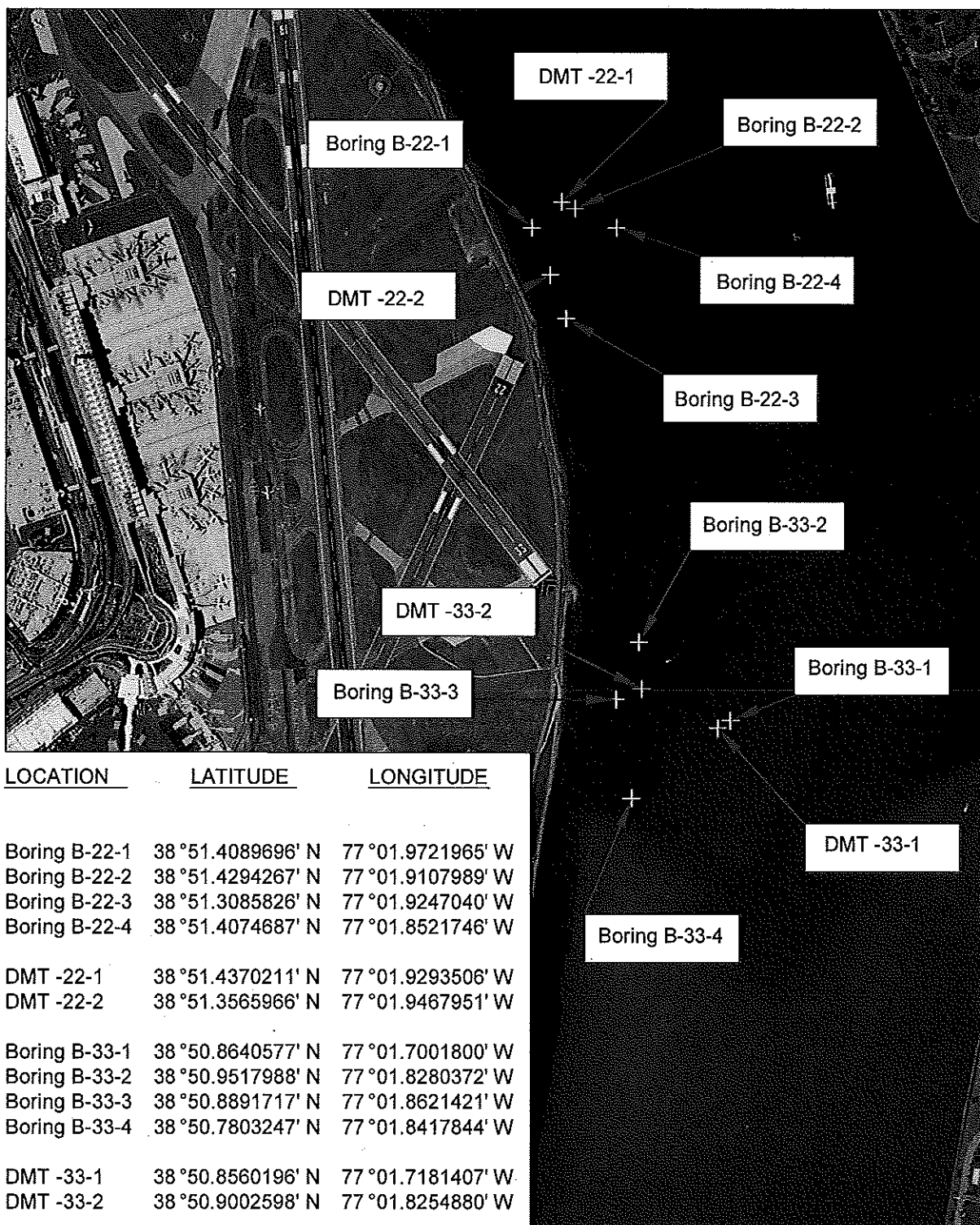
2.2.1 Sediment Grain Size Methods

Three of the six composite samples were placed into plastic bags for grain size analysis. These samples were not thermally preserved. The three samples were sent to STL Laboratories in Colchester, Vermont for American Society for Testing and Materials international standards grain size analysis (ASTM D422). In addition to the standards specified by ASTM D422, sieve number 230 was added to the analysis of the samples as per U.S. Army Corps of Engineers (USACE) standards, due to potential dredging/disposal permit requirements.

2.2.2 Sediment Chemical Analysis Methods

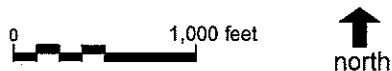
Two of the six composite samples (B-33-4, and B-33-3) were submitted to STL Laboratories in Pittsburgh, Pennsylvania and Burlington, Vermont for full chemical analysis, including:

- **Dioxins/Furans** – toxic substances created as byproduct of manufacturing and combustion
- **TS** – total inorganic residue as percent solids
- **TPH** – petroleum hydrocarbons (diesel and gasoline)
- **Metals** – priority pollutant metals [arsenic, chromium (III), copper, nickel, antimony, thallium, zinc, and mercury]



Source: Base Drawing DCA-ALP, Aerial Photograph-AirPhoto USA
 Prepared by: Ricondo & Associates, Inc.

Figure 2-1



Boring Locations

- **Hexavalent Chromium** – a carcinogen found in pigments and dyes that binds to soil particles
- **Pesticides** – toxic substances that may impact human health at high concentrations
- **Organophosphate (OP) Pesticides** – toxic substances present in about half of the insecticides used in the United States (CDC, 2005).
- **Polychlorinated biphenyls (PCB)** – persistent chemical that bioaccumulates in fish, birds and animals and was used as a fire retardant, coolant, and lubricant in various electrical products between 1930 and 1970
- **SVOC** – organic compounds with a boiling point higher than water, and which may vaporize at temperatures above room temperature
- **Cyanide (CN)** – a highly poisonous chemical used to make synthetic fibers and herbicides
- **Toxicity Characteristic Leaching Procedure (TCLP) for Metals** – the concentration of metals that are leached from the sample, used to determine if the material is hazardous per the Resource Conservation and Recovery Act. TCLP metals tested include silver, arsenic, barium, cadmium, chromium (III), lead, and selenium
- **TriButyl Tin (TBT)** – a highly toxic biocide that has been used as a paint additive to protect ship hulls

A limited chemical analysis was performed for the composite sample from location B-22-1. Because the sample had not been preserved on ice after removal, this sample was tested for Metals, Cr (VI), TCLP Metals and TriButyl Tin only.

2.2.3 Volatile Organic Compounds (VOC's) Methods

SES took four spot measurements to detect the presence of VOC's with a 2020 Pro Photovac VOC meter at the top and bottom of sediment sample tubes from location B-33-4 as they were pulled out of the drill hole. All four spot measurements for VOC's were zero. Additionally, a grab sample from sediment at the 10-foot depth interval of B-33-4 was collected in a jar and placed on ice during transfer to the STL Laboratories in Pittsburgh for VOC analysis.

TLB used the same VOC meter on other sample tubes at the time of sample collection and consistently obtained measurements of zero.

3 FINDINGS

The results of this study provide information regarding the pre-construction condition of streambed sediments in the Potomac River. In addition to establishing existing conditions, sediment quality parameters are compared to established standards to determine the probability of surface water contamination from disturbed riverbed sediments.

3.1 AMBIENT WATER QUALITY ASSESSMENT

SES collected dissolved oxygen, temperature, conductivity, salinity and TDS data from the Potomac River at boring location B-33-4 on August 31, 2006. Table 3-1 shows the baseline water quality conditions for location B-33-4. Water quality parameters for dissolved oxygen and

temperature at B-33-4 are within Code of Virginia standards for Class III waters and the D.C. Municipal Regulations for Class C waters.

Table 3-1 WATER QUALITY ASSESSMENT, POTOMAC RIVER August 31, 2006			
Parameter	Class III Water Quality Criteria	Class C Water Quality Criteria	Location B-33-4
Dissolved oxygen (mg/L)	>4	>5	5.30
Temperature (°C)	<32	<32.2	26.9
Conductivity (µS/cm)	N/A	N/A	398
Salinity (‰)	N/A	N/A	0.2
Total Dissolved Solids (mg/L)	N/A	N/A	189

Note: While pH is a typical indicator of water quality, it was not field measured as part of this study.

Legend:

- °C - degrees Celsius
- mg/L - milligrams per liter
- ‰ - parts per thousand
- µS/cm - MicroSiemens per centimeter
- N/A - Not applicable

Table 3-2 summarizes the additional observations and physical characterizations recorded at boring location B-33-4.

Table 3-2 ADDITIONAL OBSERVATIONS AND PHYSICAL CHARACTERIZATIONS AT B-33-4 August 31, 2006	
Parameter	Features
Weather Conditions	Cloudy, Windy, 72°F
Time	12:28 PM
Total Water Depth	16 Feet
Depth of Water Quality Sampling	2 Feet

3.2 SEDIMENT QUALITY ASSESSMENT

3.2.1 Sediment Grain Size

Grain size analysis was completed for three of the sediment samples. A summary of the grain size analysis is presented in Table 3-3, and detailed reports are included in Appendix A.

Sample ID	Location	% Gravel	% Sand	% Silt	% Clay	D ₅₀ (mm)	D ₈₅ (mm)
Composite-1	B-22-4A	4.4	42.8	30.4	22.5	0.04	0.38
Composite-2	B-22-2	24.9	44.3	15.7	15.2	0.28	7.25
Composite-5	B-33-1	0.0	37.0	44.7	18.3	0.05	0.15
Grain Size (mm)		2-64	0.0625-2	0.0039-0.0625	<0.0039		

The U. S. Geological Survey (USGS) monitors stream velocity and discharge at gaging station 01646500 on the Potomac River near the Little Falls Pumping Station in Washington, D.C. Since 1980, the USGS has recorded a maximum velocity of 6.85 ft/sec and discharge of 183,000 ft³/sec (recorded March 6, 1993) for the cross section at that gage station. Based on the Hjulström diagram for sediment mobility (Figure 3-1) it is likely that streambed sediment less than 1 mm in size (i.e. smaller than very coarse sand) will be mobile at a stream velocity of 6.85 ft/sec. The Hjulström diagram assumes that the streambed is uniform and stream depth is one meter. Channels like the Potomac River, with depths greater than one meter and non-uniform beds, may carry particles larger than indicated in the diagram due to the increased turbulence of the stream flow.

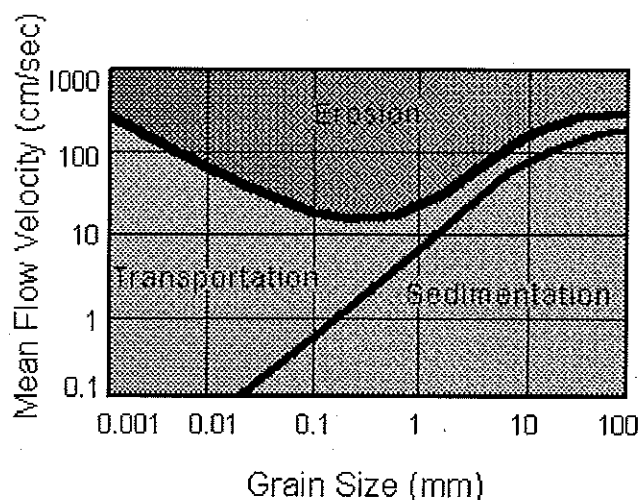


Figure 3-1. Hjulström Diagram

Total inorganic content as percent solids was measured as part of the chemical analysis for boring locations B-33-3 and B-33-4. Inorganic content was 65% and 60% for the two sites, respectively.

3.2.2 Priority Pollutant Metals

The EPA regulates thirteen priority pollutant metals in surface waters. These include Arsenic, Selenium, Cadmium, Chromium, Copper, Lead, Antimony, Silver, Thallium, Zinc, Beryllium, Mercury, and Nickel [As, Se, Cd, Cr (III and VI), Cu, Pb, Sb, Ag, Tl, Zn, Be, Hg and Ni]. Three metals - cadmium, lead, and mercury - are on the EPA priority chemicals list and subject to the Resources Conservation and Recovery Act (RCRA). The EPA has Maximum Contaminant Levels (MCL's) for drinking water, which include most of the thirteen metals. High concentrations of metals can be toxic to aquatic organisms.

Sediment samples from boring sites B-33-3, B-33-4, and B-22-1 were tested in the laboratory for pollutant metals using the Toxicity Characteristic Leaching Procedure (TCLP). The Land Disposal Restrictions (LDR) program allows use of TCLP test when measuring compliance with the treatment standards for 39 contaminants ([55 Final Rule 22660, June 1, 1990] Land Disposal Restrictions for Third Scheduled Wastes: Final rule). Low concentrations of chromium (III), copper, nickel, and zinc were detected in samples from all three locations, but the concentrations did not exceed EPA Risk-Based Concentrations for Region III (Mid-Atlantic) Residential Soil (Environmental Protection Agency, 2006). However, arsenic concentrations exceed the EPA Risk-Based concentrations for all three locations. Barium TCLP and chromium TCLP were detected at low concentrations at both boring locations. Arsenic TCLP and lead TCLP amounts detected at both locations were approaching the threshold to exceed concentrations for Virginia Water Quality Standards (Virginia State Water Control Board, 2005). Hexavalent chromium, mercury, antimony, thallium, silver, cadmium, and selenium were not detectable in any of the sediment samples. Individual analyte data results, laboratory reporting limits, and quality control information are presented in the laboratory reports in Appendix B and Table 3-4.

3.2.3 Volatile Organic Compounds (VOC's)

Field and laboratory testing for VOC's was conducted at boring site B-33-4. No detectable concentrations of VOC's were identified in the field. In the laboratory, methylene chloride (typically a lab contaminant) was detected at a concentration below the reporting limit. Other VOC's analyzed in the laboratory were not present in detectable concentrations. Individual analyte data results, laboratory reporting limits, and quality control information are presented in the laboratory reports in Appendix B.

3.2.4 Semivolatile Organic Compounds

Laboratory testing for semivolatile organic compounds (SVOC's) was conducted on sediments from boring sites B-33-3 and B-33-4. Trace amounts of SVOC's were present in samples from both locations. The concentration of benzo(a)pyrene in the sediment sample from boring location B-33-4 exceeded the EPA Risk-Based Concentration for that compound (U.S. EPA, 2006). Concentrations of other SVOC's detected in the two samples were well below the U.S. EPA Risk-Based Concentrations (U.S. EPA, 2006). Individual analyte data results, laboratory reporting limits, and quality control information for SVOC's are presented in the laboratory reports in Appendix B.

3.2.5 Dioxins/Furans

Laboratory testing for dioxin was conducted on sediments from boring site locations B-33-3 and B-33-4. Both samples contained only trace amounts of dioxin congeners. Only 2 of the congeners of HxCDD (Hexachlorodibenzo-P-Dioxin) were detected above reporting limits. The EPA does not include dioxins in the list of Risk-Based Concentrations. Individual analyte data results, laboratory reporting limits, and quality control information are presented in the laboratory reports in Appendix B and Table 3-4.

3.2.6 Pesticides and PCB's

Laboratory testing for pesticides and PCB's was conducted on sediments from boring sites B-33-3 and B-33-4. Both sites showed trace amounts of DDD and DDE. Site B-33-3 also showed trace amounts of DDT, Dieldrin, and Endrin aldehyde. All pesticide concentrations detected were below the laboratory reporting limit and below EPA Risk-Based Concentrations. Neither boring site had detectible concentrations of PCB's present in the sediments. Organophosphorous compounds were not detected in sediment from boring location B-33-4, but a low concentration of Azinphos-methyl was detected at location B-33-3. Individual analyte data results, laboratory reporting limits, and quality control information are presented in the laboratory reports in Appendix B.

3.2.7 Petroleum Hydrocarbons

Laboratory testing for TPH as diesel and gasoline was conducted on sediments from boring locations B-33-3 and B-33-4. Diesel was detected in sediments from both boring locations, with B-33-4 having a higher concentration of diesel. Gasoline was detected in sediments from boring site B-33-4 at levels below the laboratory reporting limit. The EPA does not include petroleum hydrocarbons in the list of Risk-Based Concentrations. The Virginia DEQ level for residential clean up is 230 parts per million (ppm). Individual analytical data results, laboratory reporting limits, and quality control information for petroleum hydrocarbons are presented in the laboratory reports in Appendix B and Table 3-4.

3.2.8 TriButyl Tin

TriButyl Tin (TBT) has been used as an anti-fouling biocide and as a fungicide in paints. It is a restricted-use pesticide in the United States.

Laboratory testing for TBT was conducted on sediments from boring locations B-22-1, B-33-3, and B-33-4. Concentrations of TBT were measured at 2.5 µg/Kg for all three samples. The EPA water quality criteria for aquatic life in freshwater requires that concentrations of TBT be less than 0.072 µg/l (U.S. EPA, 2003). The EPA does not have a standard for TBT in soils. Individual analyte data results, laboratory reporting limits, and quality control information are presented in the laboratory reports in Appendix B and Table 3-4.

Component	Composite-3 B-33-4	Composite-4 B-22-1	Composite-6 B-33-3	Regulatory limit
TPH (as diesel)	230 mg/kg	Not Measured	57 mg/kg	230 ppm ¹
1,2,3,6,7,8-HxCDD ²	14 pg/g	Not Measured	3.7 pg/g	N/A ³
1,2,3,4,6,7,8-HpCDD	350 pg/g	Not Measured	95 pg/g	N/A ³
OCDD	10,000 pg/g	Not Measured	3300 pg/g	N/A ³
1,2,3,4,6,7,8-HpCDF	76 pg/g	Not Measured	17 pg/g	N/A ³
OCDF	130 pg/g	Not Measured	30 pg/g	N/A ³
2,3,7,8-TCDF ⁴	2.4 pg/g	Not Measured	1.3 pg/g	N/A ³
Arsenic	7.1 mg/kg	2.2 mg/kg	3.2 mg/kg	0.43 mg/kg ⁵
TCLP Arsenic ⁷	0.21 mg/L	0.16 mg/L	0.15 mg/L	0.150 mg/L (chronic) 0.340 mg/L (acute) ⁶
Chromium	30 mg/kg	11.6 mg/kg	15.1 mg/kg	120,000 mg/kg ⁵
Copper	40.6 mg/kg	14.5 mg/kg	20.3 mg/kg	3100 mg/kg ⁵
Nickel	32.7 mg/kg	12.2 mg/kg	18.9 mg/kg	1600 mg/kg ⁵
Zinc	418 mg/kg	65.1 mg/kg	121 mg/kg	23,000 mg/kg ⁵
TCLP Lead ⁷	ND	0.015 mg/L	0.015 mg/L	0.0023 mg/L (chronic) 0.0204 mg/L (acute) ^{6,8}
n-Hexane Extractable Material	372 mg/kg	Not Measured	Not Detected	N/A ²
Tributyltin	2.5 µg/kg	2.5 µg/kg	2.5 µg/kg	0.072 µg/L ⁹
Benzo(a)pyrene	140 µg/kg ¹⁰	Not Measured	80 µg/kg	87 µg/kg ⁵

Unit Conversions: 1 mg/kg = 1ppm = 1 mg/L ; 1 µg/kg = 1 µg/L = 1 ppb

¹ Virginia DEQ threshold for residential clean up.

² Some measured results are less than the reporting limit of 7.7 pg/g.

³ The EPA does not include dioxins in the list of Risk-Based Concentrations.

⁴ Some measured results are less than the reporting limit of 1.5 pg/g.

⁵ EPA Risk-Based Concentrations for Region III (Mid-Atlantic) Residential Soil (Environmental Protection Agency, 2006).

⁶ Virginia Water Quality Standards (Virginia State Water Control Board, 2005).

⁷ Measured results are less than the reporting limit of 0.50 mg/L.

⁸ Regulatory values for lead depend on water hardness. These values assume a water hardness of 25 mg/L.

⁹ EPA Ambient Aquatic Life Water Quality Criteria.

¹⁰ Measured results are less than the reporting limit of 550 µg/kg.

4 CONCLUSIONS

The purpose of this study is to assist MWAA in determining potential impacts to water quality in the Potomac River or potential difficulties in disposal of dredged sediment associated with construction. One possible destination being investigated for placement of dredge material is transportation of the material to Dominion Virginia Power station at Possum Point for beneficial re-use as part of the plant's managed coal combustion waste initiative.

The Potomac River sediments in the proposed Runway Safety Areas for Runway Ends 33 and 22 consist primarily of sand and silt with a high organic content. Arsenic was the only pollutant detected in the sediments that clearly exceeded human health risk criteria for residential soils. The TCLP extracts for arsenic and lead are at the threshold of exceeding Virginia water quality limits for freshwater, however, the TCLP test gives a maximum extractable concentration. A standard elutriate test would be expected to give lower concentrations and is a more appropriate comparator to water quality standards. Therefore, the sediments would not be likely to fail to meet Virginia water quality limits. Low concentrations of metals, pesticides, and SVOC's were detected but do not exceed applicable risk-based criteria. Dioxins and petroleum hydrocarbons are also present.

The small grain size of the streambed sediments indicates that contaminated sediment will likely become mobile and be transported downstream if disturbed in the construction process.

Laboratory results were compared to established threshold levels for dredge disposal at the Possum Point location (Appendix C). These initial results indicate organic and inorganic compounds are present, but are not present in sufficient concentrations to warrant special treatment of dredged material from this area during disposal based on comparison with the Virginia Department of Environmental Quality (VDEQ) Permit Number VA0002017 issued to Possum Point for previous use of Dredge Spoils (see Appendix C). Of some concern for disposal at Possum Point would be low but detectable levels of TPH. The environmental manager for Possum Point indicated that TPH requirements are "nearly zero" (*Jeff Marcelles, Personal Communication, May 15, 2006*). During an additional conversation (April 13, 2007), Mr. Marcelles clarified that TPH levels equal to or in excess of 100 parts per million (equivalent to 100 mg/kg) are not accepted for disposal at Possum Point. He also explained that measurements of dried sediment would reduce TPH levels in the material due to evaporation, so it is uncertain whether dredged sediments will meet the Possum Point threshold when dried.

Because of the limited sample size, it is possible that additional testing would be requested by the permitting agencies to conclusively determine the suitability of the dredge material for disposal as cover material for ash drying basins at Possum Point. However, initial results indicate that there is little cause for concern. Furthermore, additional testing may be necessary during design and permitting phases of the project to assure that dredging activities would not pose an environmental threat or hazard to aquatic or human life. Initial results indicate that dredging activities would release sediment for transport, and that the sediment contains arsenic and lead in addition to low levels of other contaminants.

5 REFERENCES

- Alexandria Drafting Company. 2000. *Maryland and Delaware Map*.
- Centers for Disease Control and Prevention (CDC). 2005. CDC's Third National Report on Human Exposure to Environmental Chemicals.
http://www.cdc.gov/exposurereport/pdf/factsheet_organophosphate.pdf
- District of Columbia. 2003. *District of Columbia Municipal Regulations, Water Quality Standards*.
http://doh.dc.gov/doh/frames.asp?doc=/doh/lib/doh/services/administration_offices/environmental/service_s2/water_division/pdf/wq_standards03.pdf&group=1811
- Federal Aviation Administration. 1999. FAA Order 5200.8, *Runway Safety Area Program*, October 1, 1999.
- Frost, W. and T. Ernest. Arlington County Mapping Center, Department of Public Works. 1999. *Simplified Geologic Map of Arlington County, Virginia, and Vicinity*.
- Hjulström, F. 1939. Transportation of Detritus by Moving Water. In *Recent Marine Sediments: A Symposium*, Ed. Parker Trask. Tulsa, OK: Am. Assoc. Petroleum Geologists, p.5-31.
- Knighton, D. 1998. *Fluvial Forms and Processes*. Oxford University Press, New York. 383 p.
- Virginia State Water Control Board. 2005. *9 VAC 25-260 Virginia Water Quality Standards, Statutory Authority § 62.1-44.15 3a of the Code of Virginia*.
- U.S. Environmental Protection Agency. 2006. *Mid-Atlantic Risk Assessment, Human Health Risk Assessment, Risk-Based Concentration Table, April 2006 Update*.
<http://www.epa.gov/reg3hwmd/risk/human/rbc/rbc0406.pdf>
- U.S. Environmental Protection Agency. 2003. *Ambient Aquatic Life Water Quality Criteria for Tributyl tin (TBT) - Final*.
<http://www.epa.gov/waterscience/criteria/tributyltin/tbt-final.pdf>
- U.S. Environmental Protection Agency. *Code of Federal Regulations*, 40CFR Part 51.100 (s).
- U.S. Environmental Protection Agency. 1990. 55 FR 22660, *Land Disposal Restrictions for Third Scheduled Wastes: Final Rule*, June 1, 1990.
- United States Geological Survey. 1965 (photorevised 1983). *7.5-Minute Topographic Quadrangle for Alexandria, Virginia*. Reston, Virginia.

