4. Affected Environment

The environmental resources likely to be affected by the Proposed Action, as well as the past, present, and reasonably foreseeable future actions, are described in this section. Past, present, and reasonably foreseeable future actions are identified in Section 5.15, wherein the cumulative effects of these actions and the Proposed Action are discussed.

4.1 Description and Identification of the Study Area

The general study area includes the immediate environs of the Airport. Resource-specific study areas vary depending on the resource category being considered. The limits of physical disturbance (LOPD) represent the areas that will be directly affected by implementation of the Proposed Action.

Since the Draft EA was published, minor revisions were made to the LOPD to include the temporary use of Lot K, and the temporary use of an existing contractor staging area. The revisions to the LOPD would occur on previously disturbed areas and would not increase the amount of impervious area. The revised LOPD is illustrated on **Exhibit 4-1**. Other resource categories within the immediate environs of the Airport may also be affected, not including physical disturbance (e.g., the area potentially affected by air pollutant emissions, which includes Washington, D.C. and the surrounding areas of Maryland and Virginia). **Exhibit 4-2** illustrates the Airport environs for reference in this section. The specific areas that would be affected are discussed by resource category in the following sections.

4.2 Resources Not Present in the Study Area

Resources that are not present, and would therefore not be affected by implementation of the Proposed Action, include:

- farmlands
- wild and scenic rivers

4.2.1 FARMLANDS

Land within the LOPD is within the airside of the Airport and does not support agricultural uses. Therefore, no prime, unique, or state significant farmlands are present within the LOPD.

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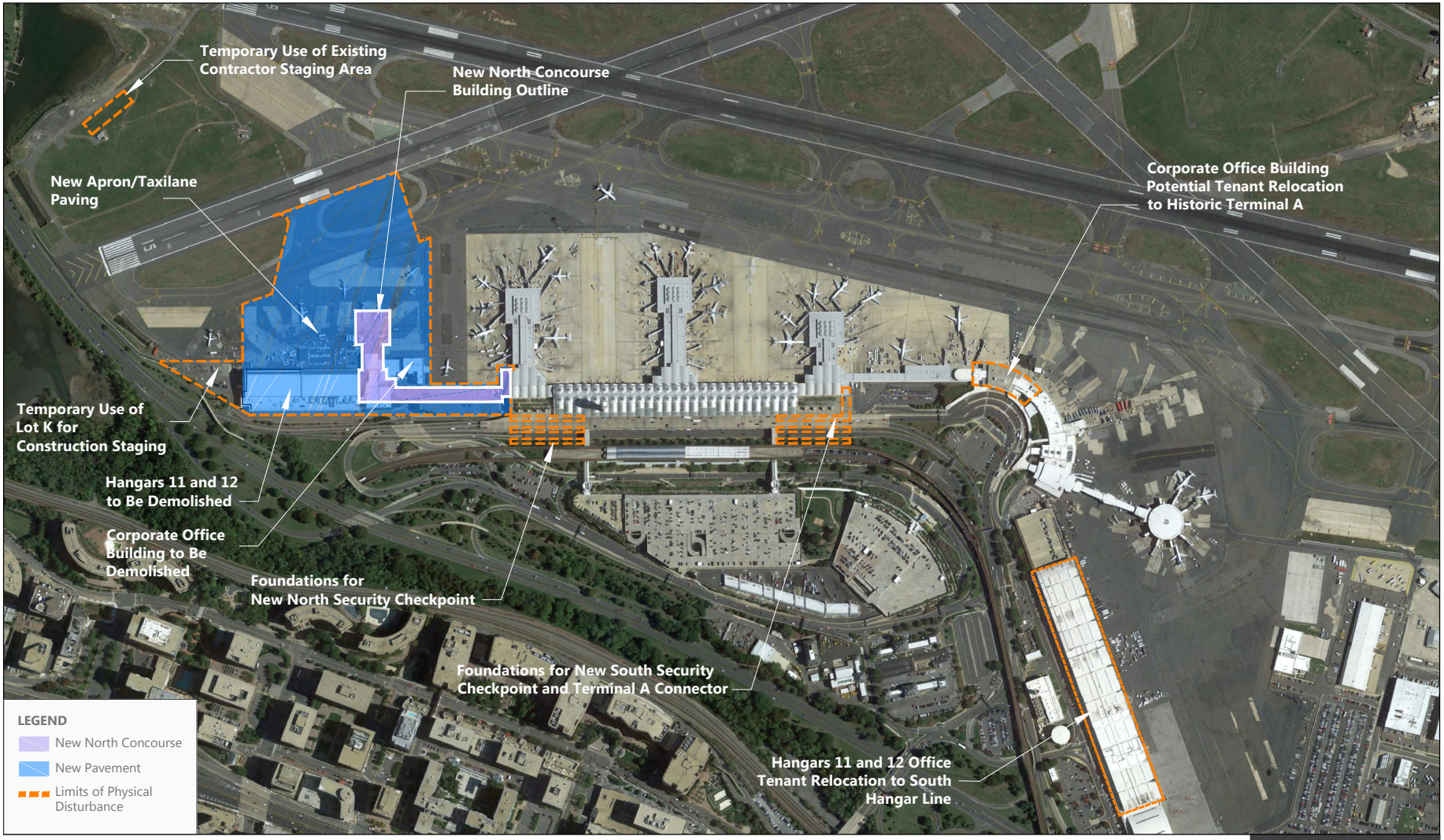

SOURCE: Ricondo & Associates, Inc., March 2015; AGD Associates, LLC., March, 2015.
PREPARED BY: Ricondo & Associates, Inc., March 2015; AGD Associates, LLC., April 2016.

EXHIBIT 4-1

NORTH 0 750 ft.

Limit of Physical Disturbance

Drawing: P:\2015_MWAA-On-Call(1-14-C108)\DCA - NNC EA\CAD\FINAL\161028_EXH0401_DCA-LimitPhysicalDisturbance.dwg_Layout: Exhibit 04-01_Oct 28, 2016, 6:26am

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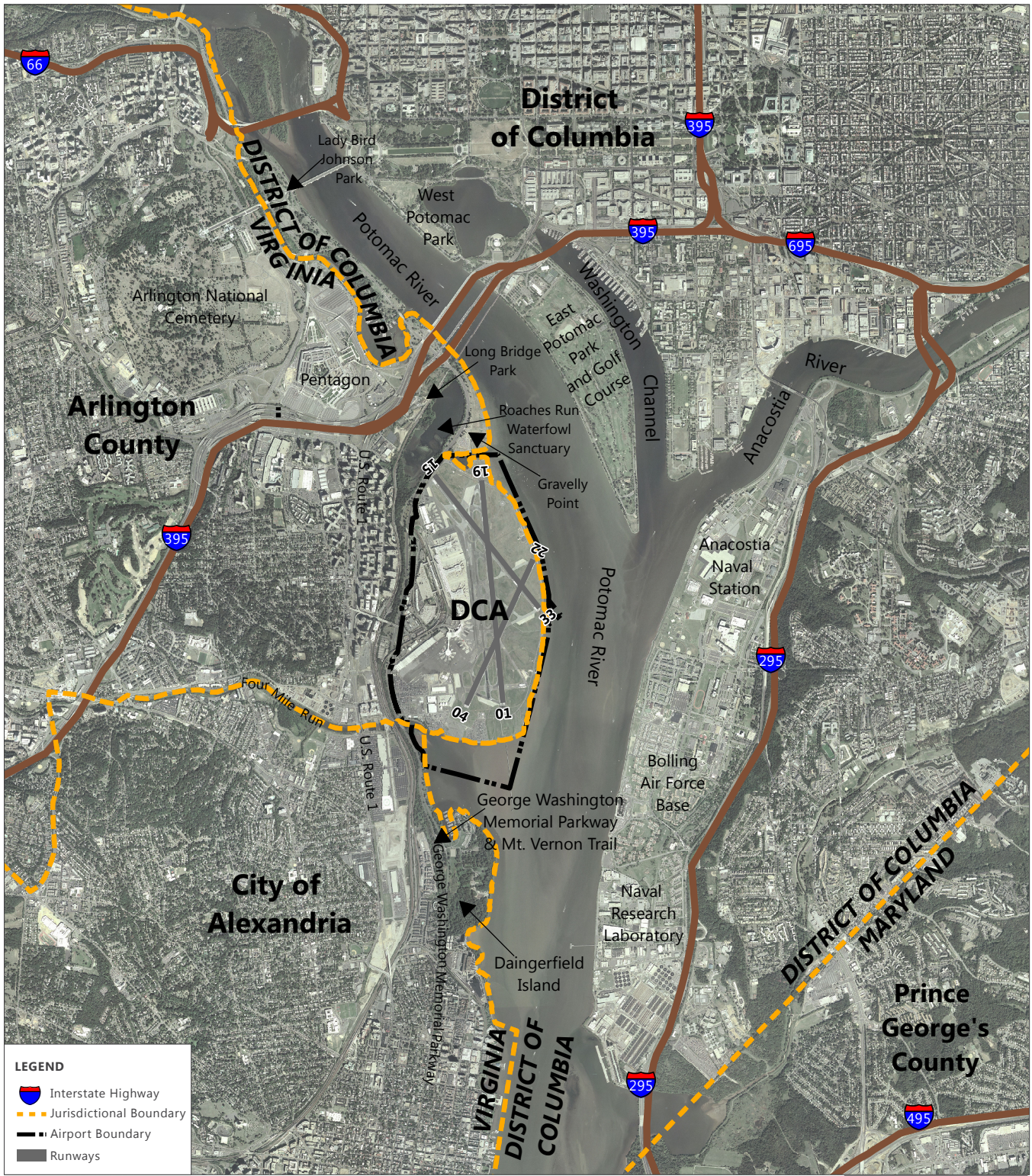

SOURCES: Aerials Express, November 2008 (Basemap Imagery obtained as part of the Ronald Reagan Washington National Airport (DCA) Terminal Instrument Procedures (TERPS) Airspace Analysis project); Ricondo & Associates, Inc. July 2015.
PREPARED BY: Ricondo & Associates, Inc. November 2016.

EXHIBIT 4-2

Airport Environs

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4.2.2 WILD AND SCENIC RIVERS

The two rivers in the vicinity of the Airport—the Potomac River and the Anacostia River—are not designated under the National Wild and Scenic River System as having remarkable scenic, recreational, geologic, fish, wildlife, historic, or cultural values.[1] Furthermore, the segments of these rivers located in the Airport vicinity are not listed in the National Rivers Inventory as having "outstandingly remarkable" natural or cultural values judged to be of more than local or regional significance.[2]

4.3 Air Quality

The air quality regulations that apply to Airport improvement projects are summarized in the following section, and the existing air quality conditions in the Washington, D.C. area are also described and presented in subsequent sections.

4.3.1 REGULATORY SETTING

The federal Clean Air Act of 1970, Title 42 United States Code (USC) § 7401, et seq., as amended, requires that states identify those areas where the National Ambient Air Quality Standards (NAAQS) are not met for specific air pollutants. The U.S. Environmental Protection Agency (EPA) designates such areas as nonattainment areas. A state with one or more nonattainment areas must prepare a State Implementation Plan (SIP) for each nonattainment area, detailing the programs and requirements that the state will implement to meet the NAAQS by the deadlines specified in the Clean Air Act Amendments of 1990 (CAAA).[3] SIPs must address all pollutants for which the NAAQS are not met.

The EPA, under mandates of the CAAA, has established primary and secondary NAAQS for six air contaminants, or criteria pollutants. These contaminants include carbon monoxide, nitrogen dioxide, ozone, lead, sulfur dioxide, and particle pollution (particulate matter [$PM_{2.5}$] and fine particulates [PM_{10}]). The primary standards were established at levels sufficient to protect public health with a satisfactory margin of safety. The secondary standards were established to protect public welfare from other adverse effects of air pollution. The criteria pollutants are described in the following sections.

4.3.1.1 Carbon Monoxide

Carbon monoxide (CO) is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels. The primary sources of CO are automobiles and other ground-based vehicles. The health effects associated with exposure to CO are related to its affinity for hemoglobin in the blood. At high concentrations, CO reduces the amount of oxygen in the blood, causing heart difficulties in people with chronic diseases, reduced lung capacity, and impaired mental abilities.

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1 Interagency Wild & Scenic Rivers Coordinating Council, The National Wild and Scenic Rivers System, *River Mileage Classifications for Components of the National Wild and Scenic Rivers System*, http://www.rivers.gov/national-system.php (accessed July 28, 2015).

2 Ibid, *Wild and Scenic Rivers*, http://www.rivers.gov/virginia.php (accessed August 11, 2015).

3 *Clean Air Act Amendments of 1990* (PL 101-49), November 15, 1990.

4.3.1.2 Nitrogen Dioxide

Nitrogen dioxide (NO_2) is a poisonous, reddish-brown to dark brown gas with an irritating odor. NO_2 forms when nitric oxide (NO) reacts with atmospheric oxygen (O_2). Most sources of NO_2 are manmade; the primary source is high-temperature combustion. Significant sources of NO_2 at airports are boilers, aircraft operations, and vehicle movements. NO_2 emissions from these sources are highest during high-temperature combustion, such as in aircraft takeoff mode. NO_2 may produce adverse health effects, such as nose and throat irritation, coughing, choking, headache, nausea, stomach or chest pain, and lung inflammation (e.g., bronchitis and pneumonia).

4.3.1.3 Ozone

Ozone (O_3) is a common constituent of smog that is formed in the atmosphere, rather than being directly emitted from pollutant sources. Ozone forms as a result of volatile organic compounds (VOCs) and oxides of nitrogen (NO_X) reacting in the presence of sunlight in the atmosphere. Ozone levels are highest in warm-weather months. VOCs and NO_X are termed "ozone precursors," and their emissions are regulated to control the creation of ozone. Ozone damages lung tissue and reduces lung function. Scientific evidence indicates that ambient levels of ozone not only affect people with impaired respiratory systems (e.g., asthmatics, but also healthy children and adults. Ozone can cause health effects, such as chest discomfort, coughing, nausea, respiratory tract and eye irritation, and decreased pulmonary function.

4.3.1.4 Lead

Lead (Pb) is a bluish-white to silvery-gray heavy metal solid. Lead occurs in the atmosphere as lead oxide aerosol or lead dust. Historically, ground access vehicles operating on leaded gasoline were a significant source of lead in the air at airports. However, the amount of lead emissions from vehicles has decreased as a result of the significant federal controls on leaded gasoline and the resultant increase in the use of unleaded gasoline in catalyst-equipped cars.

4.3.1.5 Sulfur Dioxide

Sulfur dioxide (SO_2) is formed when fuel containing sulfur (typically coal and oil) is burned during the metal smelting process and during other industrial processes. High SO_2 concentrations are found in the vicinity of large industrial facilities. The physical effects of SO_2 include temporary breathing impairment, respiratory illness, and aggravation of existing cardiovascular disease. Children and the elderly are most susceptible to the negative effects of exposure to SO_2.

4.3.1.6 Particulate Matter and Fine Particulates

Particulate matter (PM_{10}) and fine particulates ($PM_{2.5}$) consist of solid and liquid particles of dust, soot, aerosols, and other matter small enough to remain suspended in the air for a long period of time. PM_{10} consists of particulate matter with an aerodynamic diameter less than or equal to 10 micrometers and $PM_{2.5}$ consists of particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers. Particulates smaller than 10 micrometers (i.e., PM_{10} and $PM_{2.5}$) represent the portion of particulate matter

thought to represent the greatest hazard to public health.[4] PM_{10} and $PM_{2.5}$ can accumulate in the respiratory system and are associated with a variety of negative health effects. Exposure to particulates can aggravate existing respiratory conditions, increase respiratory symptoms and disease, decrease long-term lung function, and possibly cause premature death. The segments of the population that are most sensitive to the negative effects of particulate matter are the elderly, individuals with cardiopulmonary disease, and children. Aside from the physical negative effects, particulate matter in the air also reduces visibility and damages paints and building materials.

A portion of the particulate matter in the air comes from natural sources, such as windblown dust and pollen. Manmade sources of particulate matter include the following: combustion of materials, automobiles, aircraft operations, field burning, factories, vehicle movements or other manmade disturbances of unpaved areas, and photochemical reactions in the atmosphere. Fugitive dust generated by construction activities may also be a major source of particulate matter. Secondary formation of particulate matter may occur in some cases where gases such as sulfur oxides (SO_X) and NO_X interact with other compounds in the air to form particulate matter. The secondary creators of particulate matter, SO_X, and NO_X, are also major precursors to acidic deposition (acid rain). While SO_X is a major precursor to particulate matter formation, NO_X has other environmental effects. NO_X has the potential to change the composition of some species of vegetation in wetland and terrestrial systems, create the acidification of freshwater bodies, impair aquatic visibility, create eutrophication of estuarine and coastal waters, and increase the levels of toxins harmful to aquatic life.[5]

4.3.1.7 Air Quality Standards

Federal and Commonwealth of Virginia ambient air quality standards are summarized in **Table 4-1**. The Virginia Department of Environmental Quality's (VDEQ) Air Pollution Control Board (VAPCB) has adopted ambient air quality standards that are identical to the federal standards. The VAPCB has also adopted regulations prohibiting most types of open burning in the state, effective October 18, 2006.[6]

4.3.2 METHODOLOGY

Regulations governing air quality in the Commonwealth of Virginia and air quality planning documents covering the Airport environs were reviewed and are summarized in the following subsection. Ambient air quality datasets for air quality monitors in the vicinity of the Airport were also reviewed and are summarized in subsequent sections.

4.3.3 AFFECTED ENVIRONMENT

Existing air quality conditions in the Washington, D.C. area are described below.

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4 U.S. Environmental Protection Agency, *Particle Pollution and Your Health*, September 2003.

5 Nitrogen-rich discharge/runoff into marine waters causes rapid growth and accumulation of algae (eutrophication), which depletes the oxygen supply in the water. Phosphates are the primary nutrient that causes eutrophication in fresh waters.

6 Virginia Code Commission, *Virginia Register of Regulations*, Article 40, pt. II, ch. 40, p. 23 (9 VAC 5-40-5600 et seq.), September 18, 2006.

Table 4-1: Federal Ambient Air Quality Standards

POLLUTANT	AVERAGING TIME	PRIMARY STANDARD	SECONDARY STANDARD
Ozone (O_3)	1 hour [1/]	0.12 ppm	Same as primary
	8 hours (1997 standard)	0.08 ppm	Same as primary
	8 hours (2008 standard)[2/]	0.075 ppm	Same as primary
	8 hours (2015 standard)[6/]	0.070 ppm	Same as primary
Carbon Monoxide (CO)	8 hours	9.0 ppm	None
	1 hour	35.0 ppm	None
Nitrogen Dioxide (NO_2)	AAM	0.053 ppm	Same as primary
	1 hour	0.100 ppm	None
Sulfur Dioxide (SO_2)	AAM	Revoked[4/]	
	24 hours	Revoked[4/]	
	3 hours	-None-	0.50 ppm
	1 hours	0.75 ppb[4/]	None
Particulate Matter (PM_{10})	AAM	Revoked[3/]	Revoked[3/]
	24 hours	150 µg/m^3	Same as primary
Fine Particulate Matter ($PM_{2.5}$)	AAM	12 µg/m^3 [5/]	15 µg/m^3
	24 hours	35 µg/m^3	Same as primary
Lead (Pb)	Rolling 3 month average	0.15 µg/m^3 [2/]	Same as primary

NOTES:

AAM = Annual arithmetic mean

µg/m^3 = Micrograms per cubic meter

ppm = Parts per million

1/ The 1-hour ozone standard was revoked by the EPA on June 15, 2005 for all areas except those in nonattainment of the 8-hour ozone standard where the responsible governmental agency entered into an Early Action Compact (EAC). Arlington County is not an EAC area.

2/ Effective October 15, 2008.

3/ Because of the lack of evidence linking health problems to long-term exposure to coarse particulate matter, the EPA revoked the annual PM_{10} standard in 2006 (effective December 17, 2006).

4/ The 1-hour SO_2 standard added in June 2010 is a primary standard. The revision of the SO_2 NAAQS in 2010 did not address the secondary standard, which remains a 3-hour standard with a level of 0.5 ppm. In setting the primary 1-hour standard, EPA revoked the 24-hour and annual primary standard.

5/ Effective December, 2012, the primary annual $PM_{2.5}$ standard was tightened from 15.0 ug/m^3 to 12 ug/m^3.

6/ On October 1, 2015 the EPA strengthened the National Ambient Air Quality Standards (NAAQS) for ground-level ozone to 70 ppm.

SOURCE: U.S. Congress, EPA National Ambient Air Quality Standards, *Clean Air Act*, as amended (PL 91-604 and PL 101-549), http://www3.epa.gov/ttn/naaqs/criteria.html, November 1990.

PREPARED BY: HMMH., December 2015.

4.3.3.1 Attainment Status

The Airport is located in the Metropolitan Washington Region. The Airport and adjacent areas are all within Arlington County in the Commonwealth of Virginia. The areas north and east of the Airport and across the Potomac River are within the District of Columbia. Arlington County, Virginia, has been designated by the EPA as nonattainment for the 8-hour ozone. The EPA designated the region as a moderate nonattainment area for the 8-hour ozone standard in April 2004.[7] The region was designated a nonattainment area for the 1997 $PM_{2.5}$ standard in January 2005.[8] However, effective January 15, 2015, the EPA changed the region's classification to unclassifiable/attainment for the 1997 $PM_{2.5}$ standard.[9] Arlington County is designated as a moderate attainment/maintenance area for CO and as an attainment area for all other criteria pollutants.

4.3.3.2 State Implementation Plans

The VAPCB considers and adopts air pollution regulations and controls throughout the state. The VDEQ administers the regulations adopted by the VAPCB through the implementation of air pollution programs and the issuance and enforcement of permits. The Metropolitan Washington Air Quality Committee (MWAQC) is the entity that prepares air quality plans (i.e., SIPs) for the Metropolitan Washington Region, which includes Washington, D.C. and areas of southern Maryland and northern Virginia. Each state and the District of Columbia then submit the same SIP, under separate state covers, for approval.

The MWAQC prepared an 8-hour ozone SIP and a 2011 base-year emission inventory for the Metropolitan Washington Region in May 2007 and July 2014, respectively, along with a $PM_{2.5}$ SIP in March 2008.[10, 11, 12, 13] The ozone SIP and the $PM_{2.5}$ SIP were then submitted to the EPA by each state and the District of Columbia. The EPA designated the region as moderate nonattainment for the 8-hour ozone standard in April 2004, with a deadline of June 15, 2010 to meet the standard.[14] The region was designated as unclassifiable/maintenance for the 1997 $PM_{2.5}$ standard. The MWAQC submitted a $PM_{2.5}$ Maintenance Plan dated May 22, 2013.[15] The MWAQC also prepared a maintenance plan for CO, which was approved by the EPA on March 16, 1996.[16] As

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7 *Federal Register*, vol. 69, no. 84, p. 23942, April 30, 2004.

8 *Federal Register*, vol. 70, no. 3, p. 1010, January 5, 2005.

9 *Federal Register*, vol. 80, no. 10, p. 2275, January 15, 2015.

10 Metropolitan Washington Air Quality Committee, *8-Hour Ozone Attainment Plan for the Metropolitan Washington, D.C.-MD-VA Nonattainment Area*, May 23, 2007.

11 Ibid, *2011 Base Year Emissions Inventory for the Washington DC-MD-VA 2008 Ozone NAAQS Nonattainment Area, May 21, 2014.*

12 The Metropolitan Washington Region includes Arlington County and the City of Alexandria in Virginia and the District of Columbia, among other counties and cities in the region.

13 Metropolitan Washington Air Quality Committee, *State Implementation Plan (SIP) for Fine Particle ($PM_{2.5}$) Standards and 2002 Base Year Inventory for the Metropolitan Washington, D.C.-MC-VA Nonattainment Area*, March 7, 2008.

14 *Federal Register*, vol. 69, no. 84, p. 23942, April 30, 2004.

15 Metropolitan Washington Council of Governments, *Washington DC-MD-VA1997 PM2.5 Maintenance Plan*, May 22, 2013.

16 Metropolitan Washington Air Quality Committee, *Revised Carbon Monoxide Maintenance Plan and Revised 1990 Carbon Monoxide Base Year Emissions Inventory for the Washington, D.C.-MD-VA Maintenance Area*, February 2004.

part of the maintenance demonstration for CO, the MWAQC must demonstrate that emissions would not exceed the levels presented in the attainment inventory through 2016.[17]

4.3.3.3 Ambient Air Quality Monitoring

The EPA Office of Air Quality Monitoring operates one ambient (i.e., outdoor) air monitoring site in Arlington County for the following criteria pollutants: CO, NO_2, O_3, and $PM_{2.5}$. Air monitoring sites in Fairfax County provide ambient data for SO_2 and PM_{10}. **Table 4-2** presents a summary of air quality monitoring data collected at three monitoring sites in 2014. The reported averaging periods presented in the monitoring dataset are consistent with the NAAQS. **Exhibit 4-3** depicts the locations of the three ambient air quality monitor locations in relation to the Airport.

Although ozone continues to be an issue across the Metropolitan Washington Region, ozone concentrations have generally declined since 2000 as a result of emission-reduction programs and controls aimed at industrial sources and motor vehicles. As shown in Table 4-2, no exceedances of any of the NAAQS were recorded in 2014 at the three monitoring locations.

4.4 Biological Resources

4.4.1 FISH, WILDLIFE, AND PLANTS

A variety of federal and state agencies and local wildlife organizations manage public resources and monitor wildlife habitat, including settings, such as the Potomac River, that contain open water, tidal wetland, and riparian forest habitats for fish, wildlife, and plants.

4.4.1.1 Regulatory Setting

Applicable statutes and guidance relating to fish, wildlife, and plants include:

- Fish and Wildlife Coordination Act of 1958[18]
- Migratory Bird Treaty Act of 1918, as amended[19]
- Magnuson-Stevens Fishery Conservation and Management Act of 1976, as amended[20]

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17 *Federal Register*, vol. 70, no. 63, p. 16958, April 4, 2005.

18 *Fish and Wildlife Coordination Act of 1958* (16 USC § 661-666, PL 85-624).

19 *Migratory Bird Treaty Act of 1918* (16 USC § 703-711).

20 *Magnuson-Stevens Fishery Conservation and Management Act of 1976* (PL 94-265), as amended through October 1996.

Table 4-2: 2014 Air Quality Monitoring Data—Arlington County, Virginia

AQS STATION NUMBER	GEOGRAPHIC STATION LOCATION	DISTANCE/ DIRECTION FROM THE AIRPORT	POLLUTANT MONITORED	AVERAGING TIME	MAXIMUM RECORDED CONCENTRATION	NAAQS[1/]	ABOVE NAAQS
51-013-0020	38^0 51′ 27″ -77^0 03′ 33″	1.2 miles west	CO	1 hour	1.8 ppm	35 ppm	No
				8 hours	1.3 ppm	9 ppm	No
			NO_2	1 hour	0.058 ppm	0.100 ppm	No
				Annual	n.a.	0.053 ppm	No
			O_3	1 hour	0.100 ppm	0.12 ppm	No
				8 hour	0.071 ppm[5/]	0.08 ppm	No
			$PM_{2.5}$	24 hours	22.8 µg/m^3[3/]	35 µg/m^3[3/]	No
				Annual	8.8 µg/m^3[3/]	12 µg/m^3[3 4/]	No
51-059-0030	38^0 46′ 24″ -77^0 06′ 17″	6.6 miles southwest	SO_2				No
				1 hours	15 ppb	75 ppb	
				3 hours	n.a.	0.50 ppm	No
				24-hours/Annual	n.a.	Revoked[3/]	
51-510-0020	38^0 48′ 19″ -77^0 07′ 34″	5.6 miles southwest	PM_{10}	24 hours	24 µg/m^3[3/]	150 µg/m^3[3/]	No
				Annual	n.a.	Revoked[2/]	No

NOTES:

AQS = Air Quality System database

µg/m3 = Micrograms per cubic meter

n.a. = Not available

NAAQS = National Ambient Air Quality Standards

ppm = Parts per million

1/ The 1-hour ozone standard was revoked by the EPA on June 15, 2005 for all areas except those in nonattainment of the 8-hour ozone standard, where the responsible governmental agency entered into an Early Action Compact (EAC). Arlington County is not an EAC area.

2/ Because of the lack of evidence linking health problems to long-term exposure to coarse particulate pollution, the EPA revoked the annual PM_{10} standard in 2006 (effective December 17, 2006).

3/ The 1-hour SO_2 standard added in June 2010 is a primary standard. The revision of the SO_2 NAAQS in 2010 did not address the secondary standard, which remains a 3-hour standard with a level of 0.5 ppm. In setting the primary 1-hour standard, the EPA revoked the 24-hour and annual primary standard.

4/ Effective December, 2012, the primary annual $PM_{2.5}$ standard was tightened from 15.0 ug/m3 to 12 ug/m3.

5/ The standard is attained at a monitoring site when the 3-year average of the fourth highest daily maximum 8-hour average for each of the three most recent years is less than or equal to 0.075 ppm. Therefore, this concentration represents the fourth highest daily maximum 8-hour average for 2014.

SOURCE: U.S. Environmental Protection Agency AirData, http://www.epa.gov/air/data/index.html (accessed May 19, 2015).
PREPARED BY: HMMH, July 2015.

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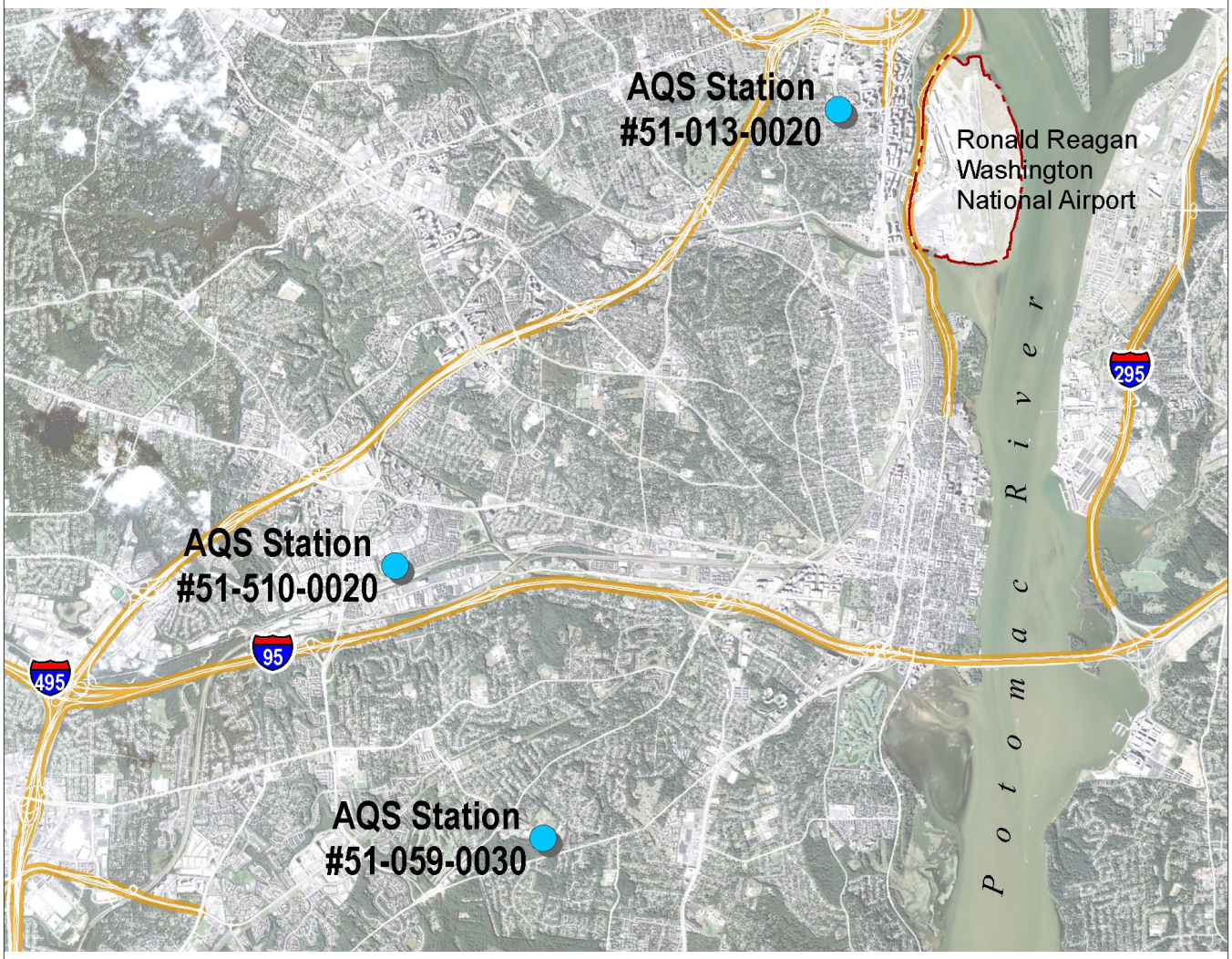

LEGEND

Ambient Air Quality Monitor

AQS Station Number	Pollutant Monitored
51-031-0020	CO, NO_2, O_3, $PM_{2.5}$
51-059-0030	SO_2
51-510-0020	PM_{10}

SOURCE: U.S. Environmental Protection Agency AirData, http://www.epa.gov/air/data/index.html (accessed May 19, 2015).
PREPARED BY: HMMH, July 2015.

EXHIBIT 4-3

NORTH 0 Not To Scale

Ambient Air Quality Monitoring Locations

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The following federal and state agencies maintain jurisdiction over plant and animal species and habitats on or near the Airport:

- U.S. Fish and Wildlife Service (FWS)
- National Marine Fisheries Service (NMFS)
- Virginia Department of Conservation and Recreation (VDCR)
- Virginia Department of Game and Inland Fisheries (VDGIF)
- Virginia Department of Agriculture and Consumer Services (VDACS)
- District of Columbia's Fisheries and Wildlife Division (DCFWD)

These agencies work cooperatively to ensure the continued survival and biodiversity of the District of Columbia's and the State of Virginia's flora and fauna. The VDCR also administers the Virginia Natural Heritage Program and works closely with other federal and state agencies, local governments, conservation organizations, and individuals to seek adequate protection of Virginia's plants, animals, and ecosystems.

4.4.1.2 Methodology

To determine the existence and extent of fish, wildlife, and plants in the vicinity of the Airport, the agencies listed above were contacted. Additionally, available studies and data collected and maintained by these and other local and state organizations were reviewed.[21] Information contained in previous environmental studies conducted at the Airport was also reviewed, and the collected information was evaluated relative to the LOPD.

4.4.1.3 Affected Environment

The Potomac River, Four Mile Run, and Roaches Run Waterfowl Sanctuary provide a variety of open water, tidal wetland, and riparian forest habitats for fish, wildlife, and plants. The District of Columbia's *Wildlife Action Plan* identifies Species of Greatest Conservation Need, along with strategies to protect the associated habitats. The *Wildlife Action Plan* states that "the Potomac and Anacostia rivers and several streams provide habitat to over 62 species of greatest conservation need, making them the highest priority habitat."[22] The Potomac River is used by species exhibiting unique life cycles that inhabit fresh, salt, and/or estuarine waters, including anadromous, semianadromous, and catadromous fish species. The Potomac River provides a migratory pathway for these fish as well as spawning grounds for some migratory species. The Potomac River and Four Mile Run also provide habitat for benthic macroinvertebrates, which serve an important role in the aquatic food chain and also serve as indicators of water quality. Vascular plants that remain below the water surface during the growing season comprise submerged aquatic vegetation (SAV). SAV provides food and cover for fish and wildlife, nutrient absorption, sediment retention, and shoreline stabilization. Common species of SAV found in the upper tidal section of the Potomac River, in which the Airport is located, are *Hydrilla verticillata* and *Najas guadalupensis*. *Hydrilla* is an invasive species that is considered a noxious weed.

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21 Agency correspondence and the minutes of the Agency Scoping Meeting are included in Appendix B.

22 District of Columbia, Department of the Environment, Fisheries and Wildlife Division, *District of Columbia Wildlife Action Plan,* 2006.

The distribution and density of SAV are expected to fluctuate due to varying precipitation levels from year to year, affecting the turbidity of the water within the mainstem of the Potomac River.

The Airport is located in a highly urban environment. While there are some forested and grassy areas on and adjacent to the Airport property that provide terrestrial habitat, there are no natural plant communities or wildlife habitat. The LOPD has been previously developed and is entirely paved or otherwise disturbed. Although the District's *Wildlife Action Plan* identifies several Species of Greatest Conservation Need (including fish, birds, mammals, reptiles, amphibians, and invertebrates), these species are not likely to use the habitats on or immediately adjacent to the Airport. Wildlife that could be present within or adjacent to the LOPD would be those species that are adapted to high levels of human activity and noise disturbance. These species could include rodents, such as the gray squirrel (*Sciurus carolinensis*) and house mouse (*Mus musculus*), and urban birds, such as the American Robin (*Turdus migratorius*), American crow (*Corvus brachyrhynchos*), and mourning dove (*Zenaida macroura*).

4.4.2 FEDERALLY PROTECTED SPECIES, CRITICAL HABITAT, AND ESSENTIAL FISH HABITAT

4.4.2.1 Regulatory Setting

Applicable laws related to federally threatened and endangered species include:

- Endangered Species Act of 1973 (ESA)[23]
- Sikes Act Amendments of 1974[24]
- Fish and Wildlife Coordination Act of 1958[25]
- Bald and Golden Eagle Protection Act[26]
- Lacey Act[27]
- Migratory Bird Treaty Act[28]
- Animal Damage Control Act of 1931[29]

The FWS is the primary agency responsible for federally listed threatened and endangered species.

4.4.2.2 Methodology

The FWS and NMFS were contacted to determine the presence of known populations, or potential presence, of federally threatened and endangered species or supporting habitats within the vicinity of the Airport. Searches of online databases maintained by Virginia agencies regarding threatened and endangered species

23 16 USC § 1531-1544.

24 PL 93-452.

25 16 USC § 661-666(c); PL 85-624.

26 16 USC § 668-668(c).

27 16 USC § 3371-3378.

28 16 USC §703-712.

29 7 USC § 426-426c; 46 Stat. 1468.

and habitat were conducted, including the VDCR natural heritage resources information database and the Virginia Fish and Wildlife Information Service geographic search database. Natural heritage resources are rare plant and animal species, rare and exemplary natural communities, and significant geologic features. The VDCR natural heritage resources information database allows for searches of species with federal or state legal status by county. The Virginia Fish and Wildlife Information Service database, maintained by the VDGIF, provides information on all wildlife in Virginia, including data on state and federal listings.

4.4.2.3 Affected Environment

Table 4-3 provides the federally listed species including threatened species, endangered species, and species of concern identified by the VDGIF within a 3-mile radius of the Airport. Of the nine species listed in Table 4-3, only the bald eagle has been confirmed at the Airport. Bald eagles are actively observed at the Airport as well as the two parks north of the Airport, Gravelly Point Park and Roaches Run Waterfowl Sanctuary.[30] The bald eagle is a federal Species of Concern. While the bald eagle was delisted from the U.S. FWS ESA Federal Threatened list in 2007, the species is still monitored by FWS under the delisting plan and protected by the Federal Bald and Golden Eagle Protection Act, the Lacey Act, and the Migratory Bird Treaty Act.

Table 4-3: Federally Threatened, Endangered, and Species of Concern[1] within Arlington County, Virginia

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS
Appalachian Grizzled Skipper	Pyrgus wyandot (centaureae wyandot)	SC
Persius Duskywing Butterfly	Erynnis persius persius	SC
Regal Fritillary	Speyeria idalia idalia	SC
Alewife	Alosa pseudoharengus	CS
Shortnose Sturgeon	Acipenser brevirostrum	FE
Atlantic Sturgeon	Acipenser oxyrinchus	FE
Blueback Herring	Alosa aestivalis	CS
Northern Long-eared Bat	Myotis septentrionalis	FT
Bald Eagle	Haliaeetus leucocephalus	SC

NOTES:

SC = Species of concern CS = Candidate species FE = Federally endangered FT = Federally threatened

1/ Species of Concern is not a legal status.

SOURCES: Virginia Fish and Wildlife Information Service, List of species known or likely to occur within a 3 mile radius of Ronald Reagan Washington National Airport (at 38,51,00.2 -77,02,18.9), http://vafwis.org/fwis/index.asp?Menu=Home (accessed May 6, 2015); Department of the Interior, U.S. Fish and Wildlife Service, *Endangered and Threatened Wildlife and Plants*, 2015; Office of the Federal Register, "Threatened Species Status for the Northern Long-Eared Bat With 4(d) Rule; Final Rule and Interim Rule," *Federal Register*, vol. 80, no. 63, April 2, 2015.

PREPARED BY: EA Engineering, Science, and Technology, Inc, July 2015; Ricondo & Associates, Inc., July 2015.

[30] eBird, *Hotspot Data for Reagan International Airport, Gravelly Point Park, and Roaches Run Waterfowl Sanctuary* (20052015), http://ebird.org/ebird/hotspots (accessed May 7, 2015).

4.4.3 STATE-PROTECTED SPECIES

4.4.3.1 Regulatory Setting

Applicable laws related to state threatened and endangered species include:

- Endangered Species Act[31]
- Virginia Natural Area Preserves Act of 1989[32]
- Virginia Endangered Plant and Insect Act[33]

In Virginia, VDGIF and VDACS have legal authority for state-listed threatened and endangered species and are responsible for their conservation. The Virginia Natural Area Preserves Act of 1989 established the Virginia Natural Heritage Program, which is managed by the VDCR. The Natural Heritage Division of the VDCR produces an inventory of the Commonwealth's natural resources and maintains a data bank of ecologically significant sites. The Virginia Endangered Plant and Insect Act gives the VDACS Office of Plant Protection the regulatory responsibility for listing and protecting Virginia's threatened and endangered plants and insects. The District of Columbia Fisheries and Wildlife Division prepares and implements the *Wildlife Action Plan.*[34]

VDGIF and VDACS databases of threatened and endangered species contain the legal status of Virginia's native animals (including vertebrates, invertebrates, and insects) and plants believed to be sufficiently threatened, in order to merit an inventory of their status and location. The Virginia Natural Heritage Program identifies natural communities, habitats, and ecosystems that are considered the most likely to be lost without conservation action in the near future. These listings include all species that are federally protected by the U.S. FWS, but they may include additional species and resources of importance to the Commonwealth.

4.4.3.2 Methodology

To determine the presence of known populations, or potential presence, of state-listed threatened and endangered species or supporting habitats within the vicinity of the Airport, the following steps were taken:

- Consultations were conducted with the U.S. FWS, NMFS, VDGIF, VDCR, and DCFWD.[35]
- Searches of online databases maintained by Virginia agencies regarding threatened and endangered species and habitat were conducted, including the VDCR natural heritage resources information database and the Virginia Fish and Wildlife Information Service geographic search database.

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31 *Endangered Species Act of 1973* (16 USC § 1531-1544).

32 Code of Virginia, § 10.1-209 through 217.

33 Code of Virginia, § 3.1 -1020 through 1030.

34 District of Columbia, Department of the Environment, Fisheries and Wildlife Division, *District of Columbia Wildlife Action Plan,* 2006.

35 Agency correspondence and the minutes of the Agency Scoping Meeting are included in Appendix B.

4.4.3.3 Affected Environment

The VDCR maintains a statewide inventory of natural heritage resources and their status under the Virginia Natural Heritage Program. Five species have been identified as natural heritage resources in Arlington County, as presented in **Table 4-4**. These species are not known to exist on or near the Airport. However, the River bulrush and Davis's sedge have been documented downstream from the project site.[36]

Table 4-4: Natural Heritage Resources in Arlington County, Virginia

COMMON NAME	SCIENTIFIC NAME	STATE STATUS
Appalachian Springsnail	*Fontigens bottimeri*	SE
Wood Turtle	*Glyptemys insculpta*	ST
Torrey's Mountain-mint	*Pycnanthemum torreyi*	--
River bulrush	*Bolboschoenus fluviatilis*	--
Davis's sedge	*Carex davisii*	--

NOTES:

SE = State endangered

ST = State threatened

-- = No Status

SOURCES: Virginia Department of Conservation and Recreation, *Natural Heritage Resources for Arlington County*, Virginia, https://vanhde.org/species-search (accessed May 7, 2015).

PREPARED BY: EA Engineering, Science, and Technology, Inc., July 2015; Ricondo & Associates, Inc., July 2015.

Table 4-5 provides a list of threatened species, endangered species, and species of concern identified by the VDGIF within a 3-mile radius of the Airport. Of the 10 species listed in Table 4-5, only the upland sandpiper has been confirmed at the Airport. Upland sandpipers have historically been observed at the Airport and could potentially use habitat in or near the Airport.[37] The upland sandpiper is state-listed (threatened) in Virginia.

[36] Alli Baird, Coastal Zone Locality Liaison, Virginia Department of Conservation and Recreation, "Terminal B & C Redevelopment, Secure National Hall, and Related Improvements," letter to Gregg Wollard, July 29, 2016.

[37] eBird, *Range Map, Upland Sandpiper*, http://ebird.org/ebird/map/uplsan?neg=true&env.minX=-77.0710066480932&env.minY=38.835147196251 47&env.maxX=-77.00234209731195&env.maxY=38.86796695695504&zh=true&gp=false&ev=Z&mr=1-12&bmo=1&emo=12&yr=all&byr=1900&eyr=2015 (accessed May 7, 2015).

Table 4-5: Threatened and Endangered Species and Species of Concern within Arlington County, Virginia

COMMON NAME	SCIENTIFIC NAME	STATE STATUS[1/]
Appalachian Grizzled Skipper	*Pyrgus wyandot (centaureae wyandot)*	ST
Shortnose Sturgeon	*Acipenser brevirostrum*	SE
Atlantic Sturgeon	*Acipenser oxyrinchus*	SE
Brook Floater	*Alasmidonta varicose*	SE
Spotted Turtle	*Clemmys guttata*	CC[/2]
Timber Rattlesnake	*Crotalus horridus*	CC[/2]
Wood Turtle	*Glyptemys insculpta*	ST
Loggerhead Shrike	*Lanius ludovicianus*	ST
Loggerhead Shrike (North American subspecies)	*Lanius ludovicianus migrans*	ST
Upland Sandpiper	*Bartramia longicauda*	ST

NOTES:

CC = Species of collection concern

SE = State endangered

ST = State threatened

1/ Species of Concern is not a legal status.

2/ Species of Collection Concern under 4 Code of Virginia § 15-360-10.

SOURCES: Virginia Fish and Wildlife Information Service, List of species known or likely to occur within a 3 mile radius of Ronald Reagan Washington National Airport (at 38,51,00.2 -77,02,18.9), http://vafwis.org/fwis/index.asp?Menu=Home (accessed May 6, 2015).

PREPARED BY: EA Engineering, Science, and Technology, Inc., July 2015; Ricondo & Associates, Inc., July 2015.

4.5 Climate

Research has shown there is a direct correlation between fuel combustion and greenhouse gas (GHG) emissions. In terms of U.S. contributions, the General Accounting Office reports that according to EPA data, "domestic aviation contributes about three percent of the total carbon dioxide emissions" compared with other industrial sources including the remainder of the transportation section (20 percent) and power generation (41 percent).[38] The International Civil Aviation Organization estimates that GHG emissions from aircraft account for roughly three percent of all anthropogenic GHG emission globally.[39]

4.5.1 REGULATORY SETTING

In response to Executive Order 13514, CEQ developed Federal Greenhouse Gas Accounting and Reporting Guidance (October 6, 2010) (hereafter "federal protocol"), which serves as the federal government's official

[38] U.S. Government Accountability Office, "Aviation and Climate Change," GAO Report to Congressional Committees, June 2009.

[39] Alan Melrose, *ICAO Environmental Report*, "European ATM and Climate Adaptation: A Scoping Study," 2010.

GHG reporting protocol. GHGs result primarily from combustion of fuels, and there is a direct relationship between fuel combustion and metric tons of CO_2 (MT CO_2). In accordance with the federal protocol, and to provide a single metric that embodies all GHGs, GHG emissions are discussed and reported in metric tons of CO_2 equivalent (MT CO_2e).

4.5.2 AFFECTED ENVIRONMENT

Climate change due to GHG emissions is a global phenomenon, so the affected environment is the global environment.[40] Current climate change measures in place within the study area include Arlington County's *Arlington Community Energy Plan* (CEP). The CEP's purpose is to minimize risks from fossil fuel burning, as well as to address concerns regarding infrastructure and fuel price volatility.[41] Specifically, the CEP was developed to address:

- fossil fuel emissions and their effect on climate change
- frequent power outages due to severe weather
- rising demand for electricity and the strains on the regional power grid
- price volatility of fuel due to international affairs

The CEP aims to minimize these risks through improving the reliability of energy sources by localizing energy generation, reducing price volatility through efficiency and diversification, and reducing the environmental impact through efficiency and cleaner sources of energy generation (i.e., renewable energy).

As part of the plan, Arlington County is committed to a goal of 3 metric ton carbon dioxide equivalent (CO_2e) per capita per year by 2050, which is a reduction of over 70 percent compared to the 2007 baseline of 13.4 metric ton CO_2e. This will be accomplished by:

- increasing the energy and building efficiency of all buildings
- increasing local energy supply and distribution efficiency in Arlington using district energy
- increasing locally generated energy supply through the use of renewable energy options
- refining and expanding transportation infrastructure and operations enhancements
- integrating CEP goals into all county government activities
- advocating and supporting personal action through behavior changes and effective education

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40 As explained by the EPA, "Greenhouse gases, once emitted, become well mixed in the atmosphere, meaning U.S. emissions can affect not only the U.S. population and environment but other regions of the world as well; likewise, emissions in other countries can affect the United States." Climate Change Division, Office of Atmospheric Programs, EPA, *Technical Support Document for Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act 2-3*, 2009, http://epa.gov/climatechange/endangerment.html.

41 Arlington County, Virginia, *Community Energy Plan*, June 2013.

4.6 Coastal Resources

Federal, state, and local laws protect coastal zone resources. Under the federal Coastal Zone Management Act of 1972 (CZMA), each state is encouraged "to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone, giving full consideration to ecological, cultural, historic, and esthetic values as well as the needs for compatible economic development."[42] Coastal zones are sensitive to changes in land cover and land use, such as converting areas of grass to impervious materials.

4.6.1 REGULATORY SETTING

The primary legislation and orders related to coastal resources include:

- Coastal Barrier Resources Act of 1982, as amended by the Coastal Barrier Improvement Act of 1990[43, 44]
- Coastal Zone Management Act of 1972, as amended[45]
- Executive Order 13089: *Coral Reef Protection*[46]
- Executive Order 35: *Continuation of the Virginia Coastal Zone Management Program*[47]

According to the Federal Emergency Management Agency's (FEMA) Coastal Barrier Resources System, no coastal barrier resources are located near the Airport or within the adjacent counties or cities. Furthermore, no coral reef resources are located in the mid-Atlantic region.

The CZMA declares that the preservation of coastal zones is a national priority and provides the framework for coastal states to develop a Coastal Zone Management Program. The National Oceanic and Atmospheric Administration (NOAA) reviews and approves state plans, which are required to include a definition of the state's coastal zone and to identify the enforceable policies that support the overall goal of the CZMA. Developed pursuant to the CZMA, the Virginia Coastal Zone Management Program (CZM) is the NOAA-approved management program for the Commonwealth. All federal or federally funded activities with any reasonably foreseeable effect on coastal zones must be consistent with the approved state plan.

The Virginia CZM Program, established by executive order of the Office of the Governor of the Commonwealth of Virginia, outlines how a network of state agencies and local governments work

42 16 USC §1452.

43 PL 97-348; 96 Stat. 1653; 16 USC § 3501 et seq, October 1982.

44 PL 101-591; 104 Stat. 2931, November 1990.

45 16 USC §§ 1451-1464, October 1972.

46 Executive Order 13089, *Coral Reef Protection*, June 11, 1998.

47 Commonwealth of Virginia, Office of the Governor, *Executive Order 35: Continuation of the Virginia Coastal Management Program,* December 2014.

cooperatively to administer the enforceable laws, regulations, and policies that protect coastal resources.[48] The VDEQ serves as the lead agency for Virginia's networked coastal program and helps agencies and localities develop and implement coordinated coastal policies and solve coastal management problems. Eight Coastal Planning District Commissions and 87 localities (including Arlington and Alexandria) comprise Virginia's network of coastal resource managers. The localities are responsible for implementing many of the Virginia CZM Program policies. The Airport is located within Arlington County, and it is therefore subject to the Virginia CZM Program.

Under the Virginia CZM Program, specific enforceable policies address many of the coastal-related resources near the Airport. As the political boundary between the Commonwealth of Virginia and the District of Columbia is the high-water mark of the Potomac River, many of the coastal resources in the vicinity of the Airport are outside the jurisdiction of the Virginia CZM Program. The District of Colombia does not have a commensurate coastal zone management program. The policies and the resource agency responsible for enforcing each policy in the Virginia CZM Program are listed in **Table 4-6**. VDEQ's Office of Environmental Impact Review acts as the Commonwealth's clearing house for coordinating the review of this EA and the Authority's "coastal zone consistency certification" relevant to the Proposed Action and these policies.

4.6.2 METHODOLOGY

To determine the existence of coastal resources in the vicinity of the Airport, as they pertain to the Virginia Coastal Program (VCP), the study team:

- Contacted the state and local agencies (i.e., VDEQ and Arlington County) that manage the various components of the Virginia CZM Program.
- Identified enforceable policies relevant to the Proposed Action.
- Identified protected geographic areas based on Arlington County maps.
- Identified Arlington County review requirements for coastal resources identified within the LOPD.

4.6.3 AFFECTED ENVIRONMENT

The information collected was evaluated relative to the Proposed Action and proximity to the LOPD. The following sections describe coastal resources that are subject to the enforceable policies of the Virginia CZM Program.

[48] Commonwealth of Virginia, Office of the Governor, *Executive Order 35: Continuation of the Virginia Coastal Management Program,* December 2014.

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Table 4-6: Enforceable Policies of the Virginia Coastal Zone Management Program and Responsible Agencies

			RESPONSIBLE VIRGINIA AGENCIES					
ENFORCEABLE POLICY	**APPLICABLE STATUTES OR REGULATIONS**	**DESCRIPTION**	**VMRC**	**VDGIF**	**VDOE**	**VDCR**	**VDEQ**	**VDOH**
Fisheries Management	Code of Virginia § 28.2-200 through 28.2-713 Code of Virginia § 29.1-100 through 29.1-577 Code of Virginia § 3.2-3904 through 3.2-3937	This management 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.	•	•				
Subaqueous Lands Management	Code of Virginia § 28.2-1200 through 28.2-1213	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, wetlands, adjacent or nearby properties, anticipated public and private benefits, and water quality standards established by the VDEQ, Water Division.	•					
Wetlands Management (tidal)	Code of Virginia § 28.2-1301 through § 28.2-1320 Code of Virginia § 62.1-44.15.20 Section 401 of the Clean Water Act of 1972	The tidal wetlands program is administered by the Virginia Marine Resources Commission. The purpose of the wetlands management program is to preserve tidal wetlands, prevent their despoliation, and accommodate economic development in a manner consistent with wetlands preservation. The Virginia Water Protection Permit Program, administered by the VDEQ, includes protection of wetlands, both tidal and nontidal.	•				•	
Dunes Management	Code of Virginia § 28.2-1400 through 28.2-1420	Dunes are protected pursuant to the Coastal Primary Sand Dune Protection Act to prevent destruction or alteration of primary dunes.	•					
Non-Point Source Water Pollution Control	Code of Virginia § 62.1-44.15:51 et seq.	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 VDEQ (through the issuance of Virginia Pollutant Discharge Elimination System individual permits for construction activities). The VDCR, Division of Chesapeake Bay, Local Assistance Department regulates activities in Chesapeake Bay Resource Management Areas and Resource Protection Areas within 84 localities along Virginia's coastal zone.				•	•	
Point Source Water Pollution Control	Section 402 of the Clean Water Act of 1972 Code of Virginia § 62.1-44.15	The VDEQ regulates discharges into state waters through Virginia Pollutant Discharge Elimination System and Virginia Pollution Abatement permits accomplished through the implementation of the National Pollutant Discharge Elimination System permit program. The point-source program—the Virginia Pollutant Discharge Elimination System permit program—is administered by the State Water Control Board.					•	
Shoreline Sanitation	Code of Virginia § 32.1-164 through § 32.1-165	The Virginia Department of Health regulates the installation of septic tanks, sets standards concerning soil types suitable for septic tanks, and specifies minimum distances that tanks must be placed away from streams, rivers, and other waters of the Commonwealth. This program, which includes shellfish closures due to bacterial contamination, is administered by the Virginia Department of Health.						•
Air Pollution Control	Code of Virginia § 10-1. 1300 through 10.1-1320	The VDEQ implements the federal Clean Air Act to provide a legally enforceable State Implementation Plan for the attainment and maintenance of National Ambient Air Quality Standards. This program is administered by the State Air Pollution Control Board.					•	
Coastal Lands Management	Code of Virginia § 62.1-44.15:67 through 62.1-44.15:79 Virginia Administrative Code 9 VAC 25-830-10 et seq.	The Division of Chesapeake Bay Local Assistance[1/] at VDCR regulates activities in Chesapeake Bay Resource Management Areas and Resource Protection Areas within 84 localities in Virginia's coastal zone through a state-local cooperative program established pursuant to the Chesapeake Bay Preservation Act and Chesapeake Bay Preservation Area Designation and Management Regulations. *				•		

NOTES:

VAC = Virginia Administrative Code
VDCR = Virginia Department of Conservation and Recreation and the Chesapeake Bay Local Assistance Department
VDEQ = Virginia Department of Environmental Quality
VDGIF = Virginia Department of Game and Inland Fisheries
VMRC = Virginia Marine Resources Commission
VDOE = Virginia Department of the Environment
VDOH = Virginia Department of Health

1/ Prior to July 1, 2004, the Division was a separate agency known as the Chesapeake Bay Local Assistance Department.

SOURCE: Virginia Coastal Resources Management Program, *VDEQ Federal Consistency Fact Sheet*, January 2015.
PREPARED BY: Wetland Studies and Solutions, Inc., June 2015 .

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4.6.3.1 Fisheries Management

Four Mile Run and Roaches Run are in Virginia and provide fish habitat in the vicinity of the Airport. The portion of the Potomac River at the Airport is in the District of Columbia and is not subject to Virginia CZM Program policies. The District of Colombia does not have a commensurate Coastal Zone Management Program and uses the Virginia CZM Program as a means of identifying and evaluating fisheries resources. There are no streams or fish habitat within the LOPD. (Please refer to Section 4.4.1 for more information on fisheries management beyond the purview of the Virginia CZM Program.)

4.6.3.2 Subaqueous Lands Management

No subaqueous lands are located within the LOPD.

4.6.3.3 Wetlands Management

Tidal and nontidal wetlands associated with the Potomac River are present on and near the Airport. However, based on a review of the National Wetland Inventory (NWI) map, recent aerial photography, and previous delineations on the airport, there are no jurisdictional or non-jurisdictional wetlands or other Waters of the United States within the LOPD. (Please refer to Section 4.15.1 for more information on wetlands beyond the purview of the Virginia CZM Program.)

4.6.3.4 Dunes Management

The Coastal Primary Sand Dune Act defines several localities in the Commonwealth of Virginia in which jurisdictional dunes are to be protected.[49] Arlington County is not one of the localities identified in the Coastal Primary Sand Dune Act as containing Virginia Marine Resources Commission (VMRC)-jurisdictional dune resources.

4.6.3.5 Non-Point Source Water Pollution Control

Soil-disturbing projects must be designed and constructed so as to reduce soil erosion and decrease potential inputs of chemical nutrients and sediments to the Chesapeake Bay, its tributaries, and other rivers and waters of the Commonwealth of Virginia. These waters include Roaches Run and Four Mile Run, which are adjacent to the Airport. 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. The VDEQ manages potential erosion through the issuance of Virginia Pollutant Discharge Elimination System construction permits in an effort to protect water resources.

4.6.3.6 Point Source Water Pollution Control

The Airport operates under a National Pollutant Discharge Elimination System (NPDES) Multi-Sector General Permit for industrial activities as described in Section 4.15.3. A portion of stormwater runoff from the project area will drain into the unnamed tributary to Roaches Run.

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[49] Code of Virginia, § 28.2-1400 et seq.

4.6.3.7 Shoreline Sanitation

There are no septic tanks in the LOPD.

4.6.3.8 Air Pollution Control

Section 4.3.3 provides detailed information on the air quality at the Airport and in adjacent areas.

4.6.3.9 Coastal Lands Management

The Chesapeake Bay Preservation Act was enacted in 1988 by the Virginia General Assembly following execution of the 1983 Chesapeake Bay Agreement among Virginia, Maryland, the District of Columbia, Pennsylvania, and the EPA.[50] Virginia's Chesapeake Bay Preservation Act requires local tidewater governments to designate and protect Chesapeake Bay Preservation Areas. Chesapeake Bay Preservation Areas are any areas delineated by a local government in accordance with criteria established pursuant to the Code of Virginia.[51] Arlington County has adopted these Chesapeake Bay Preservation Areas in its Chesapeake Bay Preservation Ordinance.[52] Arlington County separates Chesapeake Bay Preservation Areas into two categories of land use[53]:

- Resource Protection Areas protect the existence and quality of state waters and include a 100-foot buffer adjacent to and landward of these features. The Code of Virginia (§62.1-44.3) defines state waters as all water, on the surface or in the ground, wholly or partially within or bordering the Commonwealth or within its jurisdiction. Thus, the Potomac River, although under the jurisdiction of the District of Colombia, is considered a state water by Virginia when defining Resource Protection Areas. The LOPD of the Proposed Action does not extend into the 100-foot buffers that define a Resource Protection Area.
- Resource Management Areas are areas in which improper development has the potential to degrade water quality. All of Arlington County is designated as a Resource Management Area except for the areas meeting the specific criteria of a Resource Protection Area.

4.7 Department of Transportation Act, Section 4(f)

4.7.1 REGULATORY SETTING

Section 4(f) of the United States Department of Transportation (USDOT) Act of 1966, which was recodified and renumbered as Section 303(c), is the applicable law regarding the protection of public land resources.[54] This law specifies that the FAA cannot approve the use of land from publicly owned parks or recreation areas, wildlife or waterfowl refuges, or significant historic sites for transportation purposes, unless there is no feasible

50 Code of Virginia, § 62.1-44.15:67 et seq.

51 Code of Virginia, § 62.1-44.15:74.

52 Arlington County Code, § 61-1 through 61-19.

53 Arlington County Code, § 61-5.

54 49 USC § 303(c).

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

Section 6(f) of the Land and Water Conservation Fund (LWCF) Act of 1965 prohibits the conversion of property acquired or developed with LWCF grant money to non-recreational purposes without approval from the Department of Interior's National Park Service (NPS). The purpose of the LWCF Act is to protect federal investments in Section 6(f) resources for the benefit of all recreating Americans. Any parks or other sites that have been acquired via LWCF grants are designated as Section 6(f) resources. Section 6(f) is discussed with Section 4(f) because, in some cases, Section 4(f) resources have received assistance from the LWCF.

4.7.2 METHODOLOGY

To determine the existence and extent of public lands within and adjacent to the LOPD, readily available maps were collected and reviewed. Additionally, a field reconnaissance was previously conducted for the Runway 1-19 and the Runway 4-22 and Runway 15-33 Runway Safety Area Enhancements environmental assessments, which received a Finding of No Significant Impact (FONSI) on March 8, 2010 and April 2, 2012, respectively. The information gathered was evaluated to determine whether properties or resources covered by Section 4(f) of the USDOT Act could be impacted by the Proposed Action. The public lands described below are those proximate to the LOPD that could potentially be impacted by the Proposed Action.

To determine the existence of historic, archaeological, architectural, and cultural resources within or near the LOPD, available documentation was reviewed, and the appropriate local and national historic preservation agencies were contacted. The methodology for significant historic resources is more fully described in Section 4.9.2.

The NPS LWCF maintains a list of the projects receiving LWCF funds on the NPS's website.[55] This list was also reviewed for LWCF projects in the vicinity of the Airport.

4.7.3 AFFECTED ENVIRONMENT

Section 4(f) public land resources are located in the vicinity of the Airport (see **Exhibit 4-4**). The Airport is bordered to the north and west by publicly owned parks, recreation areas, wildlife or waterfowl refuges, and portions of historic sites of national, state, or local significance.

[55] U.S. Department of the Interior, National Park Service, Land and Water Conservation Fund, "Project List by County and Summary Reports," http://waso-lwcf.ncrc.nps.gov/public/ (accessed April 28, 2015).

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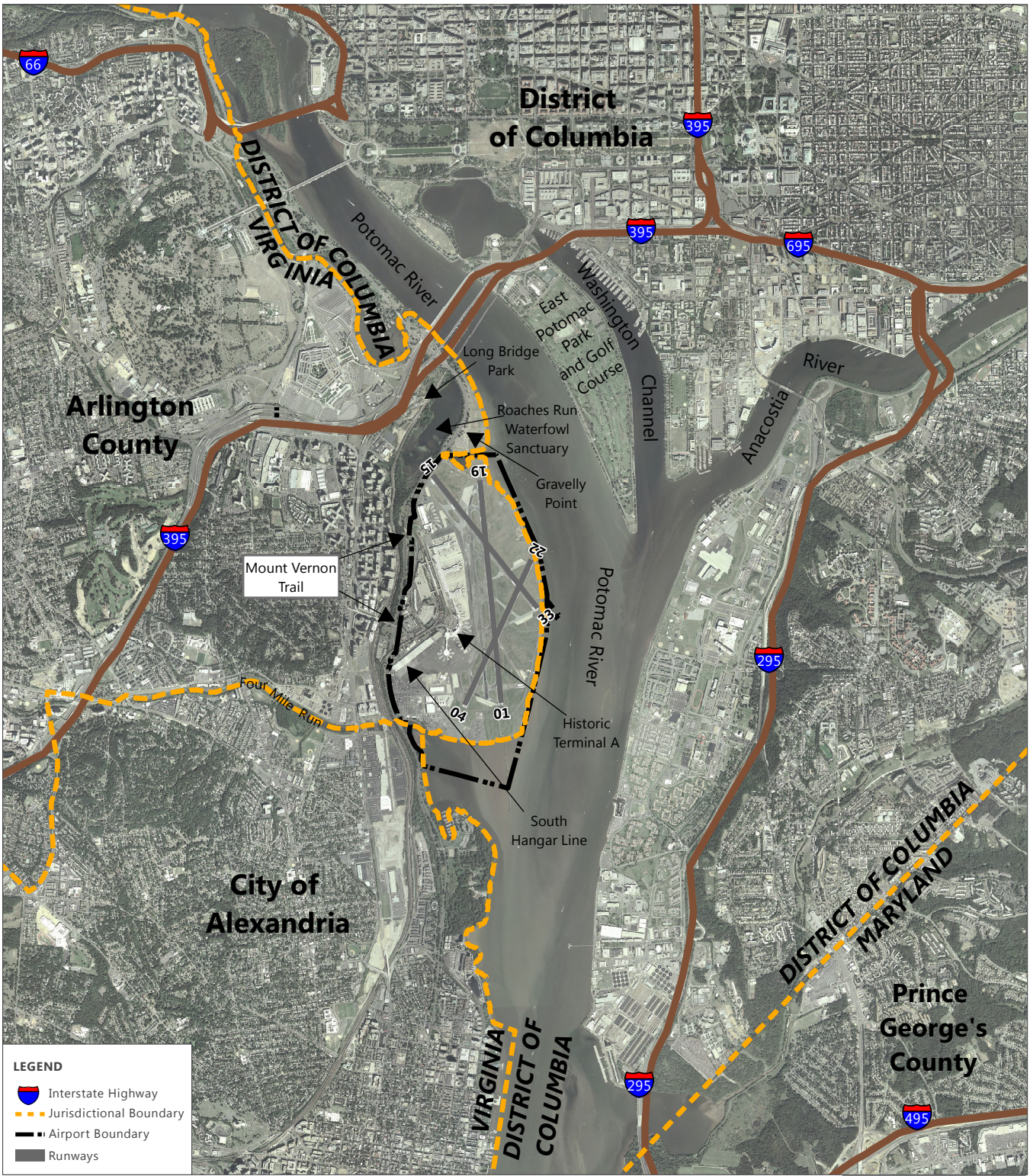

SOURCES: Aerials Express, November 2008 (Basemap Imagery obtained as part of the Ronald Reagan Washington National Airport (DCA) Terminal Instrument Procedures (TERPS) Airspace Analysis project); Ricondo & Associates, Inc. April2015.
PREPARED BY: Ricondo & Associates, Inc. November 2016.

EXHIBIT 4-4

DOT Section 4(f) Resources

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The NPS owns, maintains, and operates the George Washington Memorial Parkway (GWMP), a north-south roadway designed for recreational driving as a landscaped right-of-way immediately west of the Airport. The GWMP links a series of historic sites and parks that preserve the natural scenery and natural habitat along the Potomac River from Mount Vernon to the Great Falls of the Potomac.[56] In the immediate vicinity of the Airport, the GWMP includes Gravelly Point, Roaches Run Waterfowl Sanctuary, and Lady Bird Johnson Park to the north; Mount Vernon Trail (along the GWMP) to the west, forming the western boundary of the Airport; and Daingerfield Island, including the Washington Sailing Marina, to the south. The components of the GWMP within the study area with the potential to be affected by the Proposed Action are discussed below:

- Gravelly Point is a park located north of the Airport. The park provides a view of the Potomac River and the District of Columbia skyline, and it serves as an observation area for aircraft landing at and taking off from the Airport. The parking area is used by bicyclists and pedestrians accessing the Mount Vernon Trail. The park also contains a public boat launch.
- Roaches Run Waterfowl Sanctuary is a tidal wetland off the Potomac River located north of the Airport, west of Gravelly Point. Popular activities include bass fishing and bird watching.
- Long Bridge Park, opened in 2011, is a 30-acre park located in between Gravelly Point and I-395, bordering the Roaches Run Waterfowl Sanctuary on its west side along the Potomac River. Phase 1 of the park's construction was completed in 2011 and features three sports fields, walkways, an esplanade, an overlook with views of the Roaches Run and the Washington D.C. skyline, public art, picnic groves, a rain garden, and parking. Subsequent phases include the construction of an aquatics center and health and fitness facility, trails, and walkways.[57]
- The Mount Vernon Trail is an 18.5-mile trail for pedestrians and bicyclists.[58] The trail is adjacent to and follows the western boundary of the Airport, connecting Mount Vernon, the home of George Washington, located south of the Airport, with Theodore Roosevelt Island, located north of the Airport. At its northern extent, the trail connects to the Arlington County trail system.

The NPS also owns, maintains, and operates East Potomac Park, located on the east shore of the Potomac River, across from and northeast of the Airport. The park is part of the National Mall and Memorial Parks. East Potomac Park includes a golf course, aquatics center, and tennis center facilities, and it includes paths and roads used by bicyclists, walkers, runners, and skaters.

There are no national forests, wilderness areas, or wild and scenic rivers on or adjacent to Airport property. According to the NPS's online summary of LWCF activity, there are no Section 6(f) resources in the immediate vicinity of the Airport.

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56 U.S. Department of the Interior, National Park Service, "George Washington Memorial Parkway," www.nps.gov/gwmp (accessed April 28, 2015).

57 Arlington County, Virginia, "Projects & Planning: Concepts & Plan for Long Bridge Park," http://projects.arlingtonva.us/plans-studies/parks-open-space/long-bridge-park/concepts-plan-long-bridge-park/ (accessed May 1, 2015).

58 U.S. Department of the Interior, National Park Service, "Mount Vernon Trail," www.nps.gov/gwmp/planyourvisit/mtvernontrail.htm (accessed May 1, 2015).

Section 4(f) also includes historic sites of national, state, or local significance. The historic Terminal A and the South Hangar Line (VDHR File Number 000-0045) are both listed on the National Register of Historic Places (NRHP). These resources are discussed in more detail in Section 4.9.3.

4.8 Hazardous Materials, Solid Waste, and Pollution Prevention

4.8.1 HAZARDOUS MATERIALS

Properties where hazardous materials have either been generated or stored have the potential to be contaminated. Contaminants that are contained and stable have a low risk of release that could adversely affect human health and safety or the natural environment. Construction projects have the potential to disturb hazardous sites, thus increasing the risk of release and exposure.

4.8.1.1 Regulatory Setting

Applicable laws, regulations, and guidance related to hazardous materials include the following:

- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)[59]
- Superfund Amendments and Reauthorization Act (SARA)[60]
- Resource Conservation and Recovery Act (RCRA)[61]
- Virginia Waste Management Act[62]
- Virginia Hazardous Waste Management Regulations (VHWMR)[63]
- Virginia Solid Waste Management Regulations (VSWMR)[64]
- Virginia Regulations Governing the Transportation of Hazardous Materials[65]
- Code of Federal Regulations (CFR) Title 40 – Protection of Environment[66]
- U.S. Department of Transportation Rules for Transportation of Hazardous Materials[67]
- Aeronautics and Space Operating Requirements – Hazardous Materials[68]

59 42 USC §9601, et seq. §101, 102, 103, 105, 107, and 120.

60 PL 99-499.

61 42 USC § 6901 et seq.; PL 94 580, Sections 3001, 3010.

62 Code of Virginia, § 10.1-1400 et seq.

63 9VAC 20-60, et seq.; 40 CFR Part 261, adopted by reference as 9VAC20-60-261.

64 9VAC 20-80.

65 9VAC 20-110.

66 40 CFR.

67 49 CFR Part 107.

68 14 CFR Part 121.

Under CERCLA, the EPA maintains a National Priorities List of the most serious uncontrolled or abandoned places that contain hazardous waste. The EPA, with the cooperation of state and local agencies, then seeks to clean up those sites. Commonly referred to as "Superfund" sites, CERCLA also provides funds for cleaning up these sites. SARA was enacted to improve the administration of the CERCLA Superfund monies. RCRA authorizes the EPA to control hazardous materials generation, transportation, treatment, storage, and disposal. The RCRA Information System is the EPA's inventory of sites where hazardous wastes are managed.

Any waste, soil, or water (ground, surface, stormwater) generated through construction-related activities that is suspected of contamination must be tested and disposed of in accordance with applicable federal, state, and local laws and regulations.

4.8.1.2 Methodology

To identify possible areas where hazardous materials or petroleum-related products have been used, the following documents, which assessed the potential for such materials at the airport or near the LOPD, were reviewed. Where data was not specific to the LOPD, it was applicably extrapolated for assessment purposes based on similar construction, operations, or locations within the airport. These studies include:

- Ronald Reagan Washington National Airport, Runway 1-19 Safety Area Study – Phase III[69]
- Phase I Environmental Site Assessment Report Runway 15-33 and 4-22 Safety Area Study[70]
- South Investigation Site, Supplemental Site Investigation Sampling and Analysis Plan[71]
- Hazardous Materials Screening Survey, Hangar 11[72]
- Hazardous Materials Screening Survey, Hangar 12[73]
- Limited Soil Sampling Event, Express Ramp 35[74]
- Geotechnical Data Report, DCA US Airways Express Ramp[75]

Additional possible areas of historic materials or petroleum-related products usage or incidents at DCA were reviewed as part of listings provided by Environmental Data Resources, Inc., (EDR).[76] EDR provides database

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69 HNTB Corporation, Ricondo & Associates, Inc., and Straughan Environmental Services, Inc., *Ronald Reagan Washington National Airport, Runway 1-19 Safety Area Study – Phase III*, August 2005.

70 Ricondo & Associates, Inc. and Straughan Environmental Services, Inc., *Phase I Environmental Site Assessment Report Runway 15-33 and 4-22 Safety Area Study, Ronald Reagan Washington National Airport, Arlington County, Virginia*, June 2007.

71 Lockheed Martin, *South Investigation Site, Supplemental Site Investigation Sampling and Analysis Plan, Ronald Reagan Washington National Airport, Alexandria, Virginia, Final,* September 21, 2007.

72 Applied Environmental, Inc., *Hazardous Materials Screening Survey – Hangar 11, Ronald Reagan National Airport*, June 23, 2014.

73 Applied Environmental, Inc., *Hazardous Materials Screening Survey – Hangar 12, Ronald Reagan National Airport*, June 23, 2014.

74 Froehling & Robertson, Inc., *Limited Soil Sampling Event – Express Ramp 35 – Ronald Reagan National Airport – F&R Project No., 725-0025*, May 15, 2014.

75 Schnabel Engineering, *Geotechnical Data Report – DCA US Airways Express Ramp – Ronald Reagan National Airport*, March 21, 2014.

76 Environmental Data Resources, Inc., *EDR OnDemand, DCA EA*, July 2, 2015.

listings to users as it is provided to them directly from the regulatory agencies from which they receive the data. Where data was not specific to the LOPD, its proximity to the LOPD was determined for assessment purposes.

4.8.1.3 Affected Environment

Hangars 11 and 12

Hangars 11 and 12, which were constructed prior to 1949, are within the LOPD. Airport and tenant maintenance operations performed at Hangars 11 and 12 historically required the storage and use of hazardous substances and petroleum products. Hazardous substances and petroleum products are managed pursuant to programs regulated by the EPA, the VDEQ, and FAA regulations. The Authority's *Design Manual* includes environmental programs specific to the use, storage, and disposal of hazardous substances and petroleum products.[77] The hangar areas presently contain small volumes of regulated substances and petroleum products utilized as part of normal aircraft storage and repair operations.

Hangars 11 and 12 were constructed prior to the various U.S. bans on asbestos in building materials and lead in paint (1978).[78,79] Building materials associated with these existing structures were constructed with materials containing asbestos, lead paint, or other regulated materials (e.g., polychlorinated biphenyls (PCBs) or mercury-containing switches), as noted in previous hazardous materials surveys and reports.[80,81] Materials containing asbestos noted in the reports include the following:

- Nine-by-nine foot brown floor tile beneath carpeting and floor tile
- Various twelve-by-twelve foot beige, tan, or gray floor tile
- Various black mastics associated with specific floor tile
- Black mastic (residual)
- Yellow and black mastic associated with tan floor tile
- Black mastic on nine-by-nine foot brown floor tile beneath carpeting and floor tile
- Black mirror adhesive
- Vibration dampeners associated with duct work
- Off-white floor tile beneath carpeting
- Fire doors (assumed)

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77 Metropolitan Washington Airports Authority, *Design Manual 2010,* January 2010, http://www.mwaa.com/file/Home_2010.pdf.

78 United States Environmental Protection Agency, *U.S. Federal Bans on Asbestos*, http://www2.epa.gov/asbestos/us-federal-bans-asbestos (accessed June 29, 2015).

79 United States Consumer Product Safety Commission, *Ban of Lead-Containing Paint*, http://www.cpsc.gov//PageFiles/111614/regsumleadpaint.pdf (accessed June 29, 2015).

80 Applied Environmental, Inc., *Hazardous Materials Screening Survey – Hangar 11, Ronald Reagan National Airport*, June 23, 2014.

81 Applied Environmental, Inc., *Hazardous Materials Screening Survey – Hangar 12, Ronald Reagan National Airport*, June 23, 2014.

- Roofing materials (assumed)
- Transite panels (assumed)
- Transite piping, underground (reported, not visually confirmed)

Materials containing lead-based paint in the reports include:

- walls (terra cotta, concrete, metal, and drywall)
- raised floor (concrete)
- floors (ceramic)
- metal restroom stall doors (women's room)
- concrete ceilings
- metal ceiling panels
- door components (metal)
- support beams (metal)
- radiator covers
- window frames (metal)
- vent duct (metal)
- window components

PCBs in the form of ballasts associated with lighting fixtures are anticipated to be present according to the Hangar 11 and Hangar 12 Hazardous Materials Surveys.

Corporate Office Building

The Authority's Corporate Office Building (COB), which was constructed between 1994 and 2002, is also within the LOPD.[82] The COB was surveyed for hazardous materials in August 2015. The COB Hazardous Materials Survey is included in **Appendix D**. Representative bulk samples were collected from materials suspected to contain asbestos, but no asbestos was detected. The fire doors through the COB could not be sampled, in order to void the fire rating, and they are assumed to contain asbestos. A lead paint screening survey was also conducted, which found no lead-based paint. Additionally, all light ballasts in the COB were visually inspected and marked with labels stating "No PCBs."[83]

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82 Historic Aerials, www.historicaerials.com (accessed June 29, 2015).

83 Applied Environmental Inc., *Hazardous Materials Survey, Corporate Office Building, Ronald Reagan Washington National Airport*, August 2015.

Subsurface Conditions

Subsurface conditions within the LOPD are known to contain petroleum products. Total petroleum hydrocarbons (TPH) and petroleum odors were noted in the LOPD as described in the *Geotechnical Data Report – DCA US Airways Express Ramp – Ronald Reagan National Airport*.[84] No releases of hazardous substances have been identified in proximity to the LOPD.

Additional findings noted:

- **One federal Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) site**: The Washington National Airport – South End of Airport site, in the general area of the ends of Runways 1 and 4, was listed in 1988 when buried, corroded, and leaking drums were discovered during grading for the now existing satellite parking lot east of the Runway 4 Runway Safety Area (RSA). The contaminants were removed, and a site inspection was completed in 1995. This site, referred to as the South Investigation Site, is listed on the Federal Agency Hazardous Waste Compliance Docket and has not yet received the designation of "No Further Remedial Action Planned" (NFRAP) from the EPA. Currently the FAA is working with the VDEQ, the EPA, and the District Department of the Environment to develop a Remedy Consent Order for the purpose of completing a Remedial Investigation/Feasibility Study, a proposed Remedial Action Plan, and a Decision Document associated with the release of waste material from this site. This Remedy Consent Order is not intended to encompass response to releases of hazardous substances associated with ongoing Airport operations. This site is located on the opposite end of the Airport and is not expected to impact the project area.

- **One underground storage tank (UST):** In total, seven permanently out-of-use USTs and three removed USTs were identified at the Airport. Because these USTs were either out-of-use or removed from the ground, they are not expected to pose an environmental threat or be a source of contamination. There are no USTs known within the LOPD.

- **Three leaking UST cases:** Commonwealth of Virginia records identified two cases of leaking USTs at the old terminal facility. The cases of leaking USTs have all been remediated, and the USTs were closed; therefore, they are not expected to pose an environmental threat. The records also identified a case of a leaking UST at the Car Rental Care facility. No further information was available at the time; however, rental car facilities are located over 1,000 feet from the LOPD.

- **Commonwealth spill cases and three Federal Emergency Response Notification System incidents**: Numerous spills occurred at several places throughout the Airport, were contained by the Airport's emergency response team, and were reported to the appropriate federal and state agencies. As of 2015, several of the cases had been closed and others were lacking definitive status information. According to information from interviews with the Authority's Engineering Maintenance Department staff, none of these spills occurred in the general study area. The Authority's Office of Engineering believes that all reported spill cases have been resolved.

[84] Froehling & Robertson, Inc., *Limited Soil Sampling Event – Express Ramp 35 – Ronald Reagan National Airport*, May 15, 2014.

4.8.2 SOLID WASTE

Solid waste concerns related to the development and operation of an airport include the ability of the local waste management agencies and facilities to accept and process solid waste generated at the airport. The location of solid waste disposal sites and landfills in relation to an airport's Air Operations Area and the potential for these sites to attract wildlife are also of concern.

4.8.2.1 Regulatory Setting

Applicable laws and regulations related to solid waste disposal include:

- Solid Waste Disposal Act of 1965[85]
- Title 40 Code of Federal Regulations (CFR) Part 258.10, "Criteria for Municipal Solid Waste Landfills"

The Solid Waste Disposal Act provides safeguards to reduce the danger of solid waste disposal on human health and on the environment. Overseeing and implementing these safeguards are the responsibility of the VDEQ and the Arlington County Department of Environmental Services. In conjunction with FAA Advisory AC 150/5200-33, *Hazardous Wildlife Attractants On or Near Airports,* 40 CFR Part 258.10 addresses and restricts the proximity of landfills to the Air Operations Area (AOA).

4.8.2.2 Methodology

To identify solid waste disposal practices at the Airport, the Authority was consulted.[86] Additionally, readily available landfill information on the VDEQ website was reviewed to identify the location of nearby active landfills.[87]

The FAA considers a sanitary landfill to be incompatible with airport operations if the landfill is located within 10,000 feet of a runway serving turbo-powered aircraft, or within 5,000 feet of a runway serving piston-powered aircraft.[88,]

4.8.2.3 Affected Environment

Airport activities currently generate and collect municipal solid waste and hazardous wastes. Solid waste managed by the Authority is collected and removed from the Airport by an offsite contractor (Progressive Waste) and disposed of at approved regional facilities. In 2008, the Authority assumed responsibility for all waste disposal on the Airport except for retail concessions. Total solid waste tonnage will fluctuate commensurate with operations.

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85 42 USC § 6901 et seq. (now included in Subtitle D of the *Resource Conservation and Recovery Act*).

86 Erik Schwenke, Metropolitan Washington Airports Authority, "DCA New North Concourse/Secure Terminal Project," email to Virginia Jackson, Ricondo & Associates, Inc., August 5, 2015.

87 Virginia Department of Environmental Quality, *Listing of Active Solid Waste Landfills in Virginia*, http://www.deq.state.va.us/Portals/0/DEQ/Land/SolidWaste/SW_Permit_Report.pdf (accessed July 2, 2015).

88 FAA Advisory Circular 150/5200-33B, *Hazardous Wildlife Attractants on or Near Airports*, August 28, 2007.

According to the *Arlington County Solid Waste Management Plan*,[89] the County does not own or operate a landfill for municipal solid waste.[90] In addition, no landfills or major transfer stations are located in Arlington County. The nearest landfill is the I-95 Sanitary Landfill in Lorton, Virginia, which is more than 18 miles from the Airport.

4.9 Historical, Architectural, Archeological, and Cultural Resources

4.9.1 REGULATORY SETTING

Applicable laws include:

- National Historic Preservation Act of 1966, Sections 106 and 110
- Archaeological and Historic Preservation Act of 1974, as amended
- Archaeological Resources Protection Act of 1979, as amended
- Native American Graves Protection and Repatriation Act of 1990[91]

Historic properties eligible for, or listed on, the NRHP are protected by Section 106 of the National Historic Preservation Act (NHPA).[92,93] Under the NHPA, the FAA is required to consult with the State Historic Preservation Officer (SHPO), the Advisory Council on Historic Preservation, and other interested parties on the potential effects that any FAA-sponsored undertaking would have on historic properties listed on, or eligible for listing, on the NRHP. The Authority consultation procedures regarding the NHPA are outlined in a 1987 *Programmatic Memorandum of Agreement* among the U.S. DOT, the Virginia State Historic Preservation Officer, and the Advisory Council on Historic Preservation. The Archaeological and Historic Preservation Act and the Archaeological Resources Protection Act protect both known and as-yet-unidentified archaeological resources located on publicly owned land or resources that could be affected by federally funded actions. The Native American Graves Protection and Repatriation Act protects Native American human remains and cultural artifacts.

4.9.2 METHODOLOGY

To determine the existence of historic, archaeological, architectural, and cultural resources within or near the LOPD, available documentation was reviewed, and the appropriate local and national historic preservation agencies were contacted. Consideration was also given to historic resources elsewhere on and adjacent to Airport property, such as the GWMP, for potential viewshed-related concerns. Information was obtained from the following sources:

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89 County of Arlington, Virginia, Department of Environmental Services, *Arlington County Solid Waste Management Plan*, June 12, 2004.

90 Ibid.

91 *Native American Graves Protection and Repatriation Act* (25 USC § 3001 et seq.), November 16, 1990.

92 *National Historic Preservation Act of 1966*, as amended (16 USC § 470; PL 102-575), October 30, 1992.

93 Executive Order 11593, *Protection and Enhancement of the Cultural Environment*, May 13, 1971.

- Virginia Department of Historic Resources (VDHR) (2010 archive research for terrestrial resources within Airport property)
- Metropolitan Washington Airports Authority documents

4.9.3 AFFECTED ENVIRONMENT

Identified resources in the study area are shown on **Exhibit 4-5**. The Airport contains a complex of buildings, in which six are considered historic and are either individually listed on the NRHP or are considered NRHP-eligible. The historic Terminal A and the South Hangar Line (VDHR File Number 000-0045) are both listed on the NRHP. These structures are significant "as milestones in aviation technology and as symbols of the broad pattern of New Deal government initiatives," and they were considered by the Civil Aeronautics Administration (the predecessor of the FAA) to be the model for how airports should be designed.[94]

Historic structures that have been determined eligible for but are not listed on the NRHP include the Jet Engine Test Cell (presently the Ogden-Allied Equipment Storage and Maintenance Building) and the USDOT Abingdon Research Station (presently the Authority Engineering Complex).[95] All listed and eligible structures are located within the terminal complex area.

The Airport shares a boundary with the GWMP (also known as the Mount Vernon Memorial Highway, VDHR File Number 029-0218), which is a listed resource on the NRHP. The GWMP is significant as the first parkway constructed and maintained by the U.S. government and as the first such road with a commemorative function explicit in its name and alignment. The GWMP is separated from the boundary of the LOPD that is closest to the GWMP by vegetated areas and surface roadways.

One archaeological site, a portion of the Abingdon Plantation (VDHR File Number 44AR0018), has been identified on Airport property. Another portion of the Abingdon Plantation is identified as an architectural site (VDHR File Number 000-0041). The architectural site is located within the terminal complex and is eligible for listing in the NRHP. Some portions of the site have been excavated and others, including the plantation house foundation, have been preserved.

Most of the Airport is located on fill and, therefore, has low potential to contain additional intact archaeological resources. The depth of fill in the LOPD is approximately six feet. There is, however, the potential for archaeological sites to be located in portions of the Airport that were not filled or otherwise disturbed by previous Airport construction. Natural landforms that existed before the Airport was constructed are confined to western areas of the Airport property. Some are under varying depths of fill and can contain intact archaeological remains. Of the natural landform, or original shoreline, only limited portions have not been disturbed for construction of Airport facilities (terminals, hangars, transportation facilities, etc.). In general terms, the LOPD would occur in areas with a low potential to contain intact archaeological remains and information, and the LOPD would be entirely limited to areas with prior disturbance and/or fill.

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94 U.S. Department of the Interior, National Register of Historic Places Registration Form, *Washington National Airport Terminal and South Hangar Line* (VDHR File No. 000-0045), April 11, 1994.

95 Metropolitan Washington Airports Authority, *Archeology/Historic Preservation Considerations: Ronald Reagan Washington National Airport*, n.d.

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SOURCES: U.S. Department of Agriculture, 2005 (Aerial photo); File, 2006, Virginia Department of Historic Resources Archive, 2006 (archaeological resources).
PREPARED BY: Paciulli, Simmons & Associates, Ltd., July 2015.

EXHIBIT 4-5

NORTH

0 Not To Scale

Archaeological and Architectural Resources

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4.10 Land Use

4.10.1 REGULATORY SETTING

The compatibility of existing and planned land uses with the Proposed Action is usually associated with noise impacts. In addition to the impacts of noise on land use compatibility, other potential impacts may also affect land use compatibility.

Section 1502.16(c) of the CEQ Regulations requires the discussion of environmental impacts, including possible conflicts between the proposed action and the objectives of federal, regional, state, and local land use plans and policies.[96]

The EA must document the Authority's assurance that under 49 USC § 47107(a)(10), formerly Section 511(a)(5) of the 1982 Airport Act, appropriate action, including the adoption of zoning laws, has been or will be taken, to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft. The assurance must be related to existing and planned land uses.

Under 49 USC § 47106(a)(1) of the Airport Development Grant Program Airport Improvement Program, funding for a project may not be approved unless the Secretary of Transportation is satisfied that the project is consistent with plans (existing at the time a project is approved) of public agencies for development of the area in which the airport is located.

4.10.2 AFFECTED ENVIRONMENT

4.10.2.1 Local Jurisdictions

Affected local jurisdictions consist of the geographic areas in which environmental resources would be affected by activities associated with the construction and operation of a proposed action and feasible alternatives. With the exception of potential air quality impacts, which are regional in nature, the jurisdictions affected by the Proposed Action would be limited and restricted to Airport property and areas immediately adjacent to the Airport (i.e., the study area depicted on Exhibit 4-1).

The Airport is located in Arlington County, Virginia, along the western shore of the Potomac River. DCA occupies a total of approximately 860 acres: 733 acres of land and 127 acres of water in the Potomac River. The Potomac River bottom is managed by the National Park Service (NPS). The waters of the Potomac River up to the mean high-water line are under the jurisdiction of the District of Columbia as the west bank of the river serves as the District of Colombia's border with Virginia. Downtown Washington, D.C., lies about three miles northeast of the airport across the Potomac River. The City of Alexandria, Virginia, is located immediately south of the Airport. Several properties administered by the NPS and Arlington County are located within a one-mile radius of the Airport, as identified in Section 4.7.3.

[96] Council on Environmental Quality Regulations, https://ceq.doe.gov/nepa/regs/ceq/1506.htm#1506.2 (accessed September 23, 2015).

4.10.2.2 Generalized Land Use

Exhibit 4-6 depicts the generalized existing land uses in the Airport environs using geographic information system (GIS) data. The locations of individual facilities, such as schools and daycare sites that are relevant to evaluating children's health and safety risks, are also identified.

Land in the vicinity of DCA is densely developed due to the Airport's proximity to the nation's capital. Land use in the Airport environs is primarily residential, commercial, institutional/governmental, and parks/recreation. The Airport is bordered on the north, east, and south by the Potomac River; its corridor has been utilized to reduce overflights of noise-sensitive areas. As shown on Exhibit 4-6, the Pentagon, Arlington National Cemetery, and Fort Myer are located northwest of the Airport in Arlington County. Areas directly north of the Airport consist of parks/recreation and lands associated with the GWMP on the west bank of the Potomac River. The nation's Monumental Core is located northeast of the Airport across the river in Washington, D.C., and it supports institutional and governmental facilities, such as the Anacostia Naval Station, Bolling Air Force Base, and the Naval Research Laboratory. Arlington County and the City of Alexandria are located west and south, respectively, of the Airport and are dominated by residential and commercial land uses interspersed with institutional/governmental uses and parks/recreation uses. The commercial corridor directly west of the Airport is Crystal City, and the parks/recreation uses west and south of the Airport are on lands that are part of the GWMP, including the Mount Vernon Trail and Daingerfield Island. Downtown Alexandria lies south of the Airport.

4.11 Natural Resources and Energy Supply

Airport development projects have the potential to change energy requirements or use consumable natural resources.

4.11.1 REGULATORY SETTING

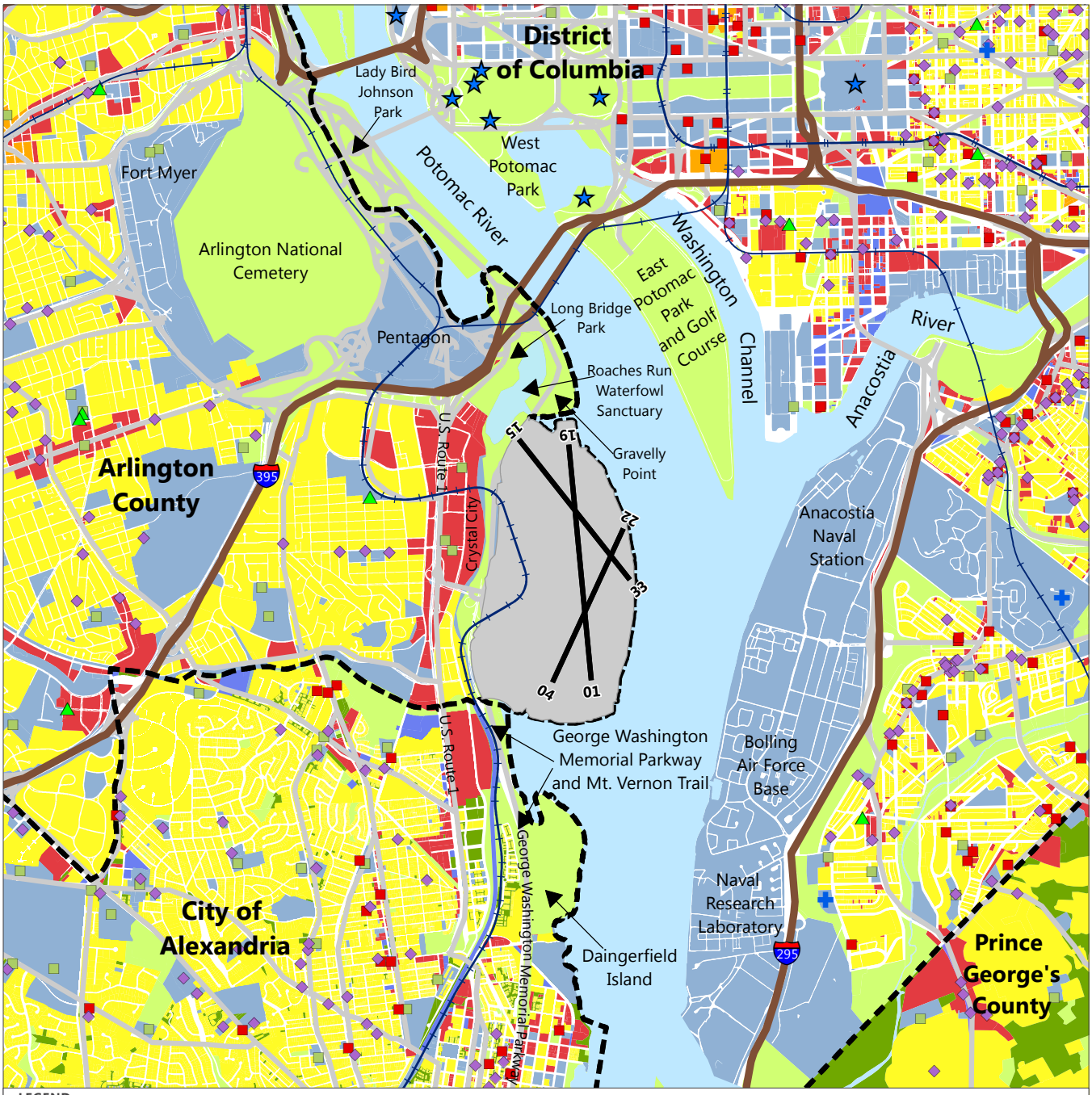
Applicable statutes and regulations related to natural resources and energy supply include the following:

- 40 CFR Parts 1502.16(e) and (f) require the consideration of potential impacts to energy requirements, energy conservation, and the use of natural or consumable resources, resulting from a proposed action and its reasonable alternatives.
- Executive Order 13123, *Greening the Government through Efficient Energy Management*, encourages federal agencies to increase the use of renewable energy.[97]

4.11.1 METHODOLOGY

Facilities that would be affected by the Proposed Action were reviewed for their use of electricity, natural gas, water, and sewage utilities.

[97] Executive Order 13123, *Greening the Government through Efficient Energy Management*, June 9, 1999.



SOURCES: Arlington County Department of Environmental Services, 2015 (land use); City of Alexandria Department of Planning & Zoning, 2015 (land use); Maryland Department of Planning, 2015 (land use); District of Columbia (DC) Office of Planning, 2015 (land use); http://gisdata.arlgis.opendata.arcgis.com, August 2015 (Arlington County libraries, hospitals, churches, day care, schools); http://opendata.dc.gov, August 2015 (DC libraries, hospitals, churches, day care, schools); http://data.alexgis.opendata.arcgis.com, August 2015 (Alexandria County libraries, hospitals, churches, day care, schools); Virginia Economic Department Partnership, 2006 (County libraries, hospitals, churches, day care, schools).
PREPARED BY: Ricondo & Associates, Inc., November 2016.

EXHIBIT 4-6

Generalized Exisiting Land Use in the Airport Environs

NORTH 0 4,500 ft.

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4.11.2 AFFECTED ENVIRONMENT

Scarce or rare resources are not used by the Authority.

DCA is currently served by a 34.5 kV (kilovolt), 3-phase primary service from Dominion Virginia Power via two incoming utility power line feeders. These feeders terminate in a utility yard across from Thomas Avenue, where the feeders split and feed the North and South Substations, which disseminate power across the airport. The North Substation has a system capacity of 24,000 kVA (thousand volt-amps). The existing usage at the North Substation is 9,325 kVA.

The airport's central utility plant provides 54,000 MBh (one thousand British thermal units [BTUs] per hour) of cooling capacity via chilled water. The chiller plant houses five water-cooled centrifugal chillers, each with an effective capacity of 10,800 MBh. The existing operational demand on the chilling plant is 45,971 MBh.

The airport's central utility plant also provides 200,000 MBh of heating capacity via three natural gas fired high-temperature water generators: two 80 MMBTU (one million BTUs) boilers and one 40 MMBTU boiler, which provide a heating capacity of 200,000 MBh. The existing operational demand on the heating plant is 67,094 MBh.

4.12 Noise and Noise-Compatible Land Use

The Airport's most recent noise contours were developed for the Final Environmental Assessment, Runway 4-22 and Runway 15-33 Runway Safety Area Enhancements, April 2, 2012 (Crosswind [CW] RSA FEA), operating conditions. The FAA's Finding of No Significant Impact Record of Decision (ROD) for the CW RSA FEA was issued April 2, 2012. Both the CW RSA FEA and FONSI/ROD are available for review at: (1) the offices of the Authority at DCA; (2) Arlington County Central Library, 1015 N. Quincy Street, Arlington, Virginia 22201; and, (3) Aurora Hills Branch Library, 735 S. 18th Street, Arlington, VA, 22202.

Because the implementation and use of this EA's Proposed Action would not increase the number of existing or forecast aircraft, and there would be no change to the approach and departure flight tracks to and from the Airport, the aircraft noise conditions would remain essentially the same as depicted in CW RSA FEA. New noise contours were not developed for this EA. The 2021 Proposed Action Noise Contour Map, included in the CW RSA FEA, and the associated land use compatibility conditions are included here for informational purposes only.

4.12.1 REGULATORY SETTING

The applicable laws and regulations related to aircraft noise exposure include:

- Aviation Safety and Noise Abatement Act of 1979, as amended[98]
- Federal Aviation Act of 1958[99]
- Control and Abatement of Aircraft Noise and Sonic Boom Act of 1968[100]
- Airport and Airway Improvement Act of 1982[101]
- Airport Noise and Capacity Act of 1990[102]
- Noise Control Act of 1972[103]
- Airport Noise Compatibility Planning[104]
- Noise Control and Compatibility Planning for Airports[105]

4.12.2 METHODOLOGY

The 2021 Proposed Action noise contours were prepared using the FAA's Integrated Noise Model (INM). Noise exposure criterion levels, expressed in day-night average sound level (DNL) expressed in A-weighted decibels of DNL 65, DNL 70, and DNL 75, were selected, as required by FAA Orders 5050.4B and, at that time, 1050.1E, which are consistent with levels used for environmental assessments and environmental impact statements, as well as in Federal Aviation Regulation (FAR) Part 150 noise compatibility programs.

The population, dwelling units, schools, religious facilities, and any other noise-sensitive facilities that could be affected by aircraft noise of DNL 65 or greater were identified. If these resources were determined to be present, the affected population and number of facilities were estimated for each noise exposure range for each alternative using GIS software and U.S. Department of Commerce, Bureau of the Census 2000 data.

98 49 USC § 47501-47507.

99 49 USC § 40101 et seq., as amended by PL 103-305, August 23, 1994.

100 49 USC § 44715, as amended by PL 103-272, July 5, 1994; PL 104-264, October 9, 1996.

101 49 USC § 47101 et seq., as amended by PL 103-305, August 23, 1994.

102 49 USC § 2101 et seq.

103 49 USC § 44715.

104 14 CFR Part 150, *Airport Noise Compatibility Planning,* September 24, 2004.

105 FAA Advisory Circular 150/5020-1, *Noise Control and Compatibility Planning for Airports*, August 5, 1983.

The guidelines for evaluating land use compatibility in aircraft noise exposure areas were developed by the FAA and are shown in **Table 4-7**. Each generalized land use listed in Table 4-7 includes a wide range of human activities resulting in various sensitivities to noise intrusions. DNLs in the table should be interpreted only as indications of potential aircraft noise effects on people living and working in areas surrounding an airport. Although specific DNLs are obtained from a noise analysis, they neither dictate specific reactions that individuals exposed to those noise levels may have, nor require specific mitigation. The information is intended only as a guide for land use development.

Designations used in this table do not constitute a federal determination that any use of land is acceptable or unacceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses, and the relationship between specific properties and specific noise exposure, rests with local authorities.

4.12.3 AFFECTED ENVIRONMENT

The CW RSA FEA Proposed Action contours shown on **Exhibit 4-7**, with the runway safety area projects complete, show that 1,432 acres of land and water in the Airport environs could be exposed to aircraft noise of DNL 65 and higher, as shown in **Table 4-8**.

Table 4-9 shows the areas predicted to be exposed to DNL 65 and higher in 2021, sorted by land use. Of the DNL 65 and higher noise exposure area, 87 percent is over water and Airport property. The next highest predominant land uses exposed to aircraft noise of DNL 65 and higher are parks (Daingerfield Island, Lady Bird Johnson Park, and Gravelly Point) and government land uses.

Table 4-10 summarizes the estimated numbers of people, dwelling units, religious facilities, convalescent homes, libraries, daycare centers, schools, parks, and hospitals that would be exposed to various ranges of aircraft noise in 2021 based on the most recent noise analysis. No people, dwelling units, religious facilities, convalescent homes, libraries, daycare centers, schools, or hospitals would be exposed to aircraft noise of DNL 65 and higher in 2021. The eastern portion of Daingerfield Island (southwest of the Airport) would be exposed to aircraft noise between DNL 65 and DNL 70. Gravelly Point (just north-northeast of the Airport) would be exposed to aircraft noise between DNL 70 and DNL 75. The southern portion of Lady Bird Johnson Park (northwest of Gravelly Point) would be exposed to aircraft noise between DNL 65 and DNL 70. There are no minority or low-income populations as defined by Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and Department of Transportation Order 5610.2, *Environmental Justice in Minority and Low-Income Populations*, within the DNL 65 contour. Similarly, there are no children populations as defined by Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks, within the DNL 65 contour.

Table 4-7 (1 of 2): Suggested Land Use Compatibility Guidelines in Aircraft Noise Exposure Areas

LAND USE	DNL 65 TO 70	DNL 70 TO 75	DNL 75+
Residential			
Residential other than mobile homes and transient lodgings	NLR required[1/]	NLR required [1/]	Incompatible
Mobile homes	Incompatible	Incompatible	Incompatible
Transient lodgings	NLR required [1/]	NLR required [1/]	Incompatible
Public use			
Schools, hospitals, and nursing homes	NLR required[1/]	NLR required[1/]	Incompatible
Churches, auditoriums, and concert halls	NLR required[1/]	NLR required[1/]	Incompatible
Governmental services	Compatible	NLR required	NLR required
Transportation	Compatible	Compatible[2/]	Compatible[2/]
Parking	Compatible	Compatible[2/]	Compatible[2/]
Commercial use			
Offices—business and professional	NLR required	NLR required	NLR required[2/]
Wholesale and retail—building materials, hardware, and farm equipment	Compatible	Compatible[2/]	Compatible[2/]
Retail trade—general	NLR required	NLR required	NLR required
Utilities	Compatible	Compatible[2/]	Compatible[2/]
Communication	NLR required	NLR required	NLR required
Manufacturing and production			
Manufacturing—general	Compatible	Compatible[2/]	Compatible[2/]
Photographic and optical	Compatible	NLR required	NLR required
Agriculture (except livestock) and forestry	Compatible	Compatible	Compatible
Livestock farming and breeding	Compatible	Compatible	Incompatible
Mining and fishing resources production and extraction	Compatible	Compatible	Compatible
Recreational			
Outdoor sports arenas and spectator sports	Compatible[3/]	Compatible[3/]	Incompatible
Outdoor music shells, amphitheaters	Incompatible	Incompatible	Incompatible
Nature exhibits and zoos	Compatible	Incompatible	Incompatible
Amusements, parks, resorts, and camps	Compatible	Compatible	Incompatible
Golf courses, riding stables, and water recreation	Compatible	Compatible	Incompatible

Table 4-7 (2 of2): Suggested Land Use Compatibility Guidelines in Aircraft Noise Exposure Areas Continued

NOTES:

DNL = Day-night average sound level, in A-weighted decibels.

Compatible = Generally, no special noise-attenuating materials are required to achieve an interior noise level of DNL 45 in habitable spaces, or the activity (whether indoors or outdoors) would not be subject to a significant adverse effect by the outdoor noise level.

Incompatible = Generally, the land use, whether in a structure or an outdoor activity, is considered to be incompatible with the outdoor noise level even if special attenuating materials were to be used in the construction of the building.

NLR = Noise Level Reduction. NLR is used to denote the total amount of noise transmission loss in decibels required to reduce an exterior noise level in habitable interior spaces to DNL 45. In most places, typical building construction automatically provides an NLR of 20 decibels. Therefore, if a structure is located in an area exposed to aircraft noise of DNL 65, then the interior noise level would be about DNL 45. If the structure is located in an area exposed to aircraft noise of DNL 70, then the interior noise level would be about DNL 50, so an additional NLR of 5 decibels would be required if not afforded by the normal construction. This NLR can be achieved through the use of noise-attenuating materials in the construction of the structure.

1/ The land use is generally incompatible with aircraft noise and should only be permitted in areas of infill in existing neighborhoods or where the community determines that the use must be allowed.

2/ NLR required in offices or other areas with noise-sensitive activities.

3/ Provided that special sound reinforcement systems are installed.

SOURCE: Ricondo & Associates, Inc., January 2000, as derived from the U.S. Department of Transportation, Federal Aviation Administration, Federal Aviation Regulations Part 150, *Airport Noise Compatibility Planning* (14 CFR Part 150 [Chapter I, Subchapter I, Table 1]), January 18, 1985, as amended.
PREPARED BY: Ricondo & Associates, Inc., June 2015.

Table 4-8: Area Exposed to Each Range of Noise Exposure—2021

DNL	AREA (ACRES)
65-70	910
70-75	295
75+	227
Total 65 and higher	**1,432**

SOURCE: Ricondo & Associates, Inc., *Final Environmental Assessment, Runway 4-22 and Runway 15-33 Runway Safety Area Enhancements*, April 2, 2012.
PREPARED BY: Ricondo & Associates, Inc., April 2011.

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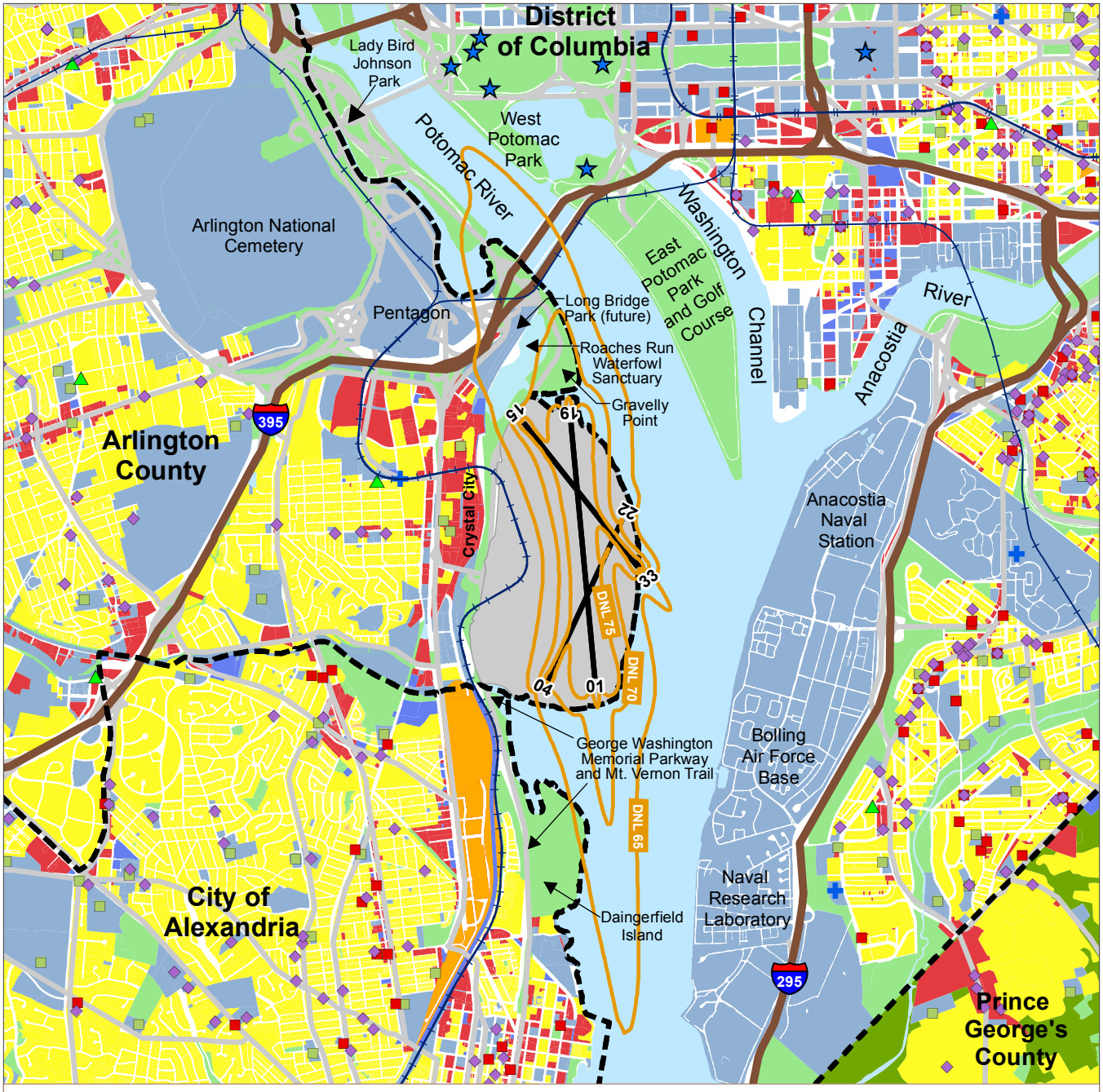

SOURCES: Arlington County Department Of Environmental Services, 2008 (land use); City Of Alexandria Department Of Planning & Zoning, 2008 (land use); Maryland Department Of Planning, 2002 (land use); District Of Columbia Office Of Planning, 2004 (land use); District Of Columbia Office Of Planning, 2006-2008 (point data: libraries, hospitals, churches, daycare, schools); Virginia Economic Department Partnership, 2006 (point data: schools); Ricondo & Associates, Inc., Calculated Using FAA INM Version 7.0.B and Data Described In Appendix E, May 2010 (aircraft noise exposure); North Potomac Yard Small Area Plan, Adopted By Alexandria City Council, May 15, 2010 And Potomac Yard/Potomac Greens Small Area Plan, amended June 14, 2008 (Future Potomac Yards Land Use).

PREPARED BY: Ricondo & Associates, Inc., 2010.

EXHIBIT 4-6

NORTH 0 Not To Scale

CW RSA FEA 2021

Proposed Action Noise Exposure Map

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Table 4-9: Aircraft Noise Exposure by Land Use Category—2021 (in acres)

	AREA BY RANGE OF NOISE EXPOSURE (ACRES)[1/]			
LAND USE	**DNL 65-70**	**DNL 70-75**	**DNL 75+**	**DNL 65 AND HIGHER**
Residential	0	0	0	0
Commercial	2	0	0	2
Mixed Use	0	0	0	0
Industrial	0	0	0	0
Government	38	0	0	38
Parks and Recreation	86	40	0	127
Water	624	93	6	722
The Airport	136	160	221	517
Roadways/Rights-of-Way	24	2	0	26
Total	**910**	**295**	**227**	**1,432**

NOTE:

1/ Table entries were rounded to the nearest acre. Totals may not add due to rounding.

SOURCES: Ricondo & Associates, Inc., April 2010 calculated using (1) FAA INM Version 7.0b; (2) data described in CW RWY FEA Appendix E, September 2008 (aircraft noise exposure); and (3) plan drawings developed based on land use data from Arlington County Department of Environmental Services, City of Alexandria Department of Planning & Zoning, 2008 (existing land use) and Maryland Department of Planning, District of Columbia Office of Planning, 2002 (existing land use).

PREPARED BY: Ricondo & Associates, Inc., April 2011.

Table 4-10: Population, Dwelling Units, and Noise-Sensitive Facilities Exposed to Aircraft Noise—2021

POPULATION OR NOISE-SENSITIVE FACILITY	DNL 65-70	DNL 70-75	DNL 75+	TOTAL DNL 65 AND HIGHER
Population	0	0	0	0
Dwelling Units	0	0	0	0
Religious Facilities	0	0	0	0
Convalescent Homes	0	0	0	0
Libraries	0	0	0	0
Daycare Centers	0	0	0	0
Schools	0	0	0	0
Parks	2	1	0	3
Hospitals	0	0	0	0

SOURCES: Ricondo & Associates, Inc. April 2010 calculated using (1) FAA INM Version 7.0b; (2) data described in CW RWY FEA Appendix E, September 2008 (aircraft noise exposure); (3) U.S. Department of Commerce, Bureau of the Census, Census 2000, May 2010 (population data); and (4) plan drawings developed based on land use data from Arlington County Department of Environmental Services, City of Alexandria Department of Planning & Zoning, 2008 (existing land use) and Maryland Department of Planning, District of Columbia Office of Planning, 2002 (existing land use).

PREPARED BY: Ricondo & Associates, Inc., April 2011.

4.13 Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks

The socioeconomics analysis considers the impacts of the alternatives on the following broad indicators: economic activity, employment, income, population, housing, public services, and social conditions. The principal social impacts considered in this EA are those associated with community disruptions, transportation, planned development, and employment.

4.13.1 REGULATORY SETTING

Statutes and regulations relevant to evaluating social impacts include:

- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act), as amended, which establishes minimum standards for federally funded programs and projects that require the acquisition of real property (real estate) or displace persons from their homes, businesses, or farm.[106]
- Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, which defines risks attributable to products or substances that children may touch or ingest, including the quality of air, food, water, and soil. [107]
- Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, which requires identification of potential disproportionately high and adverse impacts on low-income or minority populations. [108]
- USDOT Order 5610.2(a), *Environmental Justice in Minority and Low-Income Populations*, which outlines the USDOT's commitment to the principles of environmental justice and presents a program for USDOT-wide implementation. [109]
- CEQ, *Environmental Justice: Guidance Under the National Environmental Policy Act*, which presents CEQ guidance on assessing environmental justice under NEPA. [110]
- EPA, *Final Guidance for Consideration of Environmental Justice in Clean Air Act 309 Reviews*, which provides EPA guidance on environmental justice to improve the internal management of EPA's environmental justice programs as it relates to EPA reviews made under Section 309 of the Clean Air Act.[111]

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106 42 USC § 4601, et seq., PL 91-646, amended by the *Surface Transportation and Uniform Relocation Act Amendments of 1987*, Title IV of PL 100-17, PL 102-240, and PL 105-117; and 49 CFR Part 24, *Implementing the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*.

107 *Federal Register*, vol. 62, no. 78, p. 19885, April 21, 1997.

108 *Federal Register*, vol. 59, no. 32, p. 7629, February 11, 1994.

109 U.S. Department of Transportation Order 5610.2(a), *Environmental Justice in Minority and Low-Income Populations*, April 15, 1997, updated May 2012.

110 Council on Environmental Quality, *Environmental Justice: Guidance Under the National Environmental Policy Act*, December 10, 1997.

111 U.S. Environmental Protection Agency, *Final Guidance for Consideration of Environmental Justice in Clean Air Act 309 Reviews*, July 1999.

- Executive Order 13166, *Improving Access to Services for Persons with Limited English Proficiency*, which requires federal agencies to provide the opportunity for Limited English Proficiency communities to be involved in the planning process by having access to translated materials and/or translation services during meetings. [112]

4.13.2 METHODOLOGY

An analysis of the effects on environmental justice generally requires the use of census data for establishing the demographic and socioeconomic baseline. U.S. Department of Commerce, U.S. Census Bureau data was used for the analysis described in the following section.

4.13.3 AFFECTED ENVIRONMENT

Exhibit 4-8 and **Table 4-11** presents demographic and socioeconomic data from the U.S. Census Bureau for Arlington County, the City of Alexandria, and census tract 1034.02, which borders the airport in Virginia, as well as for the District of Columbia.

Table 4-11: Demographic and Socioeconomic Data by Jurisdiction

	ARLINGTON COUNTY	CITY OF ALEXANDRIA	CENSUS TRACT 1034.02	DISTRICT OF COLUMBIA
Demographic Data				
Population (estimate) 1/	226,908	148,892	5,305	658,893
Percent Change vs. 2010	+9.3	+6.4	+37.3	+9.5
Percent by Ethnicity Group 2/				
White	76.6	60.9	63.7	43.6
Black or African American	9.1	21.8	8.4	49.0
Asian/Pacific Islander/Native Hawaiian	10.4	6.1	21.2	4.2
American Indian/Alaska Native	0.7	0.4	0.5	0.6
Reporting Two or More Races	3.2	3.7	5.2	2.6
Some Other Race 3/	n/a	7.1	1.0	n/a
Percent Children Under 18 Years of Age	15.9	17.2	7.6	16.4
Socioeconomic Data				
Median Household Income, 2009-2013	$103,208	$85,706	$113,398	$65,830
Persons Below Poverty Level, 2009-2013	8.0	8.4	7.9	18.6

NOTES:

1/ The U.S. Department of Commerce, Bureau of the Census periodically updates demographic and socioeconomic characteristics for states and counties. Population data for Arlington County and the District of Columbia are 2014 estimates; population data for the City of Alexandria is a 2013 estimate.

2/ Ethnicity group data for Arlington County and the District of Columbia are from 2013; ethnicity data for the City of Alexandria is from 2010; columns may not add to 100 percent because of rounding.

3/ The 2010 Census, which was the source for the City of Alexandria ethnicity data, allowed respondents to select a "Some Other Race" category. When Census 2010 data were edited to produce the population estimates base, respondents who selected the Some Other Race category alone were assigned to one of the Office of Management and Budget (OMB)-mandated categories. For respondents who selected the Some Other Race category and one or more of the other race categories, the U.S. Census Bureau ignored the Some Other Race selection. This editing process produced tabulations that show fewer people reporting two or more races than similar tabulations from the 2010 Census since respondents who selected Some Other Race and one of the other race categories in Census 2010 appear in the single race category.

SOURCES: U.S. Department of Commerce, U.S. Census Bureau, "State and County QuickFacts," revised March 31, 2015, http://quickfacts.census.gov/qfd (accessed January 11, 2016 and April 21, 2016); City of Alexandria, Department of Planning and Zoning, "Census 2010 Comparative Demographic Profiles," p. 4, June 6, 2011, https://alexandriava.gov/planning/info/default.aspx?id=44032 (accessed May 26, 2015).

PREPARED BY: Ricondo & Associates, Inc., May 2015

[112] *Federal Register*, vol. 65, no. 159, p. 50121, August 11, 2000.

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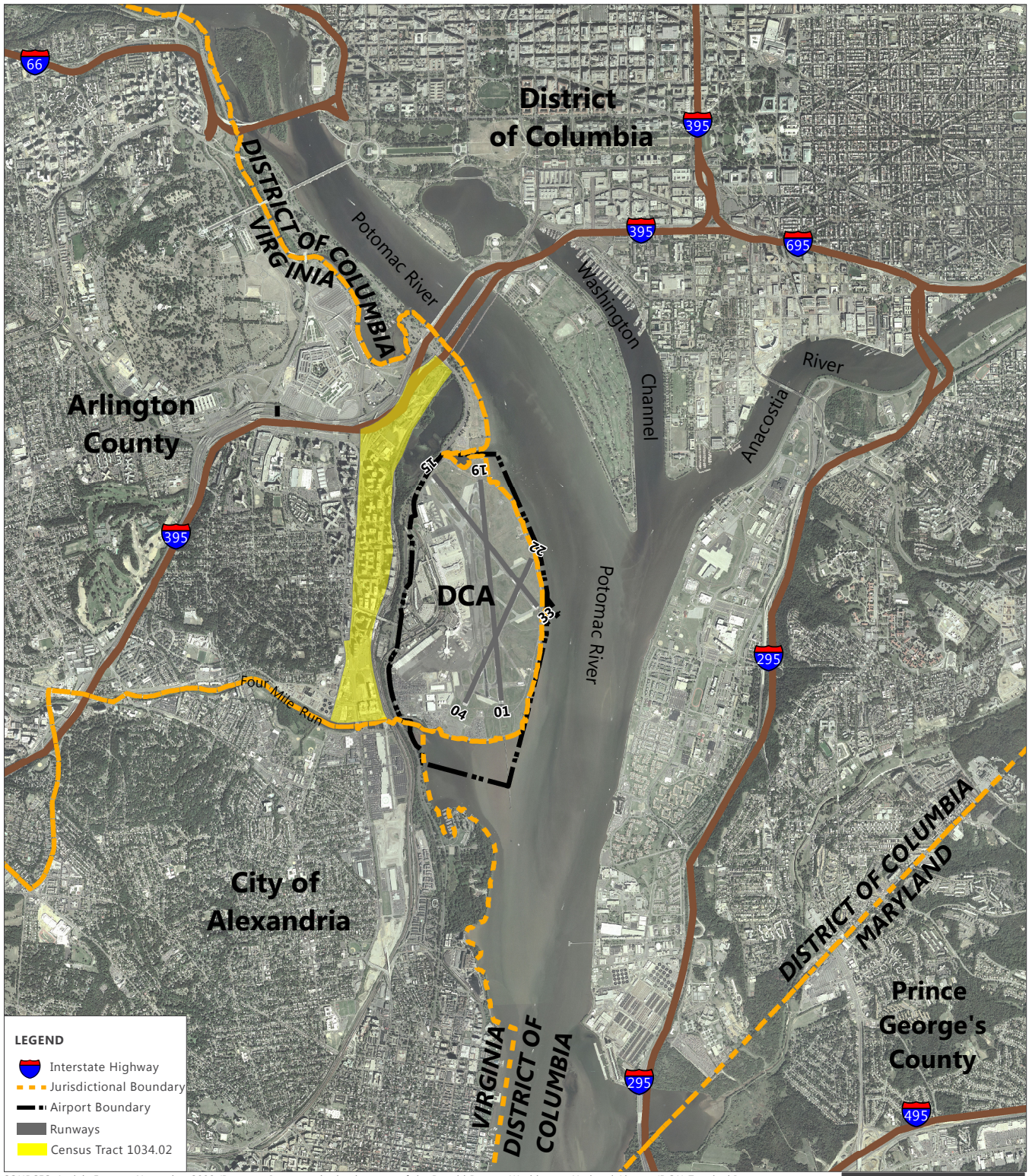

SOURCES: Aerials Express, November 2008 (Basemap Imagery obtained as part of the Ronald Reagan Washington National Airport (DCA) Terminal Instrument Procedures (TERPS) Airspace Analysis project); U.S. Census Bureau, 2014 TIGER/Line Shapefiles, http://www.census.gov/cgi-bin/geo/shapefiles2014/main, (accessed: April 21, 2016); Ricondo & Associates, Inc. April 2016.
PREPARED BY: Ricondo & Associates, Inc. November 2016.

NORTH 0 4,500 ft.

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EXHIBIT 4-8

Demographic and Socioeconomic Study Area

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Arlington County, the City of Alexandria, and Census Tract 1034.02 each have a population that is predominantly White with Asian/Pacific Islander/Native Hawaiian making up the next highest group in Arlington County, and Black or African American making up the next highest ethnic group in the City of Alexandria. The Black or African American ethnic group makes up the majority of the population in Washington, D.C., with White the next highest ethnic group. The average median household income in each of the jurisdictions examined is comparatively higher than Virginia ($63,907) and the United States as a whole ($53,046).[113] The District of Columbia has a higher percentage of persons in the poverty level (18.9 percent) compared to the average in Virginia (11.7 percent) and the United States (14.5 percent).[114] Census Tract 1034.02, adjacent to the LOPD, has a lower percentage of children under 18 years of age (7.6 percent) compared to Arlington County (15.9 percent), the City of Alexandria (17.2 percent), and the District of Columbia (16.4 percent).

4.13.4 OFF-AIRPORT TRAFFIC

The affected environment for the analysis of off-Airport traffic includes the local off-Airport roadways and intersections that may experience an increased level of activity directly resulting from the construction-related traffic of the Proposed Action. The study area for the off-street traffic analysis is shown on **Exhibit 4-9**. Based on the likely routes that soil-hauling dump trucks and construction employee vehicles will use to access and egress the Airport, the following study area was identified:

- Roadways
  - U.S. Route 1 Jefferson Davis Highway
  - Route 233 Ramps—Route 233 has four ramp connections to U.S. Route 1.
- Intersections
  - U.S. Route 1 Jefferson Davis Highway and 23rd Street S. —Signalized intersection
  - U.S. Route 1 Jefferson Davis Highway and 20th Street S. —Signalized intersection with offset eastbound and westbound approaches

The *Highway Capacity Manual*, 2000 Edition (HCM), defines capacity as the maximum number of vehicles that can pass over a particular road segment or through a particular intersection within a fixed duration. Capacity is linked to LOS, which is a qualitative measure that describes the operational conditions of an intersection or road segment and is an indicator of motorist perceptions within a traffic stream. The HCM defines six levels of service, LOS A through F, with A as the best and F the worst. LOS D or better is generally considered indicative of acceptable operations.

[113] U.S. Department of Commerce, U.S. Census Bureau, "State and County QuickFacts," revised August 5, 2015, http://quickfacts.census.gov/qfd (accessed August 27, 2015).

[114] Ibid.

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SOURCE: Kimley-Horn & Associates, December 2015.
PREPARED BY: Kimley-Horn & Associates, December 2015.

EXHIBIT 4-9

NORTH 0 Not To Scale

Construction Vehicle Route and Potentially Affected Surface Roadways

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The existing intersection and road operations are described in **Table 4-12** for the hours of 9:30 a.m. to 10:30 a.m. and 3:00 p.m. to 4:00 p.m. These hours represent the off-peak hours with the highest traffic volumes. Measures of effectiveness (MOEs) include vehicle delay for intersection operations, travel speed for U.S. Route 1 arterial, and link volume to capacity ratio for the Route 233 ramps. These MOEs are related to the LOS score. Traffic counts along the study area roadways and MOEs including intersection delay, arterial travel speed, and volume to capacity ratio are in included in **Appendix E**.

Table 4-12: Existing Traffic Conditions

	EXISTING LOS BASED ON OFF-PEAK HOUR INTERSECTION DELAY[2/]	
INTERSECTION	**A.M.**	**P.M.**
U.S. Route 1 and 20th Street (north offset)	C	C
U.S. Route 1 and 20th Street (south offset)	B	B
U.S. Route 1 and 23rd Street	D	D

	EXISTING LOS BASED ON OFF-PEAK HOUR TRAVEL SPEED DELAY[3/] (MPH)	
ROADWAY	**A.M.** (NB/SB)	**P.M.** (NB/SB)
U.S. Route 1 Jefferson Davis Highway	E / E	D / D

	EXISTING LOS BASED ON OFF-PEAK HOUR LINK VOLUME TO CAPACITY RATIO[4/]	
ROADWAY	**A.M.**	**P.M.**
Route 233 WB ramp to NB Route 1	A	A
SB Route 1 ramp to EB Route 233	D	C

NOTES:

SB = Southbound

NB = Northbound

WB = Westbound

EB = Eastbound

1/ A.M. off-peak highest volume hour = 9:30 a.m. to 10:30 a.m.; PM off-peak highest traffic volume hour = 3:00 p.m. to 4:00 p.m.

2/ LOS as a function of intersection delay is based on the findings of the *2000 Highway Capacity Manual*.

3/ LOS as a function of arterial travel speed is based on the findings of the *2000 Highway Capacity Manual*.

4/ LOS as a function of airport access roadways' volume to capacity ratio is based on information presented in (1) Transportation Research Board, National Research Council, *Highway Capacity Manual*, Exhibit 2, "LOS Criteria for Multilane Highways," December 2000, and (b) Airport Cooperative Research Program, ACRP Report 40, *Airport Curbside and Terminal Area Roadway Operations*, Table 4-1, "Levels of Service for Airport Terminal Area Access and Circulation Roadways," July 2010.

SOURCE: Kimley-Horn and Associates, Inc., December 2015.
PREPARED BY: Kimley-Horn and Associates, Inc., December 2015.

4.13.5 ON-AIRPORT TRAFFIC

The on-Airport traffic study area is depicted on **Exhibit 4-10** Traffic data from June 2015, collected as part of the *DCA Roadway Network Study and Short-Term Roadway Improvements Project*, was reviewed to identify busy-day and peak-hour traffic conditions at the Airport, along both the Terminal B/C Arrivals Level curbside and on-Airport terminal roadways and intersections. Based on review of the data, the peak hour along the Terminal B/C Arrivals Level curbside roadway was estimated to occur from 8:45 p.m. to 9:45 p.m.

The traffic data also showed that the peak hour for the terminal area roadways and intersections was estimated to occur from 3:45 p.m. to 4:45 p.m., when a considerable amount of both arrivals-related traffic and departures-related traffic are accessing/egressing the Airport. Additionally, to account for seasonality, traffic data collected in June were adjusted to peak month conditions based on 2014 monthly commercial passenger activity at the Airport. As shown in **Table 4-13**, the peak month of commercial passenger activity in 2014 was May, approximately 5 percent greater than the commercial passenger activity in June 2014. Consequently, the June 2015 traffic volumes were increased by a factor of 1.05 to represent peak-month traffic conditions. The resulting existing (2015) traffic volumes for the Terminal B/C Arrivals Level curbside, roadway segments, and intersections are depicted in **Table 4-14**, **Table 4-15**, and **Table 4-16**, respectively.

Table 4-13: Monthly DCA Passengers, 2014

MONTH [1/]	PASSENGERS [2/]
January	1,485,762
February	1,382,839
March	1,697,105
April	1,832,177
May	1,918,581
June	1,823,100
July	1,799,769
August	1,819,784
September	1,675,676
October	1,901,805
November	1,693,931
December	1,753,855

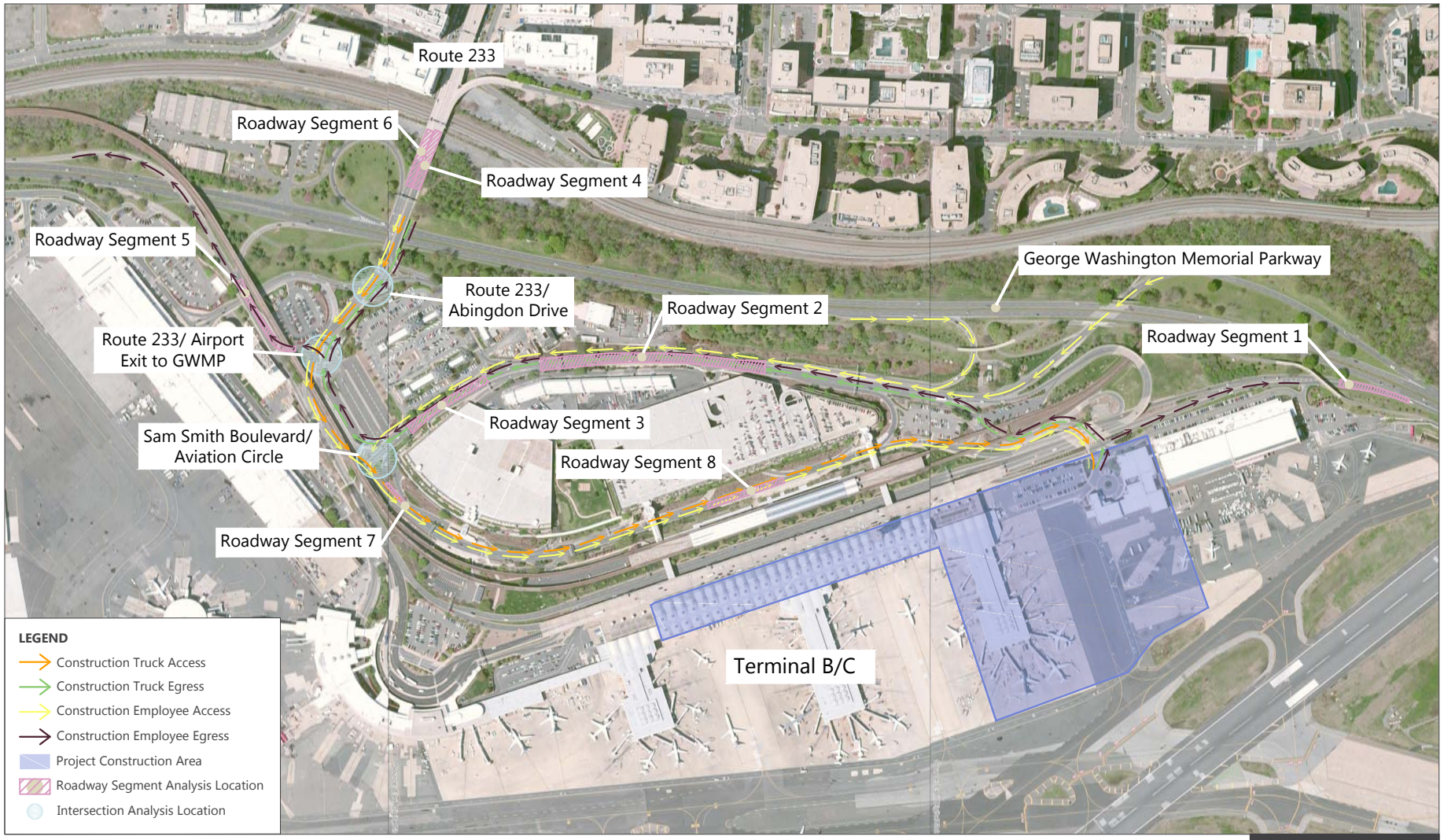
NOTES:

1/ Monthly data shown for 2014.

2/ Commercial passengers only (i.e., general aviation and military not included)

SOURCES: Metropolitan Washington Airports Authority, http://www.mwaa.com/about/reagan-2014-air-traffic-statistics (accessed June 2015), Ricondo & Associates, Inc., June 2015.

PREPARED BY: Ricondo & Associates, Inc., July 2015.



SOURCES: ESRI Database (Aerial Imagery), ESRI, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, obtained: January 2016; Ricondo & Associates, Inc., January 2016.
PREPARED BY: Ricondo & Associates, Inc., January 2016.

EXHIBIT 4-10

NORTH 0

On-Airport Traffic Study Area

Drawing: N:\MWAA\MWAA n-Call 14-08-0868\Tas 03 - DCA New North Concourse EA\04 CAD\Construction Routes.dwg_Layout: Construction Routes_Nov 02, 2016, 2:34pm

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Table 4-14: Existing (2015) Terminal B/C Arrivals Level Curbside Peak-Hour Volumes

	PEAK HOUR VOLUME [1/]
Inner Roadway	
Taxicabs	316
Shared Ride Vans	6
Parking/RAC Shuttles	31
Hotel/Motel Shuttles	34
Employee Parking Shuttles	11
Service Vehicles/Other	6
Total	**404**
Outer Roadway	
Private Vehicles/Limousines	1,227

NOTES:

RAC = Rent-A-Car

1/ Volumes represent peak month, busy day: 8:45 p.m. to 9:45 p.m.

SOURCES: Peggy Malone & Associates, June 2015; Ricondo & Associates, Inc., June 2015.
PREPARED BY: Ricondo & Associates, Inc., July 2015.

Table 4-15: Existing (2015) Roadway Link Peak-Hour Volumes

ROAD SEGMENT ID [1/]	DESCRIPTION	LINK SPEED	NUMBER OF LANES	PEAK-HOUR VOLUME [2/]
1	Terminal Access Roadway	30	1	1,413
2	Terminal Access Roadway	25	3	2,882
3	Terminal Access Roadway	25	2	1,865
4	Terminal Loop Roadway	35	2	855
5	Terminal Access Roadway	25	1	668
6	Terminal Access Roadway	35	2	1,146
7	Terminal Access Roadway	25	1	204
8	Terminal Access Roadway	25	2	459

NOTES:

1/ Refer to Exhibit 4-10 for roadway segment locations.

2/ Volumes represent peak month, busy day: 3:45 p.m. to 4:45 p.m.

SOURCES: Peggy Malone & Associates, June 2015; Ricondo & Associates, Inc., June 2015.
PREPARED BY: Ricondo & Associates, Inc., July 2015.

Table 4-16: Existing (2015) Intersection Peak-Hour Volumes[1/]

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND		
INTERSECTION [2/]	LEFT TURN	THROUGH	RIGHT TURN	LEFT TURN	THROUGH	RIGHT TURN	LEFT TURN	THROUGH	RIGHT TURN	LEFT TURN	THROUGH	RIGHT TURN
Route 233/Abingdon Drive [3/]	111	16	179	41	135	720	3	995	419	5	32	3
Route 233/Airport Exit to GWMP [4/]	-	-	-	219	40	-	-	768	447	219	40	-
Sam Smith Boulevard/Aviation Circle [3/]	-	-	-	254	1,644	259	-	204	-	-	-	-

NOTES:

1/ Volumes represent peak month, busy day: 3:45 p.m. to 4:45 p.m.

2/ Refer to Exhibit 4-10 for intersection locations.

3/ Signalized intersection

4/ Unsignalized intersection

SOURCES: Peggy Malone & Associates, June 2015; Ricondo & Associates, Inc., June 2015.
PREPARED BY: Ricondo & Associates, Inc., July 2015.

4.14 Visual Effects

4.14.1 REGULATORY SETTING

Although no federal regulations govern light emissions or visual impacts, the FAA must consider potential effects on people, wildlife, and land uses that could be affected by light emissions from the Proposed Action, including the extent to which they are currently affected by existing light emissions. In addition, unique resources including properties, and the use of properties, covered by Section 4(f) of the U.S. DOT Act, Section 6(f) of the NPS LWCF, and Section 106 of the NHPA (please refer to Sections 4.7.3 and 4.9.3) must be considered.

To facilitate a better mutual understanding of the Authority's airport improvement plans and the relationship of these plans to federal activities and interests in the region of the nation's capital, the National Capital Planning Commission and the Authority entered into a Memorandum of Understanding (MOU) in 1988. The MOU established the need for coordination of any development at the Airport that would alter the skyline when viewed from the opposing shoreline of the Potomac River or from the GWMP.

4.14.2 METHODOLOGY

Areas that may be sensitive to light emissions and/or visual impacts from the Proposed Action were identified.

4.14.3 AFFECTED ENVIRONMENT

The Airport is located within an urban environment with a high level of existing ambient light emissions. Light and glare associated with the study area is presently generated by buildings and exterior sources to protect and secure people, property, and the air transportation system. Lighting associated with these facilities in the area of the Proposed Action illuminates the Airport exit road, Metrorail line, and GWMP to the west; automobile parking and Taxiway November to the east; an aircraft holding apron to the north; and, the north end of existing Terminal B/C to the south. As shown on Exhibit 2-3, existing light-emitting airport structures located within the limits of the project site include the COB, Hangar 11, and Hangar 12.

West of the GWMP is the Crystal City area of Arlington, Virginia. Crystal City is an urban neighborhood with a dense concentration of high-rise office, hotel, and residential buildings. The extensive high-rise development is also a contributing factor to the terminal area's well-lit urban environment.

Areas and facilities with views of the north end of Terminal B/C that are potentially sensitive to light emissions and the viewshed within the vicinity of the Proposed Action include:

- GWMP and related sites
  - Mount Vernon Trail (paralleling GWMP west of the Airport)
  - Roaches Run Waterfowl Sanctuary (northwest of the Airport)
  - Gravelly Point (north of the Airport)
  - Long Bridge Park (northwest of the Airport)

- Monumental Core of the nation's capital
  - East Potomac Park
  - West Potomac Park
  - Jefferson Memorial
  - Franklin Delano Roosevelt Memorial Park

4.15 Water Resources

4.15.1 WETLANDS

Wetlands, waterways, and special aquatic sites (together referred to as Waters of the United States [WOTUS]) are protected under federal and state regulations and have important functions and values.

The U.S. Army Corps of Engineers (ACE) defines wetlands as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.[115] Wetlands provide valuable water quality functions as well as wildlife habitat. Some of the functions of wetlands are groundwater recharge, sediment/toxicant retention, nutrient removal, and flood-flow alteration.[116] Recognized functions and values of wetlands include the following:[117]

- flood-flow alteration, shoreline stabilization, storm protection, and climate control
- groundwater recharge, water purification, and sediment and nutrient retention and modification
- commercial products, recreation, and tourism
- biodiversity, including fish, shellfish, and wildlife habitat, and the associated scientific and cultural benefits

[115] United States Department of the Army (P.R. Adamus, E.J. Clairain, Jr., R.D. Smith, and R.E. Young), Waterways Experiment Station, Vicksburg, Mississippi, Environmental Laboratory, *Wetland Evaluation Technique (WET) v.2,* 1987.

[116] United States Department of the Army, Waterways Experiment Station, Vicksburg, Mississippi, Environmental Laboratory, *Corps of Engineers Wetlands Delineation Manual,* 1987.

[117] U.S. Army Corps of Engineers, New England District, *The Highway Methodology Workbook Supplement: Wetlands Functions and Values: A Descriptive Approach*, NAEEP-306-1-30a, 1999.

4.15.1.1 Regulatory Setting

Laws, regulations, and policies related to wetlands include:

- Rivers and Harbors Act of 1899, Section 10[118]
- Clean Water Act, Sections 401 and 404[119]
- Executive Order 11990, *Protection of Wetlands*[120]
- DOT Order 5660.1A, *Preservation of the Nation's Wetlands*
- Commonwealth of Virginia, State Water Control Law [121]
- District of Columbia, Water Pollution Control Act of 1984[122]
- Definition of Navigable Waters of the United States[123]
- Definition of Waters of the United States (WOTUS)[124]

These wetland laws, regulations, and policies, as they relate to the affected environment, are described further in the following paragraphs.

Section 10 of the Rivers and Harbors Act of 1899 prohibits the creation of an obstruction within navigable waters of the United States unless affirmatively authorized by Congress. The Rivers and Harbors Act defines navigable waters as those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use, to transport interstate or foreign commerce. To determine if a body of water is appropriate for inclusion as navigable waters, there must be past, present, or potential presence of foreign or interstate commerce, physical capabilities for use by commerce, and defined geographic limits of the water body.

Section 401 of the Clean Water Act[125] gives the EPA, the Commonwealth of Virginia, and the District of Columbia certification responsibility and authority over violation of water quality standards within their respective jurisdictions.[126]

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118 33 USC § 403 *et seq.*

119 33 USC § 1344, PL 92-500, as amended by PL 95-217 and PL 100-4.

120 42 FR 26961, May 25, 1977.

121 Code of Virginia, §§ 62.1-44.2 through 62.1-44.34:28.

122 Code of the District of Columbia, § 8-103.

123 33 CFR Part 329, November 13, 1986, unless otherwise noted.

124 33 CFR Part 329, June 29, 2015.

125 33 CFR §1251 et seq., 1987.

126 33 CFR §1251 et seq., 1987.

Section 404 of the Clean Water Act gives the U.S. ACE responsibility and authority over activities that result in the discharge of dredge or fill material into wetlands and waterways.[127]

Executive Order 11990, *Protection of Wetlands,* requires consideration of indirect effects on wetlands, provides a long-term goal of no net loss of wetlands, and requires federal agencies to adopt procedures that ensure compliance with Executive Order 11990.[128]

DOT Order 5660.1A, *Preservation of the Nation's Wetlands,* sets U.S. DOT policy to assure the protection, preservation, and enhancement of the nation's wetlands to the fullest extent practicable and establishes procedures for implementation of the policy.

The 1972 Virginia Wetlands Act established a permitting system for the protection of wetlands, authorized the creation of local wetland boards to make judgments on local wetlands issues, and empowered the VDEQ and Virginia Marine Resources Commission (VMRC) to issue wetland permits.

The District of Columbia's Water Pollution Control Act prohibits the discharge of pollutants into District of Colombia waters to protect and preserve aquatic life and resources for recreation, aesthetic enjoyment, and industry.

On June 25, 2015, the ACE and EPA finalized the Clean Water Rule, which more clearly defined WOTUS that are protected under the Clean Water Act and established categories of waters that are jurisdictional and others that are excluded. It also established categories that require a case-specific significant nexus to determine if they are WOTUS.

The mean high-water line of the Potomac River in the vicinity of the Airport is the division between the Commonwealth of Virginia and the District of Columbia. The Baltimore District of the U.S. ACE serves as the regulatory authority for projects within the Potomac River. The NPS maintains jurisdiction over the Potomac River bottom.[129] Any wetlands or Waters of the United States found on Airport property would be regulated by the Norfolk District of the U.S. ACE, the VMRC, and the VDEQ. The VMRC would only have jurisdiction if the wetlands or other WOTUS are tidal, or nontidal with a drainage area greater than five square miles.

4.15.1.2 Methodology

To determine the existence and extent of wetlands and WOTUS present in the LOPD, the *National Wetlands Inventory* (NWI) map information was reviewed.

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127 33 CFR §1251 et seq., 1987.

128 42 FR 26961, May 25, 1977.

129 The NPS transferred to the FAA jurisdiction over the river bottom upon which fill was placed to support the Runway Safety Area improvements for Runway 15-33. The fill for that improvement is in place, and the area is no longer considered riverbed.

4.15.1.3 Affected Environment

The NWI map does not indicate the presence of any wetlands within the LOPD. A review of recent aerial photography revealed that only 0.46 acre within the LOPD is not currently covered by concrete or buildings. This 0.46-acre grassy area is located between the hard stands and Taxiway N. Based on the NWI map and aerial photography, there are no jurisdictional wetland or other WOTUS within the LOPD.

4.15.2 FLOODPLAINS

4.15.2.1 Regulatory Setting

Applicable laws and regulations related to floodplains include:

- Executive Order 11988, *Floodplain Management*[130], May 24, 1977
- National Flood Insurance Program (NFIP)[131]
- Virginia Flood Damage Reduction Act of 1989[132]
- Virginia Floodplain Management Program[133]
- Arlington County Code of Ordinances, Chapter 48, "Floodplain Management"
- Washington D.C., Municipal Regulations, Titles 20, "Environment," and 21, "Water and Sanitation"

Federal and state regulation and local ordinances protect areas prone to flooding by assessing flood risks and preventing or mitigating flood damage. Executive Order 11998, *Floodplain Management,* implemented through USDOT Order 5650.2, *Floodplain Management and Protection*, requires that federal actions, to the extent possible, avoid impacts to floodplains and avoid floodplain development where a practicable alternative exists. Arlington County ordinances govern floodplains in the vicinity of the Airport; however, the Airport is not subject to Arlington County floodplain regulations. The NPS manages the tidal basin of Roaches Run. The VDCR regulates floodplains based on the Virginia Flood Damage Reduction Act (Code of Virginia §10.1-602) and implements the Division of Dam Safety and Floodplain Management to include coordination with the NFIP. Arlington County regulates floodplain development under the Arlington County Code of Ordinances, Chapter 48, "Floodplain Management," which stipulates that the floodplain regulations are adopted from the NFIP regulations.

4.15.2.2 Methodology

To determine the existence, extent, and governing jurisdictions of any floodplains within the LOPD, Federal Emergency Management Agency (FEMA) data for Federal Insurance Rate Map (FIRM) was reviewed, which included panel numbers 51013C0081C and 51013C0083C for Arlington County, Virginia, August 19, 2013, and FIRM Panel 1100010058C for District of Columbia, September 27, 2010.

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130 42 FR 26951, May 25, 1977.

131 42 USC § 4001, 1968, as amended.

132 Code of Virginia, Section 10.1-602.

133 Code of Virginia, Section 10.1-602.

4.15.2.3 Affected Environment

Based on a review of available floodplain information, floodplains do exist on Airport property.[134] Approximately 214 acres of the Airport are located within the 100-year floodplain and the majority of the 100-year floodplain acreage is located within the airfield (see **Exhibit 4-11**). The LOPD encompasses approximately 22 acres; however, the LOPD is located outside of the 100-year floodplain. The base flood elevation for the Potomac River at the Airport is approximately 11 feet above mean sea level.[135, 136]

4.15.3 SURFACE WATERS AND GROUNDWATER

4.15.3.1 Regulatory Setting

Surface and ground waters are sensitive to changes in land cover and uses, such as the conversion of turfgrass to impervious surface. Therefore, any proposed improvements or operational changes that increase impervious area at the Airport will likely temporarily or permanently effect stormwater runoff patterns, thus directly or indirectly influencing local water resources.

Applicable laws and regulations related to water resources that could be impacted by the Proposed Action include:

- Section 402 of the Clean Water Act, which regulates discharge of pollutants or combinations of pollutants into waters of the United States[137]
- Safe Drinking Water Act, as amended, also known as the Public Health Service Act, which prohibits federal agencies from funding actions that would contaminate a sole source aquifer or its recharge area[138]
- Virginia Stormwater Management Program, authorized under the Virginia Stormwater Management Act[139]
- Virginia Erosion and Sediment Control Law[140]
- Commonwealth of Virginia, *Sediment and Erosion Control Handbook*[141]
- Code of Virginia Water Quality Standards[142]

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134 Preliminary Federal Emergency Management Agency, FIRM Panels 51013C0081C and 51013C0083C for Arlington County, Virginia, August 19, 2013; Ibid, FIRM Panel 1100010058C for District of Columbia, September 27, 2010.

135 Ibid, FIRM Panels 51013C0081C and 51013C0083C for Arlington County, Virginia, August 19, 2013; Ibid, FIRM Panel 1100010058C for District of Columbia, September 27, 2010.

136 Federal Emergency Management Agency, *Flood Insurance Study, Arlington County, Virginia and Incorporated Areas*, Flood Insurance Study Number 51013CV000A, 2013.

137 33 USC § 1251; 40 CFR Parts 110, 112, 116, 117, 122, 125, 129, 130, 131, 136, 142, 149, 401, and 403.

138 42 USC § 300.f, et seq, December 1974.

139 Code of Virginia, §62.1-44.15:24 et seq.

140 Code of Virginia, §62.1-44.15:51 et seq.

141 Commonwealth of Virginia, Department of Conservation & Recreation, *Sediment and Erosion Control Handbook* (3rd ed.), 1992 (or current).

142 Code of Virginia, § 62.1-44.15(3a).

SOURCES: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, January 2016; Federal Emergency Management Agency (FEMA), August 19, 2013 (Data for Federal Insurance Rate Map (FIRM) was reviewed, which included panel numbers 51013C0081C and 51013C0083C for Arlington County, Virginia); FEMA, September 27, 2010 (Data for FIRM was reviewed, which included panel numbers 1100010058C for District of Columbia); Ricondo & Associates, Inc., October 2016.
PREPARED BY: Ricondo & Associates, Inc., November 2016.

NORTH 0 1,200 ft.
W:\Projects\DCA\NNC EA\MXD's\Final\Exhibit 4-11 100 Year Floodplain_110216.mxd

EXHIBIT 4-11

100-Year Floodplain

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The Airport currently operates under a National Pollutant Discharge Elimination System (NPDES) Multi-Sector General Permit (MSGP) for industrial activities.[143] This permit is issued by the EPA for stormwater discharges from the Airport to Roaches Run, Four Mile Run, and the Potomac River.

In accordance with the Airport's MSGP, any construction-related stormwater discharges from construction activities greater than one acre will require a Notice of Intent to be filed with the EPA as well as compliance with the construction site runoff requirements contained in the MSGP. Construction activities that exceed 2,500 square feet will be regulated by a Virginia Pollutant Discharge Elimination System (VPDES) Permit as administered by VDEQ.

4.15.3.2 Methodology

To determine the extent, condition, and jurisdiction of water resources present in and near the LOPD, the following methodology was used:

- Reviewed readily available studies and data maintained by the various state and local agencies and organizations, including data published online and data contained in previous environmental analyses conducted at the Airport.
- Contacted relevant agencies to ensure that the data and reports reviewed contained the most current information available.
- Determined locations of groundwater aquifers and public wells in the vicinity of the Airport from published information.
- Interpreted groundwater-recharge areas from the Arlington County Geologic Map.
- Obtained information regarding public water sources for the Airport and adjacent communities from local government agencies and the EPA.
- Reviewed an Authority map of Airport drainage basins and outfall locations.[144, 145]
- Reviewed relevant published information to assess water quality.

4.15.3.3 Affected Environment

The Airport is located on a peninsula on the Virginia side of the Potomac River immediately south (downstream) of Gravelly Point. The Airport is surrounded by water on three sides: Roaches Run to the north (including a 53-acre lake at Roaches Run Waterfowl Sanctuary), the Potomac River to the east, and Four Mile Run to the south. The confluence of Roaches Run with the Potomac River is immediately adjacent to the north side of the Airport. The confluence of Four Mile Run with the Potomac River is immediately adjacent to the south side of the Airport. The confluence of the Anacostia River with the Potomac River is on the opposite

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143 Permit #05A066 issued September 29, 2008 and expired on September 29, 2013. The permit has not been reissued; however, according to Section 1.3.2 of said permit, it is administratively continued and will remain in force.

144 Metropolitan Washington Airports Authority, Maintenance and Engineering Division, *Plate 7A Stormwater Site Map, Authority Pollutant Sources, Ronald Reagan Washington National Airport*, March 1998.

145 Metropolitan Washington Airports Authority, Office of Engineering, Design Department, *Runways 15-33 & 4-22 Safety Area Enhancements, Drainage Plan,* August 2012.

shore of the Potomac River from the Airport, as shown on Exhibit 4-6. Of these water bodies, Roaches Run and an unnamed tributary to Roaches Run receive runoff from the LOPD.

The Airport lies within the Potomac-Shenandoah River Basin, the Middle Potomac River Sub-basin, and the Potomac River Watershed. The Airport was constructed, in part, by placing fill in areas of the Potomac River between Roaches Run and Four Mile Run. One jurisdictional WOTUS (a concrete-lined tidal channel) exists on the Airport, flowing under the existing pavement before the Runway 15 end prior to emptying into Roaches Run. This unnamed tributary to Roaches Run is considered a perennial stream and, along with Four Mile Run and Roaches Run, is regulated by the Norfolk District of the U.S. ACE, VMRC, and the VDEQ. These channels are all outside of the LOPD; however, a portion of stormwater runoff from the project area will drain into the unnamed tributary to Roaches Run.

There are no public water supply intakes from the Potomac River in the vicinity of the Airport. The nearest intake is at Little Falls, which is over six miles north (upstream) of the Airport.[146] No public groundwater supply wells are located on the Airport. It is understood that Arlington County, including the Airport, acquires its public water from the Dalecarlia Treatment Plant of the Washington Aqueduct Division of the U.S. ACE. The City of Alexandria purchases its public water from the Fairfax County Water Authority, which obtains and treats water from the Potomac River and the Occoquan Reservoir.

Surface Water Resources

Although the stretch of the Potomac River adjacent to the Airport is not listed as wild and scenic, it is listed as an American Heritage River by the EPA. American Heritage Rivers include rivers that represent the natural, historical, cultural, social, and economic diversity of American waterways. An American Heritage River designation requires federal agencies to ensure that their actions have a positive effect on the natural, historical, economic, and cultural resources of American Heritage River communities.[147]

Based on the Code of Virginia, *Virginia Water Quality Standards*, Four Mile Run is designated as a Class II (tidal-freshwater) waterway.[148] The District of Columbia section of the Potomac River is designated by the District of Columbia Municipal Regulations in the five following use classifications:

- A – Primary contact recreation
- B – Secondary contact recreation and aesthetic enjoyment
- C – Protection and propagation of fish, shellfish, and wildlife
- D – Protection of human health related to the consumption of fish and shellfish
- E – Navigation

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146 Metropolitan Washington Council of Governments, *Metropolitan Washington Region Water Supply Agencies*, http://www.mwcog.org/environment/water/watersupply/suppliers.asp (accessed July 24, 2015).

147 Executive Order 13061, *Federal Support of Community Efforts along American Heritage Rivers* (62 FR 48445), September 11, 1997.

148 Code of Virginia, § 62.1-44.15 3a.

The U.S. Geological Survey (USGS), as part of the National Water Quality Assessment program, and the VDEQ monitor water quality in the Potomac River; the Northern Virginia Regional Commission monitors water quality in Four Mile Run. As of 2015, water quality had not been monitored in Roaches Run.

Potomac River Water Quality

The District of Columbia's 2014 report on water quality indicates that, of the five designated use categories, the portion of the Potomac River within the District of Colombia only fully supports use E.[149] The reasons for nonattainment of uses A, B, C, and D were violations of water quality standards as follows: use A for E. Coli, pH, and turbidity; use B for pH and turbidity; use C for temperature, pH, dissolved oxygen, and turbidity; and use D because a 1994 District Commissioner of Public Health advisory urged no consumption of fish caught within District of Colombia waters.

The EPA lists the Upper Tidal Potomac River in the study area vicinity on the 303(d) list of impaired waters and identifies PCBs, polycyclic aromatic hydrocarbons (PAHs), pH, total nitrogen, total phosphorus, and total suspended solids as causes of impairment.[150]

VDEQ data indicate that elevated dissolved inorganic nitrogen concentrations are present in the upper tidal Potomac River.[151] As documented by the City of Alexandria in 2001, the Potomac River failed water quality standards for available sunlight and suspended solids.[152] USGS water quality data indicate that the Potomac River can exceed the suspended sediment standard of 500 milligrams per liter (mg/l) at drinking water intakes during high discharge events.[153] High sediment loads were also observed in the Potomac River during the 2004 water-monitoring period.[154] As of September 2011, the most recent USGS water quality data on record for Arlington County indicate that the Potomac River is in compliance with the dissolved oxygen, pH, and temperature standards for Class II waterways in Virginia.[155] As of September 2011, the most recent USGS

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149 District of Columbia, Department of the Environment, *The District of Columbia Water Quality Assessment 2014 Integrated Report to the Environmental Protection Agency and the U.S. Congress Pursuant to Section 305(b) and 303(d) Clean Water Act*, January 2015, http://doee.dc.gov/sites/default/files/dc/sites/ddoe/page_content/attachments/Draft%202014%20District%20of%20Columbia%20Integrated%20Report.pdf.

150 United States Environmental Protection Agency, *Listed Water Information, 2012, Potomac, DC*, http://iaspub.epa.gov/waters10/attains_impaired_waters.impaired_waters_list?p_state=DC&p_cycle=2012 (accessed July 24, 2015).

151 Virginia Department of Environmental Quality, Virginia Department of Conservation and Recreation, *Virginia 305(b)/303(d) Water Quality Integrated Report to Congress and the EPA Administrator for the Period January 1, 2007 to December 31, 2012,* 2014.

152 City of Alexandria, *City of Alexandria Master Plan, Water Quality Management Supplement,* 2001.

153 White, Roger K., Donald C. Hayes, Joel R. Guyer, and Eugene D. Powell, U.S. Geological Survey, Virginia Water Science Center, *Water Resources Data, Virginia, Water Year 2011, Volume 1: Surface-Water Discharge and Surface-Water Quality Records, USGS Water Data Report VA-11-1,* 2011.

154 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.

155 U.S. Geological Survey, http://wdr.water.usgs.gov/wy2011/pdfs/01646580.2011.pdf (accessed July 24, 2015).

water analysis at Chain Bridge indicated that the Potomac River is in compliance with the dissolved oxygen, pH, and temperature standards for Class II waterways in Virginia.[156]

Groundwater Resources

As depicted on **Exhibit 4-12**, the groundwater recharge area closest to the Airport is located west of I-395, near Arlington National Cemetery. This recharge area is well beyond Airport property and more than one mile from the LOPD. Based on information from the District of Columbia, the regional groundwater table is located approximately 15 feet below the surface, except in areas where building foundations or tunnels exist, where groundwater may be as much as 25 feet below the surface.[157] The groundwater table fluctuates seasonally between 3 and 5 feet.

River Bottom Resources and Sediment Quality

Activities that could affect the Potomac riverbed are regulated by the NPS. In 2006/2007, the quality of the sediment in the Potomac River was assessed in support of the Authority's RSA Study.[158] The investigations indicated that surface water depths vary from 10.5 feet to 16.5 feet.[159] Collected samples indicate that the local river sediments are predominantly fine sand and silt (with high organic content) between 0 and 15 feet deep. Boreholes for these investigations were driven until refusal, which varied between elevation -35 feet and elevation -93 feet. Water and mud extended to a depth of -35 feet surface elevation near the Runway 22 end and to a depth of -49 feet surface elevation at the Runway 33 end. Beneath the mud, relatively firm subsurface material, consisting of sand and gravel with some silt and clay, was found in all borehole locations. Varying concentrations of metals, pesticides, semivolatile organic compounds (SVOCs), arsenic, tributyl tin, dioxins, and petroleum hydrocarbons were detected in the sediment samples.

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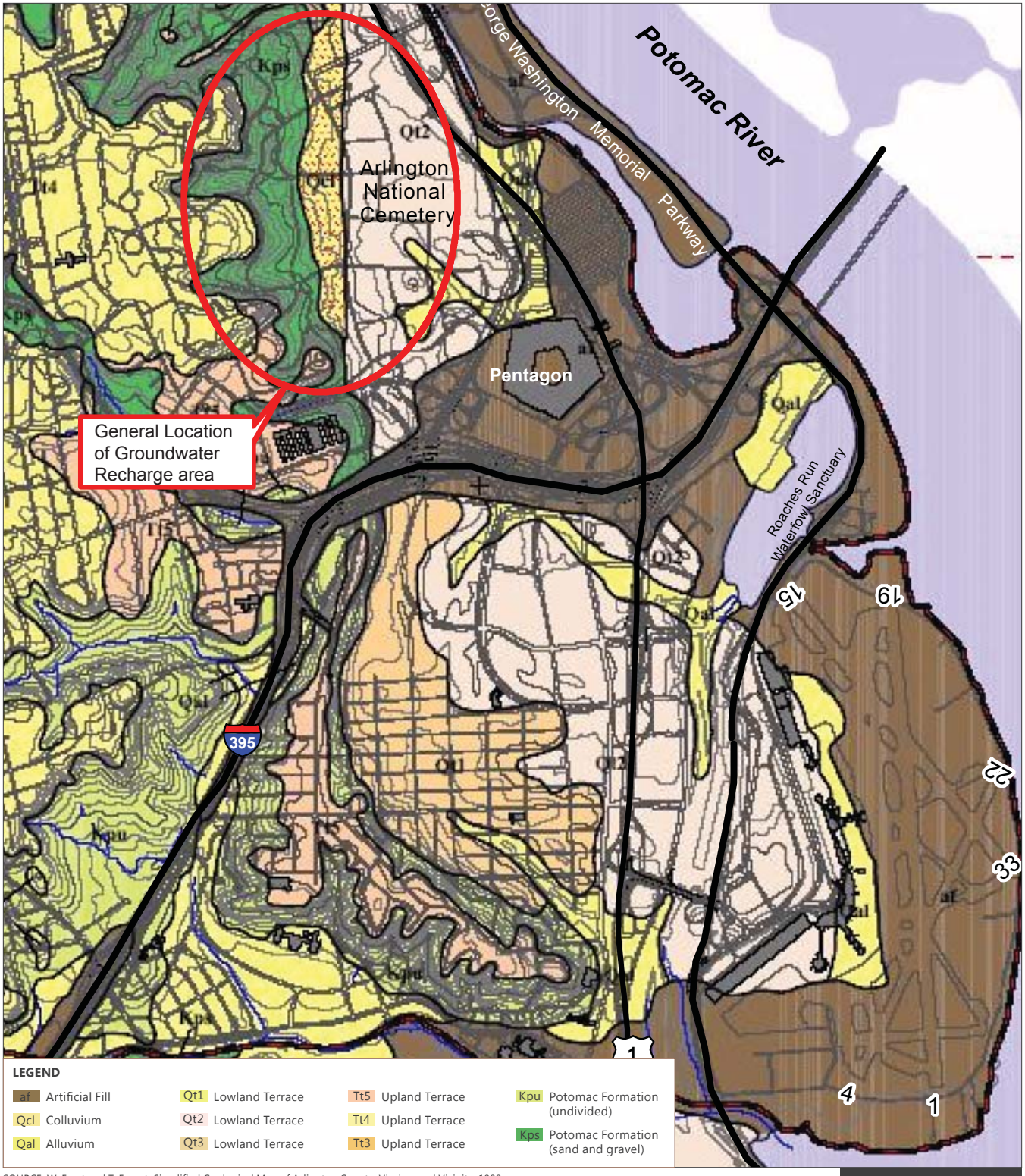
156 U.S. Geological Survey, *Water Year 2011: U.S. Geological Survey Water-Data Report WDR-US-2011* (site 01646580), http://wdr.water.usgs.gov/wy2011/pdfs/01646580.2011.pdf (accessed July 24, 2015).

157 D.C. Water Resources Research Center, University of the District of Columbia, *Background Study of the Ground Water in the District of Columbia,* 1992.

158 Straughan Environmental Services, Inc., *River Sediment Quality Assessment Report Runway 15/33 and 4/22 Safety Area Study*, July 2007.

159 Thomas L. Brown Associates, P.C., *Geotechnical Study, Runways 4-22 & 15-33 RSA, Constructability Assessment, Ronald Reagan Washington National Airport,* November 2006.



SOURCE: W. Frost and T. Ernest, Simplified Geological Map of Arlington County, Virgina, and Vicinity, 1999.
PREPARED BY: Ricondo and Associates, Inc., January 2016.

EXHIBIT 4-12

Site Geology and Groundwater Recharge Area

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