

## 4.3 Circulation Systems

### 4.3.1 Roadways and Traffic

#### **Alternative A – Master Plan Update Alternative**

As described in Section 2.2, the Master Plan Update would prompt major changes in traffic circulation patterns in the South Parking Lot with the intention of correcting the deficiencies identified by the TMP while concurrently streamlining mass transit circulation. Most notable is the proposed conversion of South Rotary Road east of Eads Street from a one-way route to two-way dedicated commuter bus ingress and egress with direct access to the PTC. Associated improvements include relocating the commuter plaza and incorporating a dedicated rideshare lane and waiting area as well as a taxi stand into the easternmost parking lot. The specified improvements have been identified as a means of markedly improving the safety, security and efficiency of the circulation system and simultaneously creating a strong pedestrian network that minimizes the potential for pedestrian/vehicular conflicts

Additional improvements to the South Parking Lot include retrofitted LED lighting and reconfiguring all three sections of the lot to provide more efficient internal circulation which, in part, would be accomplished by limiting the number of access points to North and South Rotary Roads, consolidating informal rideshare or “slug” drivers into one location, and providing signalized intersections. The results are expected to lessen the element of driver confusion, which studies have shown commonly serves as a basis for inhibiting the flow of traffic.

Improvements proposed by the Master Plan Update for implementation in the North Parking Lot largely focus on improved organization of impound and contractor staging areas. The impound lot and MACC trailers would be relocated to the area currently designated as a contractor laydown area and both would be made permanent features with the addition of appropriate vegetative screening. Added improvements include retrofitted LED lighting, a pedestrian path, and stormwater management techniques.

To further alleviate potential traffic circulation impediments, tour buses would no longer be routed to the South Parking Lot for passenger drop-offs and pick-ups near the intersection of Eads Street and South Rotary Road, but rather would be directed to the Hayes Street Parking Lot in accordance with the Pentagon South Pedestrian Safety Project. According to previous traffic analysis, since daily tour bus volumes seasonally vary and may arrive/depart at any time, their presence has the potential to momentarily inhibit traffic flow as a result of their operation in the Master Plan Area.

With fewer vehicles driving to the Pentagon daily due to a 1,295 space reduction in available parking spaces, traffic conditions on the Reservation would likely improve slightly with the greatest difference being noticeable during peak commuting hours. Conversely, the reduction in spaces would likely have a positive but minor impact on I-395 traffic volumes.

The implementation of projects to improve circulation and parking would result in short-term construction-related impacts to current users of the roadways within the Master Plan area as a result of lane closures and/or detours that could adversely affect roadway capacity and temporarily contribute to

traffic congestion. However, the staggered implementation of the circulation/parking improvement projects would lessen the overall inconvenience and impact on parking and traffic circulation.

### ***Mitigation***

Traffic management plans will be developed for individual construction projects affecting circulation to mitigate potential impacts. Details of the traffic management plans will address issues such as: the daily hours of construction including whether construction will proceed through the peak traffic periods, whether and when lanes will be closed, if detours will be used, security considerations, maintenance of traffic safety, access routes for construction vehicles, and ways to alert employees and other roadway users of changes in traffic conditions.

### ***Conclusion***

With the application of appropriate mitigation measures, short-term, construction-related impacts associated with circulation projects would be minor. Meanwhile long-term impacts of implementing the roadway and traffic projects detailed by the Master Plan Update would have an overall beneficial effect on roadways and traffic at the Pentagon Reservation.

### **Alternative B – No Action Alternative**

Implementing the No Action Alternative would result in a continuance of the current traffic circulation patterns and the associated deficiencies that impede the flow of traffic throughout the Master Plan Area, resulting in long-term minor adverse impacts.

## **4.3.2 Parking**

### **Alternative A – Master Plan Update Alternative**

Implementing the 2014 Pentagon Master Plan Update would reduce the volume of parking resources on the Pentagon Reservation in an effort to progress incrementally toward the NCPC goal of 1 parking space for every 4 employees. By implementing the proposed Master Plan projects, the number of employee parking spaces would decrease by 1,295 parking spaces or 15 percent from approximately 8,494 to 7,199.

The reduction in parking spaces would result in short term inconvenience to employees who currently drive and park at the Pentagon Reservation. Under the Master Plan Update, implementation of the TMP would help to encourage alternative employee transportation patterns and use such as public transit, bicycling, walking, carpooling, and slug lanes. The reduction in parking spaces is also a long-range element of the Master Plan Update, so employees would be provided sufficient time to evaluate alternatives.

Relocating tour bus drop-off and pick-up to the Hayes Street Parking Lot from its present location in the South Parking Lot would contribute to alleviating potential circulation impediments within the Reservation, as discussed in Section 4.3.1. Arlington County is planning a streetcar stop in the median of Army Navy Drive in this location. In addition, WMATA is planning for four bus bays in this location. The project concept design has been coordinated with Arlington County and WMATA. This improvement would coincide with the conversion of current tour bus drop-off and pick-up to a designated area for ride sharing.

The parking lot improvements detailed by the Master Plan Update would result in short-term construction-related impacts for Pentagon employees as parking spaces are reconfigured and decline in numbers over the term of the project(s). However, the staggered implementation of the parking lot improvement projects would lessen the overall inconvenience and impact on parking resources.

### ***Mitigation***

As described in Section 4.3.1, traffic management plans will be developed for individual construction projects affecting circulation/and parking to mitigate potential impacts. Parking lot improvements would create temporary disruptions as employees are required to utilize the remaining available parking resources within the Master Plan Area. Accordingly, temporary wayfinding measures will be employed by the Pentagon to assist motorists in locating available parking spaces and to minimize disruptions to circulation.

In the long term, as the number of parking spaces on the Reservation declines, demand management strategies detailed in the TMP will be implemented to aid Pentagon employees in transitioning from single occupancy vehicles to other means of transportation, including public transit, carpooling, slugging, and/or telecommuting.

### ***Conclusion***

With the application of mitigation measures, short-term construction-related impacts would be minor. The overall long-term impacts of implementing the recommendations of the Master Plan Update and TMP would be negligible on Pentagon Reservation parking resources.

### **Alternative B – No Action Alternative**

Under the No Action Alternative, the future parking resources of the Pentagon would remain unchanged and no impacts would occur.

## **4.3.3 Public Transportation**

### **Alternative A – Master Plan Update Alternative**

As discussed in Sections 2.2.3 and 4.3.1, improved circulation on South Rotary Road east of Eads Street is proposed to better accommodate buses traveling to and from the PTC as well as personnel informally ride-sharing, using a clearly identified “slug” lane, or arriving by taxi. Improvements would include reconfiguring South Rotary Road to provide direct access to the PTC for transit vehicles with dedicated ingress/egress bus lanes from Eads Street. Circulation improvements would also include direct access to the PTC for the Pentagon Circulator to facilitate the bus loop through the Reservation. The “slug lanes” and taxi stand would be incorporated into the relocated ridesharing area within the easternmost parking. Accordingly, pedestrian circulation would be configured to minimize potential conflicts with vehicular circulation.

The Pentagon South Pedestrian Safety Project, which would relocate tour bus drop-off and pick-up to the Hayes Street Parking Lot would include four tour bus bays and four WMATA bus bays as part of a TIGER Grant. The addition of the bus bays and public bike parking in the Hayes Street Lot, along with Arlington County’s planned streetcar stop in the median of Army Navy Drive at this location would help to create a multi-modal transit location.

Realigning roadways in accordance with proposed public transportation improvements would prompt roadway closures resulting in short-term, construction-related disruptions to circulation. Because the proposed projects would be staggered over a 20-year period, implementation of the various projects would not take place at the same time, which would lessen the overall impact. However, the staggered implementation of the public transportation improvement projects would lessen the overall inconvenience and impact on employee usage.

### ***Mitigation***

As described in Section 4.3.1, construction traffic management plans will be developed during the design phase of each project and implemented to minimize impacts on users of Pentagon Reservation roadways.

### ***Conclusion***

With the application of appropriate mitigation measures, short-term, construction-related impacts associated with roadway and traffic projects would be minor. Meanwhile, the implementation of the roadway and traffic projects related to transit detailed by the Master Plan Update will have an overall beneficial long-term effect on public transportation at the Pentagon Reservation.

### **Alternative B – No Action Alternative**

Under the No Action Alternative, the public transportation options would continue in their present configuration and no impacts would occur.

## **4.3.4 Pedestrian/Bicycle Circulation**

### **Alternative A – Master Plan Update Alternative**

Implementation of the Master Plan Update would necessitate and result in the incremental realignment of pedestrian circulation in association with the corresponding facility, site, security and traffic circulation improvements.

Pedestrian circulation in the North Parking Lot would remain unchanged aside from the addition of a tree-lined, north-south pedestrian path added to the center of the lot. Likewise pedestrian circulation in the North Parking Lot that is regularly used by Pentagon employees for jogging would remain unchanged.

As detailed in Section 4.3.1, implementation of the Master Plan Update would prompt the reconfiguration of pedestrian circulation within the South Parking Lot in association with the relocated commuter plaza and the reconfiguration of vehicle parking in that area. As a result, pedestrian circulation would be aligned to minimize the potential for vehicle-pedestrian conflicts and be defined by raised and signalized crosswalks equipped with an advanced pedestrian warning system.

The relocation of tour bus drop-off to the Hayes Street Lot for passenger drop-off and pick-up would align the pedestrian circulation route of visitors to the Pentagon 9/11 Memorial and Pentagon Building arriving by bus with that of visitors arriving by automobile, many of whom park in the Pentagon City Mall parking garage. This overlap of circulation routes for pedestrian visitors reduces the potential for pedestrian-vehicle conflicts by limiting the number of interaction points to a single location at the intersection of the pedestrian pathway and South Rotary Road. As a result, the potential effect of

pedestrian circulation on traffic would be reduced as fewer interaction points translate to less idling time at crosswalks. This would further translate to less engine exhaust released into the environment.

Potential pedestrian-vehicle conflicts at crossings on Army-Navy Drive, South Rotary Road, Eads Street, and within the South Parking Lot would be reduced. As with the improvements associated with the relocation of the commuter plaza, pedestrian walkways would be defined and crosswalks would be raised and signalized with an advanced pedestrian warning system.

Current proposed improvements to bicycle circulation include connectivity to Columbia Pike, along with added pedestrian circulation, and the creation of signed on-street bicycle lanes on Boundary Channel Drive, North and South Rotary Roads, and Connector Road. A signed on-street bike lane would be installed along Boundary Channel Drive from its intersection at Routes 110 and 27 to the future I-395 roundabout. The bike routes on the Reservation and entering the Reservation from the I-395 roundabout would be signed for use by DoD/Pentagon badge holders. A bike path would be added from the future I-395 roundabout along Boundary Channel Drive between the fence line and the Pentagon Lagoon via an easement provided by WHS to Arlington County for the path's construction. This public path and the bike lane around the southern end of the I-395 roundabout would provide a connection from the roundabout to Long Bridge Park and the NPS multi-use trail. Further proposed improvements include a designated bicycle parking system in the existing bicycle parking area near Corridor 2. Bicycle parking would be added for DoD/Pentagon badge holders near some employee entrances, and public bike parking would be added at the Hayes Street Parking Lot.

Building pedestrian and bike projects would result in short-term, construction-related disruptions to traffic circulation system. However, the staggered implementation of the proposed projects over an extended timeframe would minimize the disruptive effects. Increased pedestrian and bicycle facilities and amenities would provide beneficial long-term impacts.

### ***Mitigation***

As described above, traffic management plans for construction will be developed for each project in order to minimize short-term impacts on the Pentagon's transportation system.

As proposed by the Master Plan Update, the pedestrian and bicycle circulation improvements are intended to simplify and facilitate greater pedestrian and bicycle accessibility to the Pentagon Reservation and outlying facilities, while minimizing conflicts with vehicular traffic. To further these efforts, and additionally mitigate any potential conflicts, pedestrian-actuated crosswalks will be located at the north entrance to the pedestrian tunnel across South Rotary Road.

### ***Conclusion***

With the application of mitigation measures, short-term construction-related impacts would be minor. In the long term, the implementation of the recommendations of the Master Plan Update and TMP would have a beneficial effect on pedestrian and bicycle circulation at the Pentagon Reservation.

### **Alternative B – No Action Alternative**

Under the No Action Alternative, pedestrian and bicycle circulation would remain the same. As a result, multiple points of potential pedestrian-vehicular conflict would be sustained that create impediments to pedestrian circulation, resulting in long-term minor adverse impacts.

### **4.3.5 Air Transportation**

#### **Alternative A – Master Plan Update Alternative**

Implementation of the Master Plan Update would include the demolition and reconstruction of the Helipad Control Tower/Fire Station to meet Federal Aviation Administration (FAA) operational requirements. The new permanent, purpose-built facility would satisfy space and programming requirements as well as provide adequate, unobstructed views of the helipad and approaching aircraft from the tower. The helipad would remain in its current location on the David O. Cooke Terrace. Construction of a permanent tower that meets operational requirements would also result in the issuance of a permanent FAA permit, which would replace the temporary permit under which the current tower operates. This would have beneficial, long-term effects on the safety of aircraft operations at the Pentagon helipad.

Under the Master Plan Update Alternative, the Pentagon helipad would remain in its current location on the David O. Cooke Terrace and above the RDF. This would continue to result in helicopter exhaust fumes occasionally being sucked into occupied space via the RDF's air handling system. Although not ideal, this situation is functional. Therefore, while this would have a long-term adverse impact on the RDF, it would remain minor.

#### ***Mitigation***

The current control tower/fire station would be temporarily located nearby while the new facility is constructed in its location to ensure continuity of operations. The current facility would be removed once the new facility is built.

Modification of the RDF air handling system to reduce or prevent the intake of aircraft exhaust fumes could be undertaken to minimize or eliminate this impact on personnel working in the RDF.

#### ***Conclusion***

Overall, there would be long-term beneficial impacts to the safety of aircraft operations due to the replacement of the temporary helipad control tower/fire station. Minor long-term adverse impacts to the RDF air handling system would continue.

### **Alternative B – No Action Alternative**

The No Action Alternative would result in the Helipad Control Tower/Fire Station continuing in its current operational capacity which is non-compliant with FAA standards. This would have continuing adverse effects on the safety and security of helicopter operations at the Pentagon, resulting in long-term minor to moderate impacts.

## 4.4 Physical and Biological Resources

### 4.4.1 Geology, Topography and Soils

#### **Alternative A – Master Plan Update Alternative**

Facility improvements detailed by the Master Plan Update such as the PSOC and Helipad Control Tower/Fire Station would require excavation for the placement of structural footers. Such excavation is not anticipated to affect the underlying geology since the depth to bedrock beneath the Master Plan Area ranges from 30 to 50 feet below surface grade. Thus, the construction of these facilities would not present a risk to the geologic conditions beneath the Master Plan Area, nor would the facilities be at risk as a result of the underlying geology. Implementation of the Master Plan Update would not affect topography beyond surface grading.

Based on resource information, the soil characteristics of the Pentagon Reservation would support roadway and foundation improvements. However, isolated areas of unsuitable soils may be encountered necessitating the importation of structural fill.

The proposed actions detailed by the Master Plan Update would at a minimum result in the temporary exposure of the soil surface as a result of site preparation and/or grading, which would increase the potential for wind and/or stormwater erosion. Similarly, a certain number of proposed actions would require minimal to substantial soil excavation and the associated generation of temporary soil stockpiles that would likewise be subject to erosion. As a result of both actions, eroded sediments could enter the stormwater collection/management system with subsequent transportation and discharge occurring into Boundary Channel/Pentagon Lagoon, potentially resulting in sedimentation impacts.

Based on the construction history of the Pentagon and as revealed by geotechnical investigations (Brown, 2009) on-site, large volumes of fill material from unknown sources were used to raise the grade of the Pentagon Reservation during its construction. As a result, excavated subsurface materials, in addition to representing a potential sedimentation risk, could be contaminated by man-made means and accordingly would require specific handling and/or disposal procedures.

#### ***Mitigation***

Site-specific geotechnical investigations will be undertaken during the design phase of the Helipad Control Tower/Fire Station and PSOC projects in order to evaluate and verify subsurface conditions. Depth to bedrock and the loading capacity of the soils will be assessed and the resulting data incorporated into the design of foundation systems.

The provisions of the Virginia Erosion and Sediment Control Handbook will be implemented for each project that disturbs more than 10,000 square feet to minimize potential impacts from exposed, disturbed, and/or stockpiled soils resulting from the temporary loss of impervious and/or vegetative cover as related to grading, excavating and/or other construction activity. As required by the provisions of the Virginia Stormwater Management Program Construction General Permit, stormwater pollution prevention plans will be developed and implemented for projects that disturb more than 2,500 square feet, consistent with the Pentagon's location in a designated resource management area (RMA). Erosion and sediment control plans and stormwater pollution prevention plans will be prepared during project

planning prior to soil disturbance related to construction activity. Erosion and sediment control plans will include measures to minimize and/or prevent the erosion of exposed soils, the transportation of eroded soils to surface water, and the sedimentation by eroded soils within surface water. Stormwater pollution prevention plans address the stormwater runoff and potential pollutant discharge(s) which would include appropriate containment measures to prevent environmental impact.

### ***Conclusion***

With the application of mitigation measures to the Master Plan Update projects, short-term and long-term impacts on the Pentagon Reservation's geology, topography and soils would be minor.

### **Alternative B – No Action Alternative**

Under the No Action Alternative, the proposed actions detailed by the Master Plan Update would not be individually or collectively implemented resulting in no potential effects to geology, topography and/or soils.

### **4.4.2 Water Resources**

Generally, short-term or long-term impacts on water resources would be considered adverse if they were to result in any of the following:

- Degradation of water quality – in any type of water resource – below current water quality standards, or further degradation of already-impaired waters.
- Increased nutrient or sediment runoff.
- Increased turbidity.
- Loss or degradation of wetland or aquatic habitat.
- Degradation of floodplain values or increased flood risks.

### **Alternative A – Master Plan Update Alternative**

Implementing all elements of the Master Plan Update would slightly increase the area of permeable or pervious surfaces that allow rainwater to filter into the soil from the current 79 acres to 85 acres, an increase of 7.5 percent. Although there would be variation in the quality of infiltration among pervious areas in the Master Plan Area because of soil compaction, in general this would have beneficial impacts with respect to increasing absorption and assimilation of stormwater, and increasing soil percolation for local groundwater recharge.

Implementation of LID projects and stormwater BMPs included in the Master Plan Update would convert impervious surfaces into pervious areas that would allow rainwater to infiltrate into the ground rather than draining directly into storm drains. These projects would reduce the volume and temperature of rainwater draining into the Boundary Channel/Pentagon Lagoon and ultimately into the Potomac River. By retarding and absorbing rainwater on site, LID measures and other BMPs would decrease pollutants such as sediment particles, oil, nutrients, bacteria, and chemicals that would otherwise be transported into the Boundary Channel/Pentagon Lagoon and the Potomac River. As required by EO 13508 and Section 438 of the Energy Independence and Security Act of 2007, which direct federal agencies to reduce stormwater runoff from federal projects to protect water resources, implementing LID projects would

enable DoD to strengthen stormwater management on the Pentagon Reservation and reduce the negative impact on the Potomac River and, ultimately, the Chesapeake Bay watershed. Correspondingly, the implementation of the Master Plan Update's Stormwater Quality Improvements to Meet TMDL Action Plan projects would be planned and designed to meet the sediment and nutrient reduction goals specified in the Pentagon's MS4 permit and further defined in the Pentagon's TMDL Action Plan currently being drafted. This would further result in beneficial impacts on the Potomac River and Chesapeake Bay watershed.

Negligible impacts to the floodplain of the Potomac River would be expected from implementing the Master Plan Update. In the area east of Boundary Channel Drive, the 1 percent annual chance flood area is located along the Boundary Channel/Pentagon Lagoon. Based on FEMA's 2013 flood insurance rate maps, the PSOC facility would be partially built in Flood Zone X, which by definition may be either in the 0.2 percent annual chance flood area (500-year floodplain) or in the 1 percent annual chance flood area (100-year floodplain) but with less than one foot of flooding expected. Although for most facilities and actions, the requirements of EO 11988 are triggered by projects potentially affecting the 100-year floodplain, "critical" facilities or actions within the 500-year floodplain must also be considered. "Critical" facilities are facilities for which even a small 0.2 percent annual risk of flooding is unacceptable because the resulting social, environmental, and economic impacts would be too great. Examples include government facilities essential to crisis management and the preservation of human life during a disaster, or those facilities that, if flooded, would make the situation worse, for instance by causing the release of toxic materials in the environment. If possible at all, critical facilities should not be constructed in the floodplain.

The proposed PSOC facility is not a critical facility in this sense. It would consist of a small, one-story building only partially situated in the 500-year floodplain. In case of flooding, personnel and animals housed in the facility could quickly and easily move or be moved to the adjacent higher ground and evacuated. The documents and materials kept in the Court Liaison and Evidence Room would be stored in a manner that minimizes the risk of water damage in case of flooding, for instance by keeping them on elevated shelves or in waterproof containers. Although undesirable, flood damage to these materials would not significantly disrupt or impede rescue and recovery efforts during and after a disaster. Additionally, the temporary buildings currently on the site would be demolished, partially or completely offsetting any impacts of the new facility on flood levels or floodways. Therefore, the partial location of the proposed PSOC facility within the 500-year floodplain is not anticipated to result in more than negligible impacts.

None of the Master Plan Update projects involve construction or operations in, on, or over bodies of surface water. Therefore, implementation of the Master Plan Update would have no effect on surface water bodies. No construction would take place within or near the RPA and associated wetlands along the Boundary Channel/Pentagon Lagoon. Soils disturbed and exposed by construction of individual Master Plan Update projects would be subject to erosion, potentially increasing sediment loading in existing stormwater runoff and thereby indirectly causing further impairment to surface water quality in the Boundary Channel/Pentagon Lagoon.

Soil disturbance for many of the Master Plan Update projects, such as the security, circulation, and LID improvements, would be limited to relatively shallow excavation, surface clearing, and grading; as such, there is a low likelihood that groundwater would be encountered during their construction or operation.

The implementation of LID projects, reduction in surface parking, and general decrease in impervious surface in the Master Plan Area, would have beneficial impacts on stormwater and groundwater because they would reduce runoff and increase the potential for groundwater recharge. Implementation of these projects would constitute a net beneficial impact to surface water, stormwater, and groundwater water resources over no action conditions.

### ***Mitigation***

As a federally-operated DoD facility, Section 319 of the Clean Water Act requires the Pentagon to be consistent with Virginia nonpoint source pollution abatement programs that implement the act. The proposed Master Plan Update projects will adhere to state criteria for stormwater management and water quality as stipulated in Virginia Stormwater Management Regulations and Virginia Erosion and Sediment Control Regulations. A soil and erosion control plan will be required for projects that disturb more than 2,500 square feet because the Pentagon is in a RMA, as is all of Arlington County. Clearing and grading activities, installation of staging areas, parking lots, roads, buildings, utilities, or other structures, soil/dredge spoil areas, or related land conversion activities are regulated by the Erosion and Sediment Control Law and its implementing regulations. The Pentagon will prepare and implement erosion and sediment control plans that are consistent with state law.

A General Permit for Stormwater on Construction Sites will be required for Master Plan Update projects where the area of land disturbance associated with project development will exceed 2,500 square feet because the Pentagon is within a designated RMA. As a component of the General Permit, the construction contractor will develop a stormwater pollution prevention plan in accordance with VDEQ's Stormwater Management Program as well as DoD guidance to incorporate LID strategies. The permit requires the use of BMPs for erosion and sediment control at the construction site. The permit also requires the contractor to regularly inspect stormwater discharges from the site to ensure that the BMPs are controlling the discharge of pollutants to the maximum extent practicable and are meeting water quality standards. In addition, the pollution prevention plan requires the contractor to manage other wastes on site, such as building materials, garbage, and debris, and to have controls to minimize the exposure of these materials to stormwater in order to minimize the discharge of pollutants to state waters.

Adherence to the requirements of the MS4 permit will further ensure that the Pentagon fulfills the regulations of the Virginia Stormwater Management Program. Thus, long-term impacts on stormwater quantity and quality would remain beneficial.

Because it would partially be located in FEMA Flood Zone X, the proposed PSOC facility will be designed taking into account a 1 percent annual chance of flooding of less than one foot.

### ***Conclusion***

With the application of mitigation measures to the Master Plan Update projects, short-term and long-term impacts on water resources would be beneficial overall.

### **Alternative B – No Action Alternative**

Under the No Action Alternative, the Master Plan Update improvements and associated stormwater BMPs and LID techniques would not be implemented. WHS would undertake the TMDL Action Plan in

order to comply with the Phase II MS4 permit. While the TMDL Action Plan would not include project-related Master Plan Update BMPs, adherence to the requirements of the MS4 permit would have long-term beneficial impacts due to reduced stormwater quantity and improved quality.

Conditions would remain as at present with respect to surface water, floodplains, wetlands, and groundwater. Impervious surfaces in the Master Plan Area would continue to inhibit soil percolation for groundwater recharge, resulting in long-term, indirect adverse impacts on groundwater resources.

#### **4.4.3 Federal Coastal Zone Consistency Determination**

While Arlington County is included in Virginia's coastal management area under the Coastal Zone Management Act (CZMA), the Pentagon Reservation, as Federal land, is excluded from the statutory requirements of Virginia's CZM Program. However, Section 307 of the CZMA stipulates that Federal projects in Virginia's Coastal Management Area that would have foreseeable effects on coastal zone resources must be consistent to the maximum extent practicable with the enforceable policies of the Commonwealth of Virginia's CZM Program.

WHS has concluded that implementing the Pentagon Reservation Master Plan Update Alternative would have minimal effect on the land, water, uses or natural resources of the Commonwealth of Virginia's coastal zone. The proposed action would affect natural resources in the federally-approved enforceable policies of the Commonwealth of Virginia's CZM Program, as presented in Section 3.4.3.

Based on the EA analyses, WHS has determined that the implementation of the Pentagon Reservation Master Plan Update Alternative would have less than significant impacts on land, water, uses and natural resources of the Commonwealth of Virginia's coastal zone. Thus, the Master Plan Update would be consistent to the maximum extent practicable with the enforceable policies of the Virginia Coastal Zone Management Program. WHS has prepared a Federal Consistency Determination outlining how the implementation of the Pentagon Master Plan Update Alternative would affect Virginia's coastal zone resources and the federally-approved coastal zone policies applicable to each. The Federal Consistency Determination will be submitted to VDEQ for review. A copy of the Federal Consistency Determination is included in Appendix G.

#### **4.4.4 Vegetation and Wildlife**

##### **Alternative A – Master Plan Update Alternative**

Implementation of the Master Plan Update would slightly increase the vegetated part of the Pentagon Reservation. This would primarily be achieved by converting pavement to green space through the implementation of stormwater management and LID projects. The additional vegetation would help to retain stormwater on the site and improve the quality of stormwater runoff (as discussed in Section 4.4.2), provide more habitat for wildlife, reduce noise levels, absorb pollutants, provide shade, and reduce the heat island effect of the large expanses of pavement and structure, and provide a more appealing setting for workers and visitors.

The additional vegetation would include:

- Landscape plantings of turf grass, ground cover, ornamental grasses, shrubs, and trees.

- Plantings in LID bioretention and vegetated swales, stormwater planters, tree box filters, and vegetated roofs, which would be designed to intercept rainwater and allow it to percolate into the soil.
- Restoration of the riparian buffer along the Boundary Channel and Pentagon Lagoon.

Landscape trees would be added to the Pentagon Reservation as shown on *Figure 2-6*. Landscape plantings would make use of regionally native species to the maximum extent possible in keeping with the guidance in DoD Instruction 4715.3 and the *Presidential Memorandum: Environmentally and Economically Beneficial Practices on Federal Grounds*. As described in 3.4.4, use of landscape best management practices would include restoring compacted soils by using organic matter as medium and mulch to the maximum extent practicable. Increased use of groundcovers and a decreased reliance on mowed lawns would reduce the amount of watering required, which would address the requirements of Executive Order 13514 to reduce landscaping water consumption by two percent annually.

Regionally native plants that can live in soils that flood and dry out would be planted in the LID features. Vegetation types would be selected based on specific LID features.

Restoration of the natural riparian buffer began in 2010 and would continue with a series of projects in the future. Invasive species would be removed and regionally native species of perennials, grasses, shrubs, and trees would be planted and maintained until the vegetated buffer reaches a self-sustaining width of 100 feet from the water's edge.

While the Pentagon Reservation does not have an abundance of habitat for wildlife, increasing the amount of area covered by vegetation and enhancing the diversity of plant species present would provide benefits to species that use the site. Further, by planting regionally native plant species, more variety and quantities of plants from which to derive nectar, seeds and fruits, and shelter would be available, improving the quality of the habitat.

In the short term, construction activities and associated noise may disturb wildlife species that use the Pentagon Reservation. Birds appear to be the most common wildlife on site, and they can move temporarily when disturbed. Other, less mobile species of wildlife may experience greater impacts, which could include disruption of foraging or breeding patterns. However, any such impacts would be temporary, as wildlife would resume their previous habits as conditions on the Reservation return to a pre-construction condition following the implementation of the Master Plan projects. Thus, short-term impacts on wildlife from construction activities and associated noise would be minor.

The state-listed bird species that are occasionally observed on the Pentagon Reservation may temporarily be affected by construction activities, but as noted, the background noise levels are high because of aircraft and highway traffic. Black ducks and black-crowned night herons are most likely to be found along the Boundary Channel/Pentagon Lagoon, which would not be directly affected, and would not be affected in the short or long-term, except to the extent that water quality improves with improvements in stormwater. Bald eagles do not nest on the site; their occasional forays over the Pentagon Reservation, despite the presence of helicopters and fixed-wing aircraft flying at low altitudes, would not be affected by short-term construction or long-term operation of the new facilities. Gray catbirds may nest on the Pentagon Reservation, and their chances of finding a nesting spot and food sources would improve with the proposed enhancements to vegetation.

Using the USFWS's online project review process, preliminary coordination under Section 7 of the ESA and the Bald and Golden Eagle Protection Act resulted in conclusions that implementation of the Master Plan Update may adversely affect the sensitive joint-vetch (*Aeschynomene virginica*) and Atlantic Sturgeon (*Acipenser oxyrinchus*) because potential habitat may be present on the Pentagon Reservation. As stated in Section 4.4.2, however, no Master Plan Update projects would occur in, on, or over bodies of surface water or in wetlands. Thus, there would be no potential to affect the sensitive joint-vetch, found in fresh tidal wetlands, or the Atlantic Sturgeon. Further, as stated in Sections 4.5.4, the implementation of stormwater management and LID projects would reduce the quantity of and improve the quality of stormwater runoff from the Pentagon Reservation. This would ultimately result in beneficial impacts on those species and their habitat.

Although bald eagles are sighted occasionally on the Pentagon Reservation, no nests are present within the Master Plan Area and no permits under the Bald and Golden Eagle Protection Act would be required (Appendix E). Additionally, it was determined that no areas of federally-designated critical habitat are present on the Pentagon Reservation.

Through its online project review process, USFWS provided concurrence that the implementation of the Pentagon Reservation Master Plan Update would be not likely to adversely affect federally-listed threatened and endangered species, or bald eagles. A copy of the project review documentation, including the letter of concurrence, is included in Appendix E.

The VDCR-Division of Natural Heritage determined that that the Master Plan Update would have no adverse impacts on natural heritage resources. A copy of this finding is included in Appendix F.

VDGIF will review the project when it is submitted to VDEQ for the coastal consistency review (Appendix G).

### ***Conclusion***

Overall, the impacts on vegetation and wildlife from implementing the Master Plan Update would be beneficial.

### **Alternative B – No Action Alternative**

Under the No Action Alternative, vegetation and wildlife habitat on site would continue as at present and no impacts would occur. No beneficial impacts from increasing the amount and diversity of plantings and wildlife habitat would occur.

## **4.4.5 Air Quality**

### **Alternative A – Master Plan Update Alternative**

#### **Demolition and Construction Activities**

Under the Master Plan Update Alternative various project-related demolition and construction activities would occur. These activities can be expected to cause the following short-term, minor air quality impacts:

- Fugitive dust would be generated by demolition and construction operations.

- Emissions of criteria pollutants (VOC and NO<sub>x</sub> as precursors of O<sub>3</sub>, CO, PM<sub>10</sub>, PM<sub>2.5</sub> including its precursor SO<sub>2</sub>, and greenhouse gas emissions of CO<sub>2</sub>) would result from demolition and construction activities such as:
  - Use of diesel-powered and gas-powered demolition and construction equipment,
  - Construction workers' commutes.

## Operational Activities

### *Mobile Sources*

Under the Master Plan Update Alternative, commuting vehicle operations to and from the project site are anticipated to either remain the same as compared to the No Action Alternative because no increase in on-Reservation personnel is anticipated, or be reduced because of improved mass transit alternatives identified in the TMP. Therefore the Master Plan Update Alternative would have no significant mobile source-related air quality impacts. Improved circulation could reduce the volume and duration of idling traffic, which could improve air quality on the Pentagon Reservation by reducing the potential volume of vehicular emissions associated with idling traffic.

### *Stationary Sources*

Following implementation of the Master Plan Update Alternative including an improvement of the HRP, several energy-related projects would result in changes to on-site stationary combustion source operations. These projects include:

- The Classified Waste Destruction project: this project would supplement the two existing incinerators at the HRP with a new disposal system that would destroy the classified materials delivered to the incinerator plant, resulting in a reduction of operating air and greenhouse gas (GHG) emissions.
- The Cogeneration/CHP project: this project would replace three existing boilers in the HRP with multiple gas turbines fitted with heat recovery steam generators that would be capable of meeting 80 to 90 percent of the Pentagon's steam load during the winter in addition to generating electricity. During the summer, excess steam would be directed to steam-powered chillers to provide chilled water to the Pentagon. The three existing boilers to be replaced would provide redundancy and supplemental steam when necessary. By generating electricity on site, the Cogeneration/CHP Project would increase the Pentagon's grid independence by approximately 35 percent. This project would result in additional operating air emissions on the Pentagon Reservation.
- The Pentagon Power Security Upgrade project: this project would construct a bank of seven diesel generators, including two standby generators, with appropriate fuel storage that would provide emergency power to the Pentagon Reservation in the event that normal commercial power is interrupted or lost. The generator bank would also be utilized to reduce the amount of power drawn from the commercial grid during normal operation. This project has the potential to cause a net increase in operating air emissions on the Pentagon Reservation.

The combination of projects described above would likely produce a net increase in operational air emissions. However, these future projects lack specific design details that would allow estimation of their operational air emissions and associated ambient air quality impacts in the neighborhood. It is

anticipated that VDEQ air permit modification applications will be prepared for these energy projects in the future to ensure project compliance with applicable regulatory requirements, resulting in less than significant air quality impacts.

Although the existing permit limits imposed on Pentagon Reservation operations under existing conditions are slightly below the major source threshold, it is likely that this threshold would be exceeded with implementation of the three energy projects described above as part of the Master Plan Update Alternative requiring a Clean Air Act Title V permit at Pentagon Reservation. The likely exceedance of the major source threshold primarily would result from an increase in on-site power capacity as a result of constructing the Cogeneration/CHP project and the Pentagon Power Security Upgrade diesel generators to be used for reduction of the amount of existing power drawn from the commercial grid during normal operation.

#### New Source Review and Air Permitting

Prevention of Significant Deterioration (PSD) regulations were established by the USEPA to ensure that air quality in clean (attainment) areas does not significantly deteriorate and that a margin for future industrial growth is maintained. This is to be accomplished by requiring major emission sources and major modifications to major emission sources to employ the best available control technology (BACT) to curb air pollutant emissions.

Moreover, since the Pentagon Reservation is located in a nonattainment area for NO<sub>x</sub>, VOC, and PM<sub>2.5</sub>, nonattainment area New Source Review (NSR) could apply under the Master Plan Update Alternative particularly for NO<sub>x</sub>. Therefore, it is likely that the future potential new stationary sources including the proposed Cogeneration/CHP and Pentagon Power Security Upgrade diesel generators may be subject to nonattainment NSR requirements because of the potential Pentagon Reservation-wide NO<sub>x</sub> net increase. However, the determination of NSR applicability can only be made after these projects reach the final design stage, their emissions are estimated, and air permits are developed. If applicable, the new sources would likely be required to use the lowest-achievable emission rate (LAER) technology.

#### Clean Air Act General Conformity Applicability Determination

A General Conformity Rule (GCR) applicability analysis was conducted for the proposed action's demolition and construction activities according to the guidance provided by the USEPA in *Determining Conformity of General Federal Actions to State or Federal Implementation Plans* (November 30, 1993 and March 24, 2010). Under the GCR, reasonably foreseeable emissions associated with the proposed federal action, both direct and indirect, must be quantified and compared to the annual *de minimis* levels for the pollutants for which the project area is in nonattainment or maintenance status. As defined by the GCR, if the emissions of a nonattainment criteria pollutant (or its precursors) do not exceed the *de minimis* level, the Federal action has minimal air quality impact and the action is determined to conform for the pollutant under study. Therefore, no further analysis is necessary. Conversely, if the total direct and indirect emissions of a pollutant are above the *de minimis* level, a formal general conformity determination is required for that pollutant. The GCR applicability analysis is detailed in Appendix D.

For proposed actions in Arlington, which is an 8-hour O<sub>3</sub> moderate nonattainment area in an O<sub>3</sub> transport region, a PM<sub>2.5</sub> nonattainment area, and a CO maintenance area, the *de minimis* levels are 100 tons per year (tpy) for NO<sub>x</sub>, PM<sub>2.5</sub>, CO, and SO<sub>2</sub>, and 50 tpy for VOCs.

### Operational Emissions

The proposed Cogeneration/CHP and the Pentagon Power Security Upgrade generator operations would result in net increases in nonattainment and maintenance pollutant emissions on the Pentagon Reservation. As indicated above, given the current permitted limits established in VDEQ Permit Registration #70030, it is likely that the new power projects would cause the existing permitted limits (Table 3-8) to exceed the major source threshold, i.e., 100 tons per year for certain pollutants, such as NO<sub>x</sub>. Thus, a major source PSD and/or nonattainment area NSR program would likely be required during the future air permit modification process. According to the GCR §51.853(j), for “actions subject to preconstruction NSR or PSD programs under the Act”, the conformity is presumed and these actions are exempt from further GCR determination. Therefore a quantification of operational emissions under the Master Plan Update Alternative is not warranted.

### Construction Emissions

The predicted demolition, and construction activity associated emission results are summarized in Table 4-1. For NEPA disclosure purposes, Table 4-1 also includes the predicted emissions for attainment criteria pollutants and greenhouse gas emissions in terms of CO<sub>2</sub>.

**Table 4-1: Total Demolition and Construction Emissions**

Emission Source	Pollutant (tons)						
	VOC	NO <sub>x</sub>	CO	PM <sub>2.5</sub>	PM <sub>10</sub>	SO <sub>2</sub>	CO <sub>2</sub>
Diesel Equipment	0.81	7.25	6.02	0.46	0.47	0.15	754.50
Motor Vehicles	0.04	0.67	0.15	0.05	0.06	0.00	218.69
Total Construction	0.85	7.92	6.17	0.51	0.53	0.15	973.19
De minimis Level	50	100	100	100	NA	100	NA

The projections presented in Table 4-1 are based on estimated usage hours and emission factors for each type of motorized equipment that can reasonably be expected to be used during the implementation of the proposed action.

Under the GCR, total annual emissions resulting from proposed federal actions must be compared to the applicable *de minimis* levels on an annual basis. As defined by the GCR, if the emissions of a nonattainment criteria pollutant (or its precursors) do not exceed the *de minimis* level, the federal action has minimal air quality impact and is determined to conform for the pollutant under consideration. No further analysis is necessary. Conversely, if the total direct and indirect emissions of a pollutant are above the *de minimis* level, a formal general conformity determination is required for that pollutant.

As shown in Table 4-1, the expected increases in construction emissions conservatively assumed to occur entirely within just one year under Alternative A with the highest emission potential would be well below the applicable *de minimis* criteria. Therefore, a formal conformity determination is not required and air quality impacts under the proposed Alternative A would be negligible and non-significant.

## *Mitigation*

During construction, fugitive dust for each project requiring earth movement would be kept to a minimum by using control methods outlined in 9 Virginia Code 5-50-60 *et seq.* of the *Regulations for the Control and Abatement of Air Pollution*. These precautions include, but are not limited to, the following:

- Use, where possible, of water for dust control;
- Install and use hoods, fans, and fabric filters to enclose and vent the handling of dusty materials;
- Cover open equipment used for conveying materials; and
- Remove promptly spilled or tracked dirt or other materials from paved streets and remove dried sediments resulting from soil erosion.

## *Conclusion*

Overall, with the application of mitigation measures and compliance with applicable future regulatory requirements, the implementation of the Master Plan Update would result in less than significant air quality impacts in the short- and long-term.

### **Alternative B – No Action Alternative**

Under the No Action Alternative, none of the activities included in the Master Plan Update would take place. Existing conditions would continue and there would be no change to the air quality conditions, and therefore no impact.

## **4.4.5 Noise Impacts**

### **Alternative A – Master Plan Update Alternative**

In the short term, the construction activities associated with each proposed Master Plan Update project would elevate noise levels in the Master Plan Area and vicinity. Noise-producing activities would include demolition of existing pavement and structures; site clearing and grading; erection of buildings and structures; and the movements of construction-related traffic such as heavy delivery/hauling trucks and construction workers' private vehicles.

The use of heavy equipment, such as backhoes, bulldozers, and excavators, would typically generate noise levels of 85 to 100 dBA at the source; jack hammering reaches 102-111 dBA at the source (Center to Protect Workers' Rights, 2003). However, noise levels decrease as the distance between the noise source and receptor increases: the noise from an earthmover is 94 dBA 10 feet away but only 82 dBA 70 feet away (Center to Protect Workers' Rights 2003). Therefore, it is likely that elevated noise levels caused by construction noise would in most cases be limited to the immediate vicinity of the particular construction project; farther away, the construction noise would add a minor element to the already-elevated ambient noise levels characteristic of the Pentagon Reservation and its surroundings. Noise from construction activities relatively close to the Pentagon Building would be attenuated by the building's reinforced windows and structurally-hardened walls, minimizing disturbance to workers inside the building.

The Pentagon 9/11 Memorial, a noise sensitive area, would be temporarily affected by the increase in noise levels resulting from three adjacent projects: reconstruction of the South Parking Lot, construction of the SAL, and construction of the West End Safety Upgrade pedestrian plaza. Most noticeable would be

pavement demolition and earthmoving activities for each of the three projects. Particularly during pavement demolition, noise levels over 90 dBA near the equipment may occur, but would be lower when the noise reaches the Memorial. Construction activities in the middle and eastern parts of the South Parking Lot would be much less intrusive because they would be several hundred feet away from the Memorial.

Noise-sensitive areas on the periphery of the Master Plan Area – ANC to the west and northwest and medium- and high-density residential uses (Pentagon City) to the south – are well away from the proposed construction sites and would be marginally affected. Arlington Cemetery is separated from the Master Plan Area by Route 27, a six-lane limited-access highway. The residential uses to the south are separated from the majority of the Master Plan Area by I-395, which at this location is comprised of approximately 14 lanes, and Army Navy Drive, which is six lanes wide. A parking lot on Army Navy Drive between South Joyce Street and South Hayes Street is included in the Master Plan Area; it is separated from a five-story apartment building by Army Navy Drive. Traffic noise from the highways and aircraft noise likely would exceed any construction-generated noise, although louder sounds, such as those caused by jack hammering operations, could possibly be heard from the cemetery or in Pentagon City. Noise from construction projects would be below the Arlington County construction noise thresholds before reaching these sensitive noise areas.

Construction of the Master Plan Update's individual projects would not be simultaneous or continuous. Rather, the projects would be phased throughout the Master Plan Update's 20-year timeframe. Louder activities would be of short duration, infrequent, and temporary. Noise levels would vary throughout the phases of each project, and the noise generated by construction activities would last only as long as the duration of the project. Upon the completion of each project, ambient noise in the Master Plan Area would return to pre-construction levels.

In the long term, the implementation of the Pentagon Reservation Master Plan Update would not cause an overall increase in ambient noise levels in the Master Plan Area or vicinity. Although helicopter takeoffs and landings would not increase, the helipad would remain near ANC, a sensitive noise area. However, noise conditions in the part of the cemetery closest to the Pentagon Reservation are more likely governed by traffic on Route 27 and air traffic from Reagan National Airport than by helicopters, so this effect would be negligible. The Pentagon Electric Upgrade substation that would include a transformer and other electrical equipment would generate operational noise; however, given the distance from the project to noise sensitive receptors, impacts would be negligible.

The Master Plan Update Alternative includes construction and operation of a new Helipad Control Tower and Fire Station but no change in the number or type of flight operations accommodated by the helipad. If changes to the mix of aircraft or number of daily operations at the helipad were considered, they would be addressed in future NEPA documentation prepared for the helipad.

The proposed PSOC facility at the northern end of the Pentagon Reservation would include an indoor firing range that would be utilized by PFFPA personnel for weapons training and a kennel for PFFPA's working dogs. The noise from the indoor firing range would not affect noise levels beyond the PSOC site. Dogs barking in the kennels may be heard at ANC, a sensitive noise area, but the edge of the cemetery is more than 1,000 feet away from the kennels, and they are separated by Route 27. Therefore, it is unlikely that dog barking would prove annoying to cemetery visitors.

### ***Mitigation***

Construction planning for the projects near the Pentagon 9/11 Memorial will include assessing the potential value and feasibility of erecting temporary noise barriers or using other technology to shield visitors to the Pentagon Memorial from short-term construction noise that would result from the improvements to the South Parking Lot and construction of, the SAL and the pedestrian plaza.

The construction contractor for each project will develop and implement a construction traffic management plan to ensure that construction-related traffic will utilize appropriate routes to the construction site. This will reduce or eliminate potential adverse impacts from such traffic on sensitive noise receptors along the routes.

When possible and to the maximum extent practicable, construction activities associated with Master Plan Update projects will take place during permissible daytime hours as stipulated in the Noise Control Ordinance of Arlington County (7:00 a.m. to 9:00 p.m. weekdays, 10:00 a.m. to 9:00 p.m. on weekends and legal holidays). However, some Master Plan Update projects may require overnight, weekend, and similar after-hours work to effectively execute certain aspects of particular projects or to complete particular projects in their entirety. In such cases, when the construction activity would have the potential to adversely affect a sensitive noise receptor, the construction contractor will apply to Arlington County for a construction noise exemption. Additionally, the Pentagon and/or construction contractor will provide ample advanced notice of the upcoming after-hours work to occupants and/or users of the affected sensitive noise receptor(s).

### ***Conclusion***

Temporary, short-term construction-related noise impacts would be negligible to minor when mitigation measures are applied. Long-term impacts on noise levels on and in the vicinity of the Pentagon Reservation would be negligible to minor. The existing high ambient noise levels would continue.

### **Alternative B – No Action Alternative**

None of the projects included in the Pentagon Master Plan Update would be implemented under the No Action Alternative. Noise levels in the Master Plan Area would remain as at present. Therefore, there would be no impact on noise levels under the No Action Alternative.

## 4.5 Utilities

### 4.5.1 Potable Water

#### **Alternative A – Master Plan Update Alternative**

Over the long term, implementation of the Master Plan Update would not require an increase in the volume of potable water and/or the efficiency of its delivery systems because the population of the Pentagon Reservation and demand for water are expected to remain the same upon completion of the proposed action. Facility improvements recommended by the Master Plan Update and subsequent project-related utilities studies for the proposed Helipad Control Tower/Fire Station and the PSOC/North Village Modifications would require re-evaluation if the project scopes are modified. Several additional proposed projects, such as the Cogeneration/Combined Heat and Power (CHP) Project, would each require assessment during design to confirm that the nearest service lines are appropriately sized and contain sufficient capacity for domestic and fire protection uses. In the short-term, use of water may slightly increase due to construction uses including the establishment of landscape plantings. Because drought tolerance would be an important factor in selecting species and varieties of trees and groundcover plants, increased use of water would gradually taper off after planting takes place.

The remainder of the proposed improvements would not have a potable water requirement; however, their implementation may necessitate the excavation and relocation of existing potable water supply lines. Precautions would be taken to locate buried water lines prior to all excavation and grading activity. Trenching to install/re-route/upgrade service lines could potentially result in temporary disruptions to traffic circulation.

#### ***Mitigation***

The mitigation of the potential adverse effects associated with encountering subsurface utilities as a result of water supply line installation/relocation/upgrading will require the identification and marking of all subgrade utilities within the project site for comparison to existing utility maps during the design phase of each project. Furthermore, in the interest of public safety and to mitigate potential circulation impediments, contractors will coordinate the scheduling of utility projects with appropriate Pentagon authorities to alert employees in a timely manner. Adequate signs will also be posted alerting commuters of potential delays and suggesting the use of alternate routes.

#### ***Conclusion***

With the application of mitigation measures, the Master Plan Update would result in negligible short- and long-term impacts on potable water infrastructure.

#### **Alternative B – No Action Alternative**

Under the No Action Alternative, the Master Plan Update would not be implemented, and impacts associated with modifying the water supply system would not occur.

## 4.5.2 Energy Systems

### Alternative A – Master Plan Update Alternative

Implementing the Pentagon Reservation Master Plan Update may require the extension of energy system connections to proposed new and upgraded facilities including the PSOC, Pentagon Motor Pool, Cogeneration/CHP, Pentagon Power Security Upgrade, Pentagon Electric Upgrade, and Pentagon South Pedestrian Safety Project. Because energy system service mains already exist in the areas of these projects, the ability to obtain the necessary connection(s) is a detail that would be addressed during project design. Furthermore, implementation of both the PSOC and Helipad Control Tower/Fire Station Projects may require localized reconfiguration and extension of existing utilities.

Proposed Master Plan improvements to the HRP as specified by the Energy Conservation Investment Program (ECIP) include the Classified Waste Destruction and Cogeneration/CHP projects. Per the ECIP, the Classified Waste Destruction project involves supplementing the two existing incinerators at the HRP with a new disposal system that, once operational, would destroy the classified materials delivered to the incinerator plant.

The Cogeneration/CHP Project involves replacing three of the existing boilers in the HRP with multiple gas turbines fitted with heat recovery steam generators that would be capable of meeting 80-90 percent of the Pentagon's steam load during the winter in addition to generating electricity. During the summer, excess steam would be directed to steam-powered chillers to provide chilled water to the Pentagon. The three remaining boilers would provide redundancy and supplemental steam when necessary. By generating electricity onsite, the Cogeneration/CHP Project would create a positive impact by increasing the Pentagon's grid independence by approximately 35 percent which equates to approximately 600,000 MMBTUs. Furthermore, project implementation would reduce WHS's Scope 1 and Scope 2 GHG by approximately 26,000 MTCO<sub>2</sub>e which equates to an approximately 15 percent reduction from WHS's FY 2008 baseline of 177,000 MTCO<sub>2</sub>e. Per ECIP, these reductions would contribute toward DOD's agency-wide goal to reduce GHG emissions by 34 percent by 2020.

The Classified Waste Destruction and Cogeneration/CHP projects would be integrated and accommodated by the existing energy resources and infrastructure including the electrical main extending northwestward to the Pentagon and the gas main extending south of the HRP.

Similarly, the duct bank housing the Dominion Power high voltage service feed to the Pentagon bisects the North Parking Lot; accordingly, caution would be exercised during excavation and grading in association with implementing any proposed improvements in the vicinity. The duct bank transecting the North Parking Lot combined with the high water table and topographic constraints could limit the extent of implementing new traffic patterns and subsequent stormwater management changes in the North Parking Lot.

The Pentagon Power Security Upgrade entails the construction of a bank of at least seven diesel generators collectively housed in a permanent structure with appropriate fuel storage that would provide emergency power to the Pentagon Reservation in the event that normal commercial power is interrupted or lost. The generator bank would likewise be utilized to reduce the amount of power drawn from the commercial grid during normal operations. The proposed location on the Pentagon Reservation is under evaluation and the specific design details would be determined following the acceptance of the Master

Plan. Design would likewise occur in concurrence with the design of the Cogeneration/CHP Facility as the supplemental power plant is planned to complement that facility. Overall, however, implementation of the Pentagon Power Security Upgrade would further minimize the Pentagon's reliance on the commercial grid, particularly in the event of a catastrophic power failure, thereby resulting in a beneficial effect on energy systems on the Pentagon Reservation.

Modifying the Pentagon Reservation's energy system by adding service connections could require the installation of pad-mounted transformers. Generally, throughout the Pentagon Reservation Master Plan Update, trenching may be required in the event of modifying the electrical lines, which could affect traffic circulation patterns. Overall, the projects included in the Master Plan Update would have negligible or no impact on the energy system infrastructure within the Master Plan Area.

### *Mitigation*

The mitigation of the potential adverse effects associated with encountering subsurface utilities during energy service construction/line installation/re-routing projects will require the identification and marking of all subgrade utilities within the project site for comparison to existing utility maps during the design phase of each project. Furthermore, in the interest of public safety and to mitigate potential circulation impediments, contractors will coordinate the scheduling of utility projects with appropriate Pentagon authorities to alert employees in a timely manner. Adequate signs will also be posted alerting commuters of potential delays and suggesting the use of alternate routes. The completion of projects in the vicinity of subgrade Dominion Power service lines will require a heightened level of coordination between the utility, designers, and contractors.

If the installation of pad-mounted transformers is required for additional service connections, the transformers will be confirmed to be free of polychlorinated biphenyls (PCBs).

### *Conclusion*

With the application of mitigation measures, the Master Plan Update would result in negligible short- and long-term impacts on energy systems, with beneficial impacts occurring due to an increase in the Pentagon Reservation's grid independence.

### **Alternative B – No Action Alternative**

Under the No Action Alternative, the proposed actions of the Master Plan Update would not be implemented and the status quo would be maintained. The efficiency of the classified waste destruction facility and the HRP would not be improved, and the Pentagon's reliance on the commercial power grid would not be minimized. In addition, sufficient backup power in the event of a major power failure would not be available. This would have a long-term minor to moderate adverse impact on those components of the energy system on the Pentagon Reservation.

For all other aspects of the Pentagon Reservation's energy system, impacts resulting from the No Action Alternative would be negligible or minor.

### 4.5.3 Telecommunications

#### **Alternative A – Master Plan Update Alternative**

The implementation of the Pentagon Reservation Master Plan Update would require that attention be given to the existing telecommunications utilities located within proposed project areas. Underground telecommunications lines/duct banks are present throughout the site but because of security concerns are generally not mapped. Close coordination with Pentagon Reservation staff on all projects is required to determine the locations of the existing telecommunications lines relative to required excavation or grading, as well as to determine the need for future access and/or to add capacity.

Implementation of the Master Plan Update would necessitate trenching to extend telecommunications services as a result of PSOC, all security-related projects including the vehicular and pedestrian ACPs, Cogeneration/CHP, Classified Waste Destruction and the Pentagon Motor Pool Project. Such trenching may result in temporary disruptions to traffic circulation.

#### ***Mitigation***

Mitigation of the potential adverse effects associated with encountering subsurface utilities during telecommunication line installation/relocation will require the identification and marking of all subgrade utilities within the project site for comparison to existing utility maps during the design phase of each project. Furthermore, in the interest of public safety and to mitigate potential circulation impediments, contractors will coordinate the scheduling of utility projects with appropriate Pentagon authorities to alert employees in a timely manner. Adequate signs will also be posted alerting commuters of potential delays and suggesting the use of alternate routes.

#### ***Conclusion***

The Master Plan Update would result in negligible short- and long-term impacts on telecommunications systems.

#### **Alternative B – No Action Alternative**

Under the No Action Alternative, the proposed actions of the Master Plan Update would not be implemented, and corresponding impacts associated with telecommunication system modification would not occur.

### 4.5.4 Stormwater Management

#### **Alternative A – Master Plan Update Alternative**

As discussed in Section 4.4.2, implementing all elements of the Master Plan Update would slightly increase the area of pervious surfaces from the current 79 acres to 85 acres, an increase of 7.5 percent. Correspondingly, this would improve stormwater runoff quality, minimize peak runoff volume, and encourage infiltration for groundwater recharge in accordance with the applicable local, state, and federal regulations. Nonetheless, the size of the individual Master Plan Update projects listed below would exceed land disturbance thresholds for erosion and sediment control plans as stipulated in the Pentagon's MS4 permit:

- West End Safety Upgrades

- South Parking Lot Improvements
- Pentagon South Pedestrian Safety Project
- Helipad Control Tower/Fire Station
- North Parking Lot Improvements
- Relocation of the Impound Lot/MACC Trailers
- PSOC/North Village Modifications
- Pentagon Electric Upgrade (East Utility Tunnel)
- Pentagon Power Security Upgrade

The projects listed above would also be subject to the Virginia Stormwater Management Program Stormwater Regulations (9VAC25 – Chapter 830) addressing stormwater management, as administered through the Pentagon’s current MS4 permit. Depending on final project design and land disturbance calculations, the listed projects may also exceed land disturbance thresholds for stormwater management found in Section 438 of the EISA, and therefore would also exceed thresholds for the Chesapeake Bay Ordinance.

Major stormwater collection systems in the vicinity of each project provide adequate capacity to accommodate any increased flow requirements. Modification to branch collection systems, land conversion from impervious pavements to pervious green areas combined with best management practice (BMP) technologies, may be required to collect and treat stormwater per permit requirements for each individual project. Per VDEQ permitting guidelines, land conversion is the preferred first step in all renovation projects followed by the implementation of low impact development BMP technologies if land conversion is not practicable. Of primary concern are large land redevelopment projects such as the South and North Parking Lot Improvements projects.

Based on current design concepts, the conversion of impervious surfaces to pervious green areas in association with both the South and North Parking Lot Improvements projects would result in decreases that may be insufficient to satisfy VDEQ permitting requirements as calculated using the Virginia Runoff Reduction Methodology. Selection of BMP for projects involving large disturbed areas (like the South Parking Lot Improvements Project) gravitates towards a limited number of alternatives. Designers would be required to conduct an in-depth engineering evaluation of soils, geology, topography and existing infrastructure. Based on previous infiltration studies at selected locations on the Reservation, soils in all locations were found to be predominantly Type C and Type D (fine particle clays and sandy clays). Also, the shallow elevations of existing storm sewer infrastructure in both the South and North Parking Lots reduce potential BMP options.

In the South Parking Lot, infiltration technologies therefore appear to be impractical. The selective use of vegetated filter strips, dry swales, and bioretention could offer LID solutions if the areas adjacent to the pavement can be graded to provide the necessary open area. Permeable pavement in parking stalls or underground filtering technologies (sand or cartridge) are additional LID technologies available if either the grading or hydraulic tie-ins to existing infrastructure are not practicable.

Modifications to the North Parking Lot have additional restraints. The presence of both high water table conditions and more stringent existing hydraulic gradients may further limit BMP choices to wet swale type BMP technologies. In both parking lots, additional geotechnical investigations may define areas where infiltration technologies can be used or where existing elevations of surface and ground water allow for additional strategies that require separation from groundwater to be used.

Major stormwater quantity increases are not anticipated because the projects would not result in a substantial increase in impervious surface on the Reservation. Projects would be reviewed under the MS4 permitting requirements.

Section 438 of the EISA states that projects with greater than 5,000 square feet of disturbance restore the site's post-development hydrology to predevelopment status, to the maximum extent technically feasible (METF). To accomplish this objective, each individual project must capture, treat and recycle/infiltrate/evapotranspire the design storm runoff. The design storm runoff can be calculated by either historically comparing the site before modern development (woods in good condition in most cases) to the proposed development or using a calculated 95<sup>th</sup> percentile storm (1.7- inch storm for Washington, D.C.).

Green roofs, infiltration technologies in Type A soils (sands and gravels), and rainwater harvesting are several of the key technologies available for achieving the stated requirements of Section 438 of the EISA. Accordingly, green roofs would be investigated for all new projects, and geotechnical investigations would be conducted to confirm the previous soils classifications. Rainwater harvesting for irrigation is currently occurring for major portions of the site with irrigation pumps installed in the Pentagon Lagoon where the majority of surface run-off is discharged for both the Pentagon Reservation and for a portion of Arlington National Cemetery.

### *Mitigation*

Potential negative impacts to stormwater management during construction of Master Plan Update projects would be minimized through use of VDEQ-approved erosion and sediment control plans. Potential negative impacts to post-construction stormwater management are mitigated through the implementation of VDEQ-approved stormwater management measures which are, identified in VDEQ-approved plans developed for each project. Assuming that these mitigation measures are executed, then implementing the Master Plan Update would have minimal adverse impact on stormwater management on a project-by-project basis. Overall, when land is converted from impervious to pervious and/or VDEQ-approved LID BMPs are installed to treat stormwater discharge on individual projects, the impacts on Pentagon Reservation-wide stormwater management would be beneficial.

To minimize any potential impacts resulting from inadvertent surface releases, site-specific stormwater pollution prevention plans would be prepared for all Master Plan projects disturbing more than 2,500 square feet of land, in accordance with the General Permit for Discharges of Stormwater from Construction Activities.

### *Conclusion*

Overall, incorporating these mitigation measures into Master Plan Update projects would result in beneficial impacts on the stormwater management system as pervious surfaces increase and more stormwater is retained on site.

### **Alternative B – No Action**

Under the No Action Alternative, the Master Plan Update improvements would not be implemented and the corresponding impacts related to modifying or expanding the stormwater management system would not occur within the Master Plan Area. WHS would undertake the TMDL Action Plan in order to comply with the Phase II MS4 permit, which would have long-term beneficial impacts to stormwater management.

## **4.5.5 Sanitary Sewer System**

### **Alternative A – Master Plan Update Alternative**

Since the population of the Pentagon Reservation and general water use are not expected to increase with implementation of Master Plan Update, wastewater generation would not increase in enough capacity to inhibit wastewater system efficiency. The majority of the proposed projects would result in no impacts to the sanitary sewer system. The existing service to the proposed PSOC would require replacement and improvements of existing sanitary sewer system components. All other projects that require sanitary sewer building connections would be extended to adjacent gravity sanitary sewers to accommodate the proposed facilities.

### *Mitigation*

The mitigation of the potential adverse effects associated with encountering subsurface utilities during sanitary sewer line installation/relocation/modification will require the identification and marking of all subgrade utilities within the project site for comparison to existing utility maps during the design phase of each project.

### *Conclusion*

The Master Plan Update would result in negligible short- and long-term impacts on the sewer system.

### **Alternative B – No Action Alternative**

Under the No Action Alternative, the proposed actions of the Master Plan Update would not be implemented, and corresponding impacts associated with sanitary sewer system modification would not occur.

## **4.5.6 Solid Waste**

### **Alternative A – Master Plan Update Alternative**

Implementation of the Master Plan Update would generate solid waste through the demolition of existing facilities and development of the proposed projects. With the anticipated volumes of solid waste to be generated by the proposed actions, solid waste staging would likely be required in association with proper disposal. As a result, the temporary staging of solid waste could have temporary minor adverse impacts on the quality of stormwater runoff.

Because the population of the Pentagon is expected to stay constant throughout the Master Plan Update period, the operation of facilities constructed under the Master Plan Update is not expected to generate volumes of solid waste that would substantially increase those currently generated by existing facilities.

### ***Mitigation***

During construction, erosion and sediment control measures similar to those employed for soil erosion will be implemented to minimize potential impacts from exposed, disturbed, and/or stockpiled solid wastes. In addition, a demolition and construction debris recycling program will be implemented in accordance with waste reduction and minimization policies.

Once facilities become operational, solid wastes generated within the Master Plan Area will be managed in accordance with existing Pentagon policies for the collection and sorting of recyclable materials for appropriate disposal.

### ***Conclusion***

The Master Plan Update would result in minor short-term and negligible long-term impacts on waste management systems and procedures at the Pentagon Reservation.

### **Alternative B – No Action Alternative**

Under the No Action Alternative, the projects detailed by the Master Plan Update would not be implemented, and the volume of solid waste would not be affected. As a result, there would be no impacts on solid waste.

## **4.5.7 Hazardous Waste**

### **Alternative A – Master Plan Update Alternative**

In the short term, construction operations associated with the Master Plan Update projects would require the storage and use of some hazardous substances such as oils, lubricants, paints, or similar products on the work sites. Quantities would be limited and typical of small- to medium-size construction projects; construction contractors would be required to manage them in accordance with federal, state, and DoD regulations and procedures.

As noted in Section 3.5.7, a potential exists on the Pentagon Reservation for encountering contaminants during soil excavation activities. Prior to soil disturbance associated with Master Plan Update projects, borings would be conducted to determine the presence of contaminants in soils underlying the project sites. Contingency plans to deal with contaminants that may be encountered during excavation would be developed and implemented as necessary. Soils excavated during the implementation of Master Plan Update projects would be tested for the presence of contaminants prior to disposal or re-use on the Reservation; no excess soils would be transported off-site for re-use or disposal, in accordance with Pentagon policies. Any currently unknown contaminants identified on the Pentagon Reservation during construction activities would be remediated in accordance with state, federal and DoD laws, regulations, and instructions.

For these reasons, the Master Plan Update would have no short-term, construction-related impacts on hazardous substances or hazardous wastes on the Pentagon Reservation.

When operational, the Helipad Control Tower/Fire Station would use petroleum products and produce petroleum wastes. Fuel would also be stored and used on-site for the Pentagon Power Security Upgrade project. Grease, lubricants, fuel, and other chemicals associated with operations at the new Helipad Control Tower/Fire Station, and fuel associated with the Pentagon Power Security Upgrade, would be transported, handled, stored, and disposed of in accordance with all applicable state and federal laws and regulations and DoD instructions. Fuel, oil and/or other petroleum products associated with the new facilities would be stored in approved tanks that would be inspected regularly for leaks and spills, and an oil spill control plan would be in place to limit damage if a spill were to occur. In addition, the new Helipad Control Tower/Fire Station would replace the existing facility, thereby offsetting any increase over current levels in the use of hazardous substances or the generation of hazardous wastes resulting from that project. Hazardous substances used throughout the Reservation, such as petroleum products and pesticides, and hazardous wastes including used oil, would continue to be transported, stored, handled, and disposed of in accordance with state and Federal laws and DoD instructions. Therefore, impacts on hazardous substances and hazardous wastes on the Pentagon Reservation resulting from the Master Plan Update would be negligible.

### ***Mitigation***

During construction activities, standard mitigation measures will be taken to prevent pollutants from reaching the soil, groundwater, or surface water. For example, during project activities, contractors will be required to perform daily inspections of equipment, maintain appropriate spill-containment materials onsite, and store all fuels and other materials in appropriate containers. Equipment maintenance activities will not be conducted on the project sites. In the long term, following the implementation of the Master Plan Update Alternative, the handling of hazardous substances will continue to be undertaken in accordance with state and Federal laws and DoD instructions.

### ***Conclusion***

Impacts on hazardous substances and hazardous wastes resulting from the Master Plan Update Alternative would be negligible.

### **Alternative B – No Action Alternative**

Under the No Action Alternative, the Pentagon's use of hazardous substances, such as petroleum products and pesticides, would continue as at present. Hazardous substances and wastes would be transported, stored, handled, and disposed of in accordance with all state and federal laws and regulations and DoD instructions. For these reasons, the No Action Alternative would have no adverse impacts on hazardous substances and hazardous wastes on the Pentagon Reservation.

## 4.6 Cumulative Impacts

Cumulative impacts result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. They are considered within the analysis so that the environmental impacts of the proposed action are not viewed in isolation, but are understood within the context of other ongoing or planned changes.

The past, present, and reasonably foreseeable future actions that could contribute to cumulative impacts are described in Chapter 1, Section 1.5.

### 4.6.1 Socio-economic Resources

The proposed projects in the Master Plan Update to the Pentagon Reservation have the potential to create cumulative impacts to land use. These elements include the creation of more open space within the Pentagon Reservation, the proposed pedestrian plaza for the Pentagon 9/11 Memorial, and the proposed changes to the interchange at Columbia Pike. When considered with the proposed realignment of Columbia Pike, the demolition of FOB2 and extension of open space at that site, and the creation of recreational facilities and public open space at Long Bridge Park, there would be a beneficial cumulative impact on land use in the area surrounding the Pentagon Reservation.

### 4.6.2 Cultural Resources (Historic and Archaeological Resources, Visual Resources)

Proposed elements in the Master Plan Update to the Pentagon Reservation have the potential to combine with other planned projects in the area to create cumulative impacts to cultural resources, when considered together with the impacts of the proposed action.

When the addition of open space in the Master Plan Update (including demolition of some existing non-historic facilities) is considered together with the expansion of ANC and the addition of a Heritage Center at the former location of FOB2, beneficial cumulative impacts would occur to cultural resources.

Revitalization of the Columbia Pike corridor, together with traffic and circulation improvements in the Master Plan update, would also result in beneficial cumulative impacts. Similarly, the Columbia Pike Multimodal Street Improvements project involves revitalization of the historic route and streetscape enhancements that would, together with circulation improvements, result in a beneficial impact to historic resources.

### 4.6.3 Circulation Systems

If construction of elements of the Master Plan Update occurs simultaneously with other projects in the area, this could contribute to a minor short-term adverse cumulative impact to vehicular circulation on area rights-of-way. However, because the proposed projects would be spread over a number of years, implementing the various Master Plan projects would not take place at the same time, which would lessen the overall inconvenience and impact on parking and traffic movements.

Cumulative beneficial impacts would occur due to the circulation improvements proposed by the Master Plan Update, the improvement of the 14<sup>th</sup> Street Bridge Corridor, the proposed Columbia Pike realignment, the proposed multimodal street improvements and street car projects, and the proposed access to Long Bridge Park. There would also be a long-term beneficial cumulative impact to vehicular circulation due to the proposed reduction in parking on the Pentagon Reservation.

#### **4.6.4 Physical and Biological Resources**

If construction of Master Plan Update projects occurs simultaneously with other projects in the area, there could be minor short-term adverse cumulative impacts to soil, water quality, and wildlife due to soil erosion and sedimentation and an increase in air emissions, dust, and noise-producing activities associated with construction. However, best-management practices would be implemented during construction and the proposed Master Plan projects would be implemented over a number of years, limiting the overlap of projects.

Cumulative beneficial impacts would occur due to the increase in vegetative cover and the increase in pervious surfaces to aid in improving water quality proposed by the Master Plan Update, the extension of open space at the FOB2 site, and the creation of public open space in Long Bridge Park.

#### **4.6.5 Utilities and Infrastructure**

Potential short-term adverse cumulative impacts to stormwater management could occur if construction of Master Plan Update projects occurs simultaneously with other projects in the area. However, impacts would be minimized through use of erosion and sediment control plans and stormwater management measures.

The proposed elements in the Master Plan Update to the Pentagon Reservation have the potential to create cumulative impacts to stormwater management and groundwater recharge. These elements include the implementation of LID projects, the reduction of surface parking, and a general decrease in impervious surface area. When considered with the extension of open space at the FOB2 site, and the creation of recreational facilities and public open space at Long Bridge Park, there would be a beneficial cumulative impact on stormwater management in the area surrounding the Pentagon Reservation.

## 4.7 Summary and Comparison of Impacts

The table below provides a summary of each alternative's impacts on the resources analyzed in the Environmental Assessment.

**Table 4-2: Summary of Impacts**

<b>Resources</b>	<b>Alternative A – Master Plan Update Alternative</b>	<b>Alternative B – No Action Alternative</b>
Land Use Patterns	Beneficial impacts	No impact
Planning Control and Policies	Minor adverse and some beneficial impacts	Minor impacts
Demographics and Environmental Justice	No impact	No impact
Historic and Archaeological Resources	Negligible and some beneficial impacts, with potential minor adverse impacts; the parallel Section 106 consultation process is ongoing	No impact
Visual Resources	Moderate impacts to views within the Reservation; minor to moderate impacts to views from surrounding areas; beneficial impacts from areas within and surrounding the Reservation	No impact
Roadways and Traffic	Short-term minor and long-term beneficial impacts	Minor impacts
Parking	Short-term minor and long-term negligible	No impact
Public Transportation	Short-term minor and long-term beneficial impacts	No impact
Pedestrian/Bicycle Circulation	Short-term minor and long-term beneficial impacts	Minor impacts
Air Transportation	Minor adverse and beneficial impacts	Minor to moderate impacts
Geology, Topography and Soils	Minor impacts	No impact
Water Resources	Beneficial impacts	Beneficial impacts
Vegetation and Wildlife	Beneficial impacts	No impact
Air Quality	Short-term minor and long-term less than significant impacts with applicable future regulatory requirements	No impact
Noise	Short- and long-term negligible to minor impacts	No impact
Potable Water, Energy Systems, and Telecommunications	Negligible impacts; and beneficial impacts to energy systems	No impact to potable water or telecommunications; minor to moderate impact to energy system components
Stormwater Management	Beneficial impacts	Beneficial impacts
Sanitary Sewer and Solid Waste	Negligible impacts	No impact
Hazardous Substances	Negligible impacts	No impact

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# APPENDICES

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## B. LIST OF PREPARERS

### AECOM

- *Richard Dorrier, Principal/Senior Planner*  
MLA, Regional Planning, University of Massachusetts  
BA, Environmental Science, University of Virginia
- *Lisa Park, Associate Principal/Project Manager*  
BS, Industrial Engineering and Operations Research, Virginia Polytechnic Institute and State University
- *Adriane Fowler Truluck, Senior Associate*  
MLA, Landscape Architecture, University of Virginia; Certificate in Historic Preservation, University of Virginia  
BA, Geography-Anthropology, Vassar College
- *Penny Douglas, Senior Environmental Planner*  
M.A., Geography, University of Maryland  
B.S., Natural Resource Planning, University of Michigan
- *Victor Frankenthaler, Senior Environmental Planner*  
M.S., Geography, Rutgers University  
B.S., Environmental Planning and Design
- *Fang Yang, Senior Air Quality Scientist*  
M.S., Atmospheric Science, New York University  
B.S., Physics, Fudan University
- *Laurent Cartayrade, Senior Environmental Planner*  
PhD, MA, University of Maryland-College Park, History  
BA, University of Paris IV-Sorbonne
- *Craig Carver, Environmental Planner*  
M.U.R.P., Urban Planning, Virginia Commonwealth University  
B.A., Music, Virginia Commonwealth University
- *Matthew Longacher, Planner*  
Master of Urban and Environmental Planning, University of Virginia  
B.S., Biology, College of William and Mary
- *Susan Bemis, Environmental Planner*  
Master of Urban and Environmental Planning, University of Virginia  
B.A., Policy Studies and Spanish, Dickinson College

Timmons Group

- *John T. Russell, PG*  
M.S. Geology, Old Dominion University  
B.S. Geology, Virginia Polytechnic Institute and State University
- *Tom Seaborn, Senior Project Manager*  
M.S. Sanitary Engineering, Virginia Polytechnic Institute and State University  
B.S., Civil Engineering, Virginia Polytechnic Institute

Civilian staff at the Department of Defense contributed information contained in this Environmental Assessment. In addition, design and planning staff at AECOM provided valuable contributions to this EA.

## C. DISTRIBUTION LIST

### Department of Defense (DoD)

Washington Headquarters Service (WHS)  
Pentagon Force Protection Agency (PFPA)  
Office of the Secretary of Defense (OSD)  
1155 Defense Pentagon  
Washington, DC 20301-1155

U.S. Army Corps of Engineers (USACE)  
Baltimore District  
10 South Howard Street  
Baltimore, MD 21201

Joint Base Commander  
Joint Base Myer-Henderson Hall  
204 Lee Avenue, Suite 107  
Fort Myer, Virginia 22211-1116

### Federal

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401 9<sup>th</sup> Street, NW  
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Washington, DC 20590

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1200 Pennsylvania Avenue, NW  
Washington, DC 20460

National Park Service  
National Capital Region  
1100 Ohio Drive, SW  
Washington, DC 20242

Arlington National Cemetery  
Administrative Building  
Arlington, VA 22211

*State*

Virginia Department of Environmental Quality  
629 East Main Street  
Richmond, VA 23219

Virginia Department of Conservation and Recreation  
217 Governor Street  
Richmond, VA 23219

Virginia Department of Game and Inland Fisheries  
4010 West Broad Street  
Richmond, VA 23230

Virginia Department of Historic Resources  
2801 Kensington Avenue  
Richmond, VA 23221

Virginia Department of Transportation  
4975 Alliance Drive  
Fairfax, VA 22030

*Local Government*

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2100 Clarendon Boulevard  
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Arlington County Public Library – Central Library  
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Arlington, VA 22202

Arlington County Public Library – Plaza Branch  
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Arlington, VA 22201

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## D. GENERAL CONFORMITY RULE AND AIR EMISSIONS ANALYSIS

### D.1 Introduction

This appendix provides the following analyses of potential air quality impacts:

- Criteria pollutants emissions analysis and Clean Air Act general conformity rule applicability analysis.
- Greenhouse gas analysis.

### D.2 Clean Air Act Conformity

The 1990 amendments to the Clean Air Act (CAA) require federal agencies to ensure that their actions conform to the appropriate State Implementation Plan (SIP) in a nonattainment area. The SIP provides for implementation, maintenance, and enforcement of the National Ambient Air Quality Standards (NAAQS); it includes emission limitations and control measures to attain and maintain the NAAQS. Conformity to a SIP, as defined in the CAA, means conformity to a SIP's purpose of reducing the severity and number of violations of the NAAQS to achieve attainment of the standards. The federal agency responsible for a proposed action is required to determine if its proposed action conforms to the applicable SIP.

The US Environmental Protection Agency (USEPA) has developed two sets of conformity regulations; federal actions are differentiated into transportation projects and non-transportation-related projects:

- Transportation projects, which are governed by the "transportation conformity" regulations (40 CFR Parts 51 and 93), effective on December 27, 1993 and revised on August 15, 1997.
- Non-transportation projects, which are governed by the "general conformity" regulations (40 CFR Parts 6, 51 and 93) described in the final rule for *Determining Conformity of General Federal Actions to State or Federal Implementation Plans* published in the *Federal Register* on November 30, 1993. The general conformity rule became effective January 31, 1994 and was revised on March 24, 2010.

This general conformity applicability analysis is prepared as an appendix to the environmental assessment (EA) for the Pentagon Reservation Master Plan Update implementation in Arlington County, Virginia. Since the proposed action is a non-transportation project, only the general conformity rule applies.

### D.3 General Conformity

#### D.3.1 Attainment and Nonattainment Areas

The general conformity rule applies to federal actions occurring in air basins designated as nonattainment for the NAAQS or in attainment areas subject to maintenance plans (maintenance areas). Federal actions occurring in air basins that are in attainment with the NAAQS are not subject to the conformity rule.

A criterion pollutant is a pollutant for which an air quality standard has been established under the CAA. The designation of nonattainment is based on the exceedances or violations of the air quality standard. A maintenance plan establishes measures to control emissions to ensure the air quality standard is maintained in areas that have been re-designated as attainment from a previous nonattainment status.

Under the requirements of the 1970 Clean Air Act (CAA), as amended in 1977 and 1990, the USEPA established NAAQS for six criteria pollutants: carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), inhalable particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), and lead (Pb).

Areas that meet the NAAQS for a criterion pollutant are designated as being in "attainment;" an area where a pollutant level exceeds the corresponding NAAQS is designated as being in "nonattainment." O<sub>3</sub> nonattainment areas are subcategorized based on the severity of their pollution problem (marginal, moderate, serious, severe, or extreme). PM<sub>10</sub> and CO nonattainment areas are classified as moderate or serious. When insufficient data exist to determine an area's attainment status, it is designated unclassifiable (or in attainment).

The Pentagon Reservation Master Plan Update implementation would take place at the Pentagon, which lies within Arlington County, VA, an area that is currently designated as a nonattainment area for PM<sub>2.5</sub>, a moderate nonattainment area for 8-hour O<sub>3</sub>, a maintenance area for CO, and an attainment area for the other criteria pollutants. O<sub>3</sub> is principally formed from nitrogen oxides (NO<sub>x</sub>) and volatile organic compounds (VOC) through chemical reactions in the atmosphere. SO<sub>2</sub> is considered a precursor of PM<sub>2.5</sub>.

### **D.3.2 *De Minimis* Emissions Levels**

To focus general conformity requirements on those federal actions with the potential to have significant air quality impacts, threshold (*de minimis*) rates of emissions were established in the final rule. A formal conformity determination is required when the annual net total of direct and indirect emissions from a federal action occurring in a nonattainment or maintenance area for a criterion pollutant would equal or exceed the annual *de minimis* level for that pollutant. Table D-1 lists the *de minimis* levels for each pollutant.

Table D-1

*De Minimis* Emission Levels for Criteria Air Pollutants

Pollutant	Nonattainment Designation	Tons/Year
Ozone*	Serious	50
	Severe	25
	Extreme	10
	Other nonattainment or maintenance areas outside ozone transport region	100
	Marginal and moderate nonattainment areas inside ozone transport region	50/100**
Carbon Monoxide	All	100
Sulfur Dioxide	All	100
Lead	All	25
Nitrogen Dioxide	All	100
Particulate Matter ≤ 10 microns	Moderate	100
	Serious	70
Particulate Matter ≤ 2.5 microns***	All	100
Notes: * Applies to ozone precursors – volatile organic compounds (VOC) and nitrogen oxides (NO <sub>x</sub> ); ** VOC/NO <sub>x</sub> ; *** Applies to PM <sub>2.5</sub> and its precursors.		

For O<sub>3</sub> nonattainment areas, USEPA's conformity rules establish *de minimis* emission levels for both O<sub>3</sub> precursors, VOC and NO<sub>x</sub>, on the presumption that VOC and NO<sub>x</sub> reductions will contribute to reductions in O<sub>3</sub> formation. Since the project site is located in an O<sub>3</sub> moderate nonattainment area in an O<sub>3</sub> transport region, the *de minimis* levels of 100 tons per year (tpy) of NO<sub>x</sub> and 50 tpy of VOC apply.

For PM<sub>2.5</sub> nonattainment areas, USEPA's conformity rules establish *de minimis* emission levels for both PM<sub>2.5</sub> and its precursor, SO<sub>2</sub>. Although the project area is currently designated as in attainment for SO<sub>2</sub>, SO<sub>2</sub> was considered in the analysis as a precursor of PM<sub>2.5</sub>. The *de minimis* level of 100 tpy applies to both PM<sub>2.5</sub> and SO<sub>2</sub>. For CO maintenance areas, 100 tpy is the *de minimis* level.

### D.3.3 Analysis

This CAA General Conformity Rule (GCR) analysis was conducted according to the guidance provided by 40 CFR Parts 6, 51, and 93. *Determining Conformity of Federal Actions to State or Federal Implementation Plans*, (USEPA, November 30, 1993 and March 24, 2010).

The analysis was performed for Alternative A, the Master Plan Update, under which the highest emission potential is anticipated, to determine whether a formal conformity analysis would be required. Other

alternatives discussed in the EA would have similar but smaller air impacts due to the smaller scale of construction/demolition activities under these alternatives. Pursuant to the GCR, all reasonably foreseeable emissions (both direct and indirect) associated with the implementation of the Alternative A were quantified and compared to the applicable annual *de minimis* levels to determine potential air quality impacts.

The conformity analysis for a federal action examines the impacts of the direct and indirect net emissions from mobile and stationary sources. Direct emissions are emissions of a criterion pollutant or its precursors that are caused or initiated by a federal action and occur at the same time and place as the action. Indirect emissions, occurring later in time and/or further removed in distance from the action itself, must be included in the determination if both of the following apply:

- The federal agency can practicably control the emissions and has continuing program responsibility to maintain control.
- The emissions caused by the federal action are reasonably foreseeable.

Increased direct and indirect NO<sub>x</sub>, VOC, PM<sub>2.5</sub>, CO, and SO<sub>2</sub> emissions would result from the following potential demolition and construction activities:

- Use of diesel and gas-powered demolition and construction equipment.
- Movement of trucks containing construction and removal materials.
- Commuting of construction workers.

## **D.4 Emissions Determination**

The GCR requires that potential emissions generated by any project-related activity and/or increased operational activities be determined on an annual basis and compared to the annual *de minimis* levels for those pollutants (or their precursors) for which the area is classified as nonattainment or maintenance. Emissions attributable to activities related to the Master Plan Update Alternative were analyzed for NO<sub>x</sub>, VOC, PM<sub>2.5</sub>, CO, and SO<sub>2</sub>. Additionally, for the EA disclosure purposes, PM<sub>10</sub> emissions and greenhouse gas emissions in terms of Carbon Dioxide (CO<sub>2</sub>) were also estimated.

### **D.4.1 Planned Operational Activities**

Commuting vehicle operations are anticipated to remain the same as compared to No Action Alternative conditions because no increase in on-Reservation personnel is anticipated. Therefore the Master Plan Update Alternative would result in minimal change in mobile source-related air emissions.

Following the implementation of the Master Plan Update Alternative including an improvement of the HRP, several energy-related projects would result in changes in on-site stationary combustion source operations including:

- The Classified Waste Destruction project would destroy rather than incinerate the classified materials delivered to the incinerator plant, resulting in a reduction of air emissions.

- The Cogeneration/Combined Heat and Power project would increase the Pentagon's grid independence by approximately 35 percent resulting in additional air emissions on the Reservation.
- The Pentagon Power Security Upgrade project would provide emergency power to the Reservation in the event that normal commercial power is interrupted or lost. The generators would be utilized to reduce the amount of power drawn from the commercial grid during normal operation, causing a potential net increase in air emissions on the Reservation.

However, these future power projects lack specific design details that could be used to reasonably predict associated increase in emissions. Moreover, because the existing permit limits imposed on operations are just slightly below the major source threshold, it is likely that this threshold would be exceeded under the Master Plan Update Alternative, primarily due to an increase in power capacity as a result of constructing a new Cogeneration/CHP as a supplement to the existing HRP.

Because the construction of a new Cogeneration/CHP would likely cause the Reservation to become a major source exceeding 100 tons per year for certain criteria pollutants such as NO<sub>x</sub>, a major source Prevention of Significant Deterioration (PSD) and/or nonattainment area New Source Review (NSR) program will likely be required during the future air permit modification process. According to the GCR §51.853(j), for "*actions subject to preconstruction NSR or PSD programs under the Act*", the conformity is presumed and these actions are exempt from further GCR determination. Therefore a quantification of operational emissions under the Master Plan Update Alternative is not warranted and considered in the EA.

#### **D.4.2 Proposed Construction Activities**

Estimates as to construction crew and equipment requirements and productivity are based on data presented in:

- "2003 R.S. Means Facilities Construction Cost Data", R.S. Means Co., Inc., 2002
- "2003 R.S. Means Facilities Construction Cost Data", R.S. Means Co., Inc., 2002

The assumptions and calculations presented below are based on the planned actions and provides a planning-level description of the proposed work. The planned work includes construction of the following:

- Pentagon Support Operations Center (PSOC) – a 25,825 square feet (SF) facility (inclusive of a kennel, indoor firing range and evidence room). The facility will be a 1-story structure.
- North Village Modifications – Temporary modular buildings, a small storage building, and two sewage settling tanks would be demolished. Areas not incorporated into the PSOC would be left as open space for future development.
- Helipad Control Tower/Fire Station (CT/FS) – A 5,630 SF structure including a 5,074 SF fire station and a 556 SF control tower (three stories above the fire station) for the existing helipad would be constructed.
- Motor Pool – A 600 SF structure with office/support space, plus fenced-in parking for 20 vehicles.

- Pentagon Power Security Upgrade - This project would reduce the reliance on the grid for power supply. Sizes are not specified.
- Cogeneration/Combined Heat and Power – This project would also reduce the reliance on the grid for power supply.
- Electric Upgrade - A project that would install an electrical substation enclosure set partially inside an existing grassy hill at the Corridor 8 Bridge.
- Classified Waste Destruction– This project would provide sustainable methods for destruction of classified materials using a new disposal system. This would be installed within the existing incinerator plant.
- Circulation Improvements – The existing approximately 20-acre South Parking Lot will be demolished and reconstructed to incorporate low-impact development (LID) design principles and reorganized to improve parking lot operations, new “Slug Lanes” be constructed, and safety and security improvements will be.
- Security Projects - A fence/barrier around the perimeter of the Pentagon building , HRP, and North Village areas would be implemented. Permanent access control points would replace existing temporary facilities.
- Site Improvements –, A pedestrian plaza near the Pentagon 9/11 Memorial and a series of LID projects would be implemented throughout the Pentagon Reservation.

Because most of the structures are described in a similar manner regarding type of construction (reinforced concrete with pile foundations), a “typical” 15,000 gross square footage structure is employed for the purposes of estimating the bulk of the proposed construction work, and scaled as appropriate to the actual size of each facility. This approach is employed for the PSOC and Control Tower/Fire Station.

### *PSOC Building*

The PSCO building would provide 25,825 SF of floor space on one level with a total building height of 25 feet. It would be a cast-in-place reinforced concrete structure on pile foundations. Construction items for this structure include the following:

- Foundation
- Enclosure – One floor with roof to be framed:
- Interior construction and finishes
- Interior utility installations
- Other systems including backup power generator

### *North Village Modifications*

Work in this area consists of the demolition of temporary modular buildings, a storage building, and two sewage settling tanks. The sizes of the buildings and tanks are not specified. For estimate purposes, it is

assumed that structures with a total of 20,000 SF of floor space with an average 20-foot structure height are to be demolished as an overall equivalent measure.

#### *Helipad Control Tower/Fire Station Building*

The Control Tower/Fire Station building would provide 5,382 SF of floor space. Because the method of construction is generally similar, the Control Tower/Fire Station building is not separately estimated, but is based on the ratio floor space of the CT/FS as compared to the PSOC (26.3 percent of the PSOC floor area).

#### *Motor Pool*

It is assumed that the Motor Pool building would be of similar construction to the PSOC, and estimated based on the ratio floor space as compared to the PSOC (2.3%).

For the fenced parking area with a 20-vehicle capacity, it is assumed that the lot will have dimensions of 150 ft by 100 ft (1,667 SY or 0.34 ac).

#### *Pentagon Power Security Upgrade*

The power security building would house diesel-powered emergency generators and fuel storage to provide backup power. The size, design and location are not yet established. For estimate purposes, assuming an average of 88 kBtu/SF energy consumption (per DOE Buildings Energy Book) for buildings of post-1990 vintage (based on recent renovation of Pentagon as compared to actual construction date), 52 percent of the total 89 million kWh of electricity is consumed annually; estimating two-thirds is consumed during normal business hours and a 2,000-hour work schedule is used, average real-time consumption requiring replacement by backup power is 29,815 kW. Assume that half is to be provided on a routine basis by the COGEN plant (estimated separately), and that half is normally supplied by the grid but would require replacement in the event of a grid failure. Therefore, 15,000 kW of backup power is required.

For the power security structure, a steel-framed structure with cast-in-place reinforced concrete enclosures on pile foundations is assumed. Construction items for this structure include the following:

- Foundation
- Enclosure – One floor with roof to be framed:
- Mechanical systems

#### *Pentagon Electric Upgrade*

This project is similar in scope to the Pentagon Power Security Upgrade, but about half the size. It was conservatively assumed that the same emissions levels would result from this upgrade as compared to the Pentagon Power Security Upgrade.

### Cogeneration/Combined Heat and Power

The Cogeneration/Combined Heat and Power project replaces existing equipment in the power plant in the HRP. Size and design are not yet established. Gas turbines would be installed for power generation, and the potential requirement to increase the power plant's existing footprint will be determined during detailed design.

### Classified Waste Destruction

This project may require increasing the footprint of the existing incinerator building in the HRP to adequately house the new equipment. It is assumed that the installation of the equipment is negligible in comparison to the project as a whole, and is not estimated separately.

### Site-Wide Civil Items

This section includes the demolition of existing structures and pavement, installation of major new utility infrastructure, construction or reconstruction of parking areas, and miscellaneous other site improvements. Relative quantities were not provided for the various site projects. It is assumed that electrical, natural gas, telecommunications, potable water, and sewer service must be provided to the planned project as necessary requiring total new infrastructure installations of 15,000 LF for each major utility. It is further assumed a total of 10 acres of new pavement will be constructed in the form of new or reconstructed roads, parking lots and/or walkway/bikeways, and that a total of 50,000 SF of existing buildings (other than that included in the North Village estimate) are assumed to be scheduled for demolition, plus 5 acres of pavement. These civil items would include:

- Clearing of existing vegetation
- Existing structure demolition
- Existing pavement demolition
- Site grading
  - Duct banks to provide electrical and telecom services
  - Electric service drop
  - Telecom service drop
  - Water distribution
  - Vitrified clay pipes and plain joints
  - Gas service line
  - Streetlights
  - Pavement
  - Site wide landscaping – assume total area for landscaping is 5 ac
  - Security perimeter fence is assumed to consist primarily of concrete-filled pipe bollards
  - Guard stations

### **D.4.3 Construction Equipment Operations and Emissions**

The quantity and type of equipment necessary were determined based on the activities needed to implement the proposed action as described above. All equipment was assumed to be diesel-powered unless otherwise noted. Each piece of equipment is assumed to be operated continuously during each 6-hour working day, which is equivalent to eight hours per day. Pieces of equipment to be used include, but are not limited to:

- Backhoe loaders
- Chain saws
- Chipping machines
- Compressors
- Concrete pumps
- Cranes
- Dozer
- Front end loaders
- Gas engine vibrators
- Gas welding machines
- Graders
- Hammers
- Pavers
- Rollers
- Dump trucks
- Tractor trucks
- Water tank trucks

Estimates of equipment emissions were based on the estimated hours of usage and emission factors for each motorized source for the project. Emission factors for NO<sub>x</sub>, VOC, CO, CO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, and SO<sub>2</sub> related to heavy-duty diesel equipment were obtained from NONROAD emission factor model (USEPA, 2008).

The USEPA recommends the following formula to calculate hourly emissions from non-road engine sources including cranes, front end loaders, etc.:

$$M_i = N \times HP \times LF \times EF_i$$

where:

$M_i$  = mass of emissions of  $i$ th pollutants during inventory period;

$N$  = source population (units);

$HP$  = average rated horsepower;

$LF$  = typical load factor; and

$EF_i$  = average emissions of  $i$ th pollutant per unit of use (e.g., grams per horsepower-hour).

Typical load factor values were obtained from NONROAD model emission factor worksheet (USEPA, 2008). Estimated emissions from operation of on-site equipment are presented in Table D-2.

#### **D.4.4 Construction Vehicle Operations and Emissions**

Truck and commuting vehicle operations would result in indirect emissions. However, the only activities that are subject to the general conformity determination include vehicle operations within Pentagon reservation site. Motor vehicle operations within Pentagon reservation site are assumed and summarized as follows:

- Pickup, dump and other trucks would travel at an average speed of 25 miles per hour (mph) on site, for a total estimated on-base run time of two hours per working day; and
- Each worker's commuter vehicle would take a 20-minute round trip to commute within Pentagon reservation site at an average speed of 25 mph.

Emission factors for motor vehicles were calculated for year 2012 for both trucks (modeled as heavy duty diesel vehicles) and commuter vehicles (modeled as light duty gasoline vehicles) using the USEPA MOVES 2010b, the most recent mobile source emission factor model, associated with national default input parameters available in the model for Arlington County where the project site is located. These emission factors were then multiplied by the vehicle operational hours to determine motor vehicle emissions (Table D-3).



Table D-3  
Motor Vehicle Emissions Worksheet for Proposed Action

Activity	Hours of Operation	VOC Emission factor (lbs/hr)	NOx Emission factor (lbs/hr)	CO Emission factor (lbs/hr)	PM2.5 Emission factor (lbs/hr)	PM10 Emission factor (lbs/hr)	SO2 Emission factor (lbs/hr)	CO2 Emission factor (lbs/hr)	VOC	NOx	CO	PM2.5	PM10	SO2	CO2	Emissions (tons)
<b>Truck Emissions</b>																
Construction																
Total Vehicles =	7238															
Total working days =	250															
Running mins per day per veh =	120	0.01	0.09	0.01	0.01	0.01	0.00	28.00	0.04	0.66	0.05	0.05	0.06	0.00	202.66	
<b>Commuter Vehicle Emissions</b>																
Construction																
Total vehicles =	22204															
Total working days =	250															
Running mins per day per veh =	20	0.00	0.00	0.03	0.00	0.00	4.33	4.33	0.00	0.01	0.10	0.00	0.00	0.00	16.03	
<b>Total</b>																
		0.04	0.67	0.15	0.05	0.06	0.00	218.69								

## D.5 Compliance Analysis

Based on this analysis of NO<sub>x</sub>, VOC, PM<sub>2.5</sub>, and SO<sub>2</sub> emissions performed in conjunction with the Final Rule of *Determining Conformity of Federal Actions to State or Federal Implementation Plans*, (USEPA November 30, 1993 and March 24, 2010), the proposed action under Alternative A would not require a formal conformity determination. The conservative results, based on the total emissions, as compared to annual average emissions, predicted from combined demolition and construction activity over many years including the total construction emissions predicted in a separate EA (WHS July 2011) for The Pentagon Sentry Program which is also part of this Master Plan Update, and presented in Table D-4, show no exceedance of the applicable *de minimis* criteria of 100 tpy for NO<sub>x</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> and CO, and 50 tpy of VOC. Therefore, the proposed action would have minimal air quality impacts and would not require a formal conformity determination.

Table D-4  
Total Emissions under Master Plan Update Alternative

Emission Source	Pollutant (tons)						
	VOC	NO <sub>x</sub>	CO	PM <sub>2.5</sub>	PM <sub>10</sub>	SO <sub>2</sub>	CO <sub>2</sub>
Total Construction	0.85	7.92	6.17	0.51	0.53	0.15	973.19
De minimis Level	50	100	100	100	NA	100	NA

## D.6 Greenhouse Gas Emissions

The demolition- and construction-related greenhouse gas emissions in terms of CO<sub>2</sub> levels were estimated in the same way used for predicting criteria pollutant emissions and they are summarized in Tables D-2 through D-4.

## REFERENCES

R.S. Means Co., 2002. *2003 RSMMeans Facilities Construction Cost Data*.

US Department of Energy (DOE) Building Energy Data Book Tables 3.1.4 and 3.1.9 at <http://buildingsdatabook.eren.doe.gov/ChapterIntro3.aspx> [Accessed February 10, 2014]

US Environmental Protection Agency. November 30, 1993. *40 CFR Parts 6, 51, and 93. Determining Conformity of Federal Actions to State or Federal Implementation Plans*.

US Environmental Protection Agency. July 17, 2006. *40 CFR Parts 51 and 93. PM2.5 De Minimis Emission Levels for General Conformity Applicability*.

USEPA. December 31, 2008. *Nonroad Model Emission Factor Worksheet*.

US Environmental Protection Agency. June 2012. *Motor Vehicle Emission Simulator (MOVES). User Guide for MOVES2010b*.

## E. UNITED STATES FISH & WILDLIFE SERVICE REVIEW PACKAGE

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AECOM 703 549 8729 tel  
675 North Washington Street 703 549 9134 fax  
Suite 300  
Alexandria, VA 22314  
www.aecom.com

March 6, 2014

Ecological Services  
U.S. Fish and Wildlife Service  
6669 Short Lane  
Gloucester, Virginia 23061

Subject: Project Review  
Pentagon Reservation Master Plan Update Environmental Assessment  
Arlington County, Virginia

Dear Reviewer,

The Department of Defense, Washington Headquarters Service (WHS) is preparing an Environmental Assessment (EA) for a Master Plan Update for the Pentagon Reservation in Arlington County, Virginia. The purpose of the Master Plan Update is to guide development of the Pentagon Reservation over the next 20 years. The goals of the Master Plan update are to maintain, enhance, and optimize the DoD Headquarters/Pentagon operations. Specific master plan objectives are to incorporate security strategies to protect employees, properties, and visitors; enhance the safety and quality of life for employees and visitors; improve vehicular and pedestrian circulation; preserve and protect historical resources on the Pentagon Reservation; and integrate environmental protection and sustainability initiatives.

The 238-acre Pentagon Reservation is located in Arlington County, Virginia (Figures 1 and 2). Approximately 159 acres of the Pentagon Reservation are impervious surfaces, covered by pavement and structures. Most of the vegetation on site consists of mowed grass and landscape plantings with the exception of a narrow band of natural vegetation that serves as a buffer (and is designated as a Chesapeake Bay Resource Protection Area on the attached figure) along the Boundary Channel/Pentagon Lagoon. The Boundary Channel/Pentagon Lagoon connects to the Potomac River. No surface waters or wetlands are located on the Reservation.

The majority of development associated with the Master Plan Update would occur on previously-disturbed, impervious surfaces. The implementation of the Master Plan Update would result in a small reduction in impervious surface on the Reservation and would include the planting of additional vegetation. Thus, the volume of stormwater runoff to the Potomac River would not increase, and its quality would improve.



We request your review of this project.

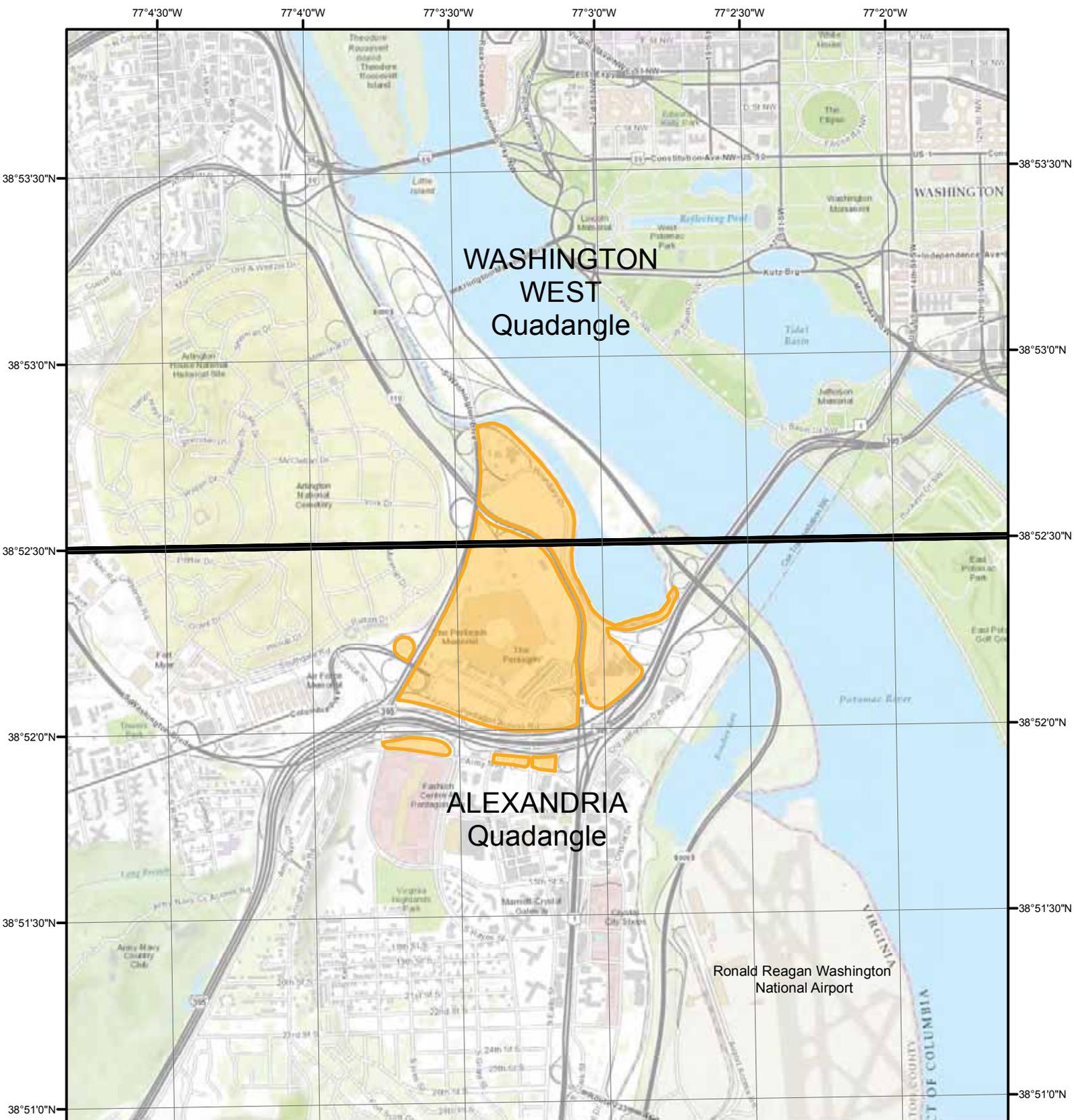
Sincerely,

A handwritten signature in black ink, appearing to read 'C. Carver', with a long horizontal flourish extending to the right.

Craig Carver  
Environmental Planner  
Craig.Carver@aecom.com  
703-706-0129

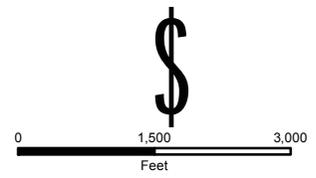
cc: Ms. Elizabeth H. Lenyk, AIA  
Chief Master Planner, Pentagon Reservation  
WHS/FSD  
elizabeth.h.lenyk.civ@mail.mil

cc: Mr. Joseph Eichenlaub  
Environmental Engineer  
WHS/SCD  
Joseph.Eichenlaub@whs.mil



## Pentagon Reservation & Vicinity

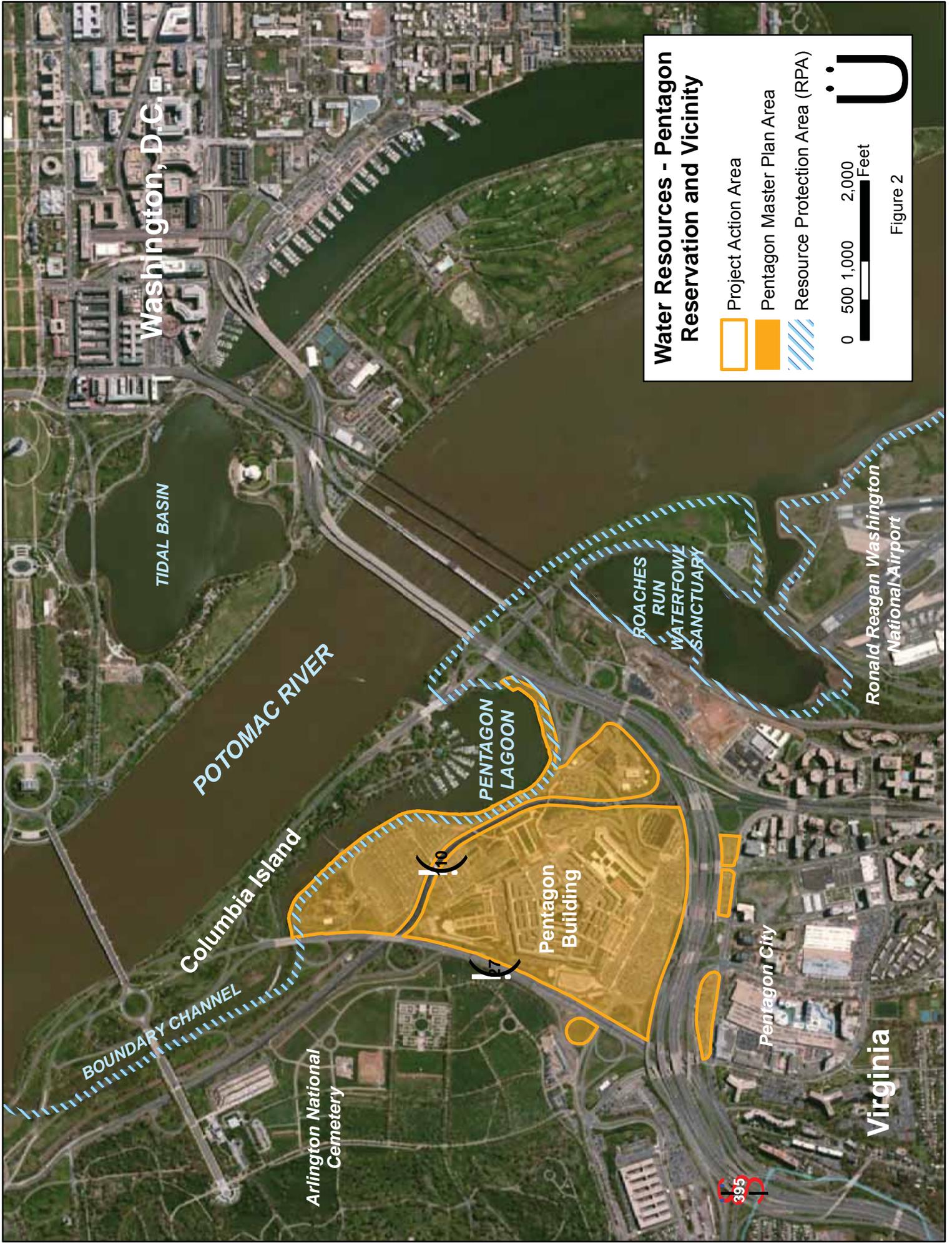
-  Project Action Area
-  Pentagon Master Plan Area
-  Reference Grids for USGS Quadangle Maps



Alexandria Quadangle  
Washington West Quadangle

Source: USGS

Figure 1





# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Ecological Services  
6669 Short Lane  
Gloucester, Virginia 23061



Date:

## Online Project Review Certification Letter

Project Name:

Dear Applicant:

Thank you for using the U.S. Fish and Wildlife Service (Service) Virginia Field Office online project review process. By printing this letter in conjunction with your project review package, you are certifying that you have completed the online project review process for the referenced project in accordance with all instructions provided, using the best available information to reach your conclusions. This letter, and the enclosed project review package, completes the review of your project in accordance with the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (ESA), and the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c, 54 Stat. 250), as amended (Eagle Act). This letter also provides information for your project review under the National Environmental Policy Act of 1969 (P.L. 91-190, 42 U.S.C. 4321-4347, 83 Stat. 852), as amended. A copy of this letter and the project review package must be submitted to this office for this certification to be valid. This letter and the project review package will be maintained in our records.

The species conclusions table in the enclosed project review package summarizes your ESA and Eagle Act conclusions. These conclusions resulted in “no effect” and/or “not likely to adversely affect” determinations for listed species and critical habitat and/or “no Eagle Act permit required” determinations for eagles regarding potential effects of your proposed project. We certify that the use of the online project review process in strict accordance with the instructions provided as documented in the enclosed project review package results in reaching the appropriate determinations. Therefore, we concur with the “no effect” and “not likely to adversely affect” determinations for listed species and critical habitat and “no Eagle Act permit required” determinations for eagles. Additional coordination with this office is not needed.

Candidate species are not legally protected pursuant to the ESA. However, the Service encourages consideration of these species by avoiding adverse impacts to them. Please contact this office for additional coordination if your project action area contains candidate species.

Should project plans change or if additional information on the distribution of listed species, critical habitat, or bald eagles becomes available, this determination may be reconsidered. This certification letter is valid for one year.

Applicant

Page 2

Information about the online project review process including instructions and use, species information, and other information regarding project reviews within Virginia is available at our website [http://www.fws.gov/northeast/virginiafield/endspecies/project\\_reviews.html](http://www.fws.gov/northeast/virginiafield/endspecies/project_reviews.html). If you have any questions, please contact Kimberly Smith of this office at (804) 693-6694, extension 124.

Sincerely,

/s/ Cynthia A. Schulz

Cindy Schulz  
Supervisor  
Virginia Field Office

Enclosures - project review package

## Species Conclusions Table

Project Name: Pentagon Reservation Master Plan Environmental Assessment

Date: 4 February 2014

Species / Resource Name	Conclusion	ESA Section 7 / Eagle Act Determination	Notes / Documentation
Sensitive joint-ventch ( sc no n ir inic )	Potential habitat present, no current survey conducted	Not likely to adversely affect	No projects affecting wetlands are included under the Proposed Action. The implementation of the Proposed Action is not anticipated to degrade potential habitat for this species.
Sturgeon, Atlantic ( ci ns r o rinc us)	Potential habitat present, no current survey conducted	Not likely to adversely affect	None of the projects included under the Proposed Action involve construction in or over water. Some projects included under the Proposed Action would improve on-site stormwater management. Further degradation of water bodies potentially providing habitat for this species is not anticipated to result from the implementation of the Proposed Action.
Bald eagle (Haliaeetus leucocephalus)	Unlikely to disturb nesting bald eagles	No Eagle Act permit required	
Bald eagle	Does not intersect with bald eagle concentration area	No Eagle Act permit required	
Critical habitat	No critical habitat present		

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## United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Virginia Ecological Services Field Office  
6669 SHORT LANE  
GLOUCESTER, VA 23061  
PHONE: (804)693-6694 FAX: (804)693-9032  
URL: [www.fws.gov/northeast/virginiafield/](http://www.fws.gov/northeast/virginiafield/)

Consultation Tracking Number: 05E2VA00-2014-SLI-0924

January 28, 2014

Project Name: Penatagon Reservation Master Plan

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project.

### To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having

similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan ([http://www.fws.gov/windenergy/eagle\\_guidance.html](http://www.fws.gov/windenergy/eagle_guidance.html)). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment



United States Department of Interior  
Fish and Wildlife Service

Project name: Penatagon Reservation Master Plan

## Official Species List

### Provided by:

Virginia Ecological Services Field Office

6669 SHORT LANE

GLOUCESTER, VA 23061

(804) 693-6694

<http://www.fws.gov/northeast/virginiafield/>

### Expect additional Species list documents from the following office(s):

Chesapeake Bay Ecological Services Field Office

177 ADMIRAL COCHRANE DRIVE

ANNAPOLIS, MD 21401

(410) 573-4599

**Consultation Tracking Number:** 05E2VA00-2014-SLI-0924

**Project Type:** Transportation

**Project Description:** Multiple projects to upgrade and reconfigure transportation and other physical facilities on the federally-owned, 220-acre Pentagon Reservation in Arlington County, Virginia.



United States Department of Interior  
Fish and Wildlife Service

Project name: Penatagon Reservation Master Plan

## Project Location Map:



**Project Coordinates:** MULTIPOLYGON (((-77.0632313 38.8680729, -77.0637034 38.8689434, -77.0652076 38.8702465, -77.063579 38.8707811, -77.0614761 38.8712472, -77.0601457 38.8713825, -77.0592445 38.8724166, -77.0578283 38.8750243, -77.0572275 38.877094, -77.0571846 38.8785624, -77.0572704 38.8806687, -77.0549959 38.8803681, -77.0535368 38.8790986, -77.0522493 38.8775952, -77.0513052 38.8759915, -77.051391 38.8739201, -77.0513052 38.8733187, -77.0498031 38.871481, -77.0487732 38.8714476, -77.0472282 38.8718152, -77.0463699 38.8726504, -77.0466274 38.8730848, -77.0462412 38.8741205, -77.0450395 38.8732184, -77.047314 38.8693426, -77.0482153 38.8684739, -77.0496272 38.8674381, -77.0511721 38.8668366, -77.0525454 38.8664691, -77.058 38.8668032, -77.0583004 38.865333, -77.0629738 38.8657339, -77.0632313 38.8680729)))

**Project Counties:** District of Columbia, DC | Arlington, VA



United States Department of Interior  
Fish and Wildlife Service

Project name: Penatagon Reservation Master Plan

## Endangered Species Act Species List

There are a total of 1 threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed on the **Has Critical Habitat** lines may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

sensitive joint-vetch (*Aeschynomene virginica*)

Listing Status: Threatened



United States Department of Interior  
Fish and Wildlife Service

Project name: Penatagon Reservation Master Plan

## **Critical habitats that lie within your project area**

There are no critical habitats within your project area.



## United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Chesapeake Bay Ecological Services Field Office  
177 ADMIRAL COCHRANE DRIVE  
ANNAPOLIS, MD 21401  
PHONE: (410)573-4599 FAX: (410)266-9127

Consultation Tracking Number: 05E2CB00-2014-SLI-0313

January 28, 2014

Project Name: Penatagon Reservation Master Plan

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project.

### To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the

human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan ([http://www.fws.gov/windenergy/eagle\\_guidance.html](http://www.fws.gov/windenergy/eagle_guidance.html)). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment



United States Department of Interior  
Fish and Wildlife Service

Project name: Penatagon Reservation Master Plan

## Preliminary Species list

### Provided by:

Chesapeake Bay Ecological Services Field Office  
177 ADMIRAL COCHRANE DRIVE  
ANNAPOLIS, MD 21401  
(410) 573-4599

### Expect additional Species list documents from the following office(s):

Virginia Ecological Services Field Office  
6669 SHORT LANE  
GLOUCESTER, VA 23061  
(804) 693-6694  
<http://www.fws.gov/northeast/virginiafield/>

**Consultation Tracking Number:** 05E2CB00-2014-SLI-0313

**Project Type:** Transportation

**Project Description:** Multiple projects to upgrade and reconfigure transportation and other physical facilities on the federally-owned, 220-acre Pentagon Reservation in Arlington County, Virginia.

Preliminary



United States Department of Interior  
Fish and Wildlife Service

Project name: Penatagon Reservation Master Plan

### Project Location Map:



**Project Coordinates:** MULTIPOLYGON (((-77.0632313 38.8680729, -77.0637034 38.8689434, -77.0652076 38.8702465, -77.063579 38.8707811, -77.0614761 38.8712472, -77.0601457 38.8713825, -77.0592445 38.8724166, -77.0578283 38.8750243, -77.0572275 38.877094, -77.0571846 38.8785624, -77.0572704 38.8806687, -77.0549959 38.8803681, -77.0535368 38.8790986, -77.0522493 38.8775952, -77.0513052 38.8759915, -77.051391 38.8739201, -77.0513052 38.8733187, -77.0498031 38.871481, -77.0487732 38.8714476, -77.0472282 38.8718152, -77.0463699 38.8726504, -77.0466274 38.8730848, -77.0462412 38.8741205, -77.0450395 38.8732184, -77.047314 38.8693426, -77.0482153 38.8684739, -77.0496272 38.8674381, -77.0511721 38.8668366, -77.0525454 38.8664691, -77.058 38.8668032, -77.0583004 38.865333, -77.0629738 38.8657339, -77.0632313 38.8680729)))

**Project Counties:** District of Columbia, DC | Arlington, VA



United States Department of Interior  
Fish and Wildlife Service

Project name: Penatagon Reservation Master Plan

## Endangered Species Act Species List

There are a total of 0 threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed on the **Has Critical Habitat** lines may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

There are no listed species identified for the vicinity of your project.

Preliminary



United States Department of Interior  
Fish and Wildlife Service

Project name: Penatagon Reservation Master Plan

## **Critical habitats that lie within your project area**

There are no critical habitats within your project area.

Preliminary



**COMMONWEALTH of VIRGINIA**  
**DEPARTMENT OF CONSERVATION AND RECREATION**

600 East Main Street, 24<sup>th</sup> Floor  
Richmond, Virginia 23219  
(804) 786-6124

February 28, 2014

Craig Carver  
AECOM  
675 Washington Street, Suite 300  
Alexandria, VA 22314

Re: Pentagon Master Plan Update EA

Dear Mr. Carver:

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

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

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

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

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

A fee of \$90.00 has been assessed for the service of providing this information. Please find enclosed an invoice for that amount. Please return one copy of the invoice along with your remittance made payable to the Treasurer of Virginia, **DCR - Division of Natural Heritage, 600 East Main Street, 24<sup>th</sup> Floor, Richmond, VA 23219**. Payment is due within thirty days of the invoice date. Please note the change of address for remittance of payment as of July 1, 2013. Late payment may result in the suspension of project review service for future projects.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Gladys Cason (804-367-0909 or [Gladys.Cason@dgif.virginia.gov](mailto:Gladys.Cason@dgif.virginia.gov)). This project is located within 2 miles of a documented occurrence of a state listed animal. Therefore, DCR recommends coordination with VDGIF, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

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

Sincerely,



Alli Baird, LA, ASLA  
Coastal Zone Locality Liaison

Cc: Amy Ewing, VDGIF



# Virginia Department of Game and Inland Fisheries

1/28/2014 10:51:58 AM

## Fish and Wildlife Information Service

**VaFWIS Search Report** Compiled on 1/28/2014, 10:51:58 AM

[Help](#)

Known or likely to occur within a **3 mile radius around point 38,52,15.6 -77,03,22.0**  
 in **013 Arlington County, 510 Alexandria City, VA**

[View Map of Site Location](#)

523 Known or Likely Species ordered by Status Concern for Conservation

<a href="#">BOVA Code</a>	<a href="#">Status*</a>	<a href="#">Tier**</a>	<a href="#">Common Name</a>	<a href="#">Scientific Name</a>
010032	FESE	II	<a href="#">Sturgeon, Atlantic</a>	Acipenser oxyrinchus
060006	SE	II	<a href="#">Floater, brook</a>	Alasmidonta varicosa
030062	ST	I	<a href="#">Turtle, wood</a>	Glyptemys insculpta
040129	ST	I	<a href="#">Sandpiper, upland</a>	Bartramia longicauda
040293	ST	I	<a href="#">Shrike, loggerhead</a>	Lanius ludovicianus
100155	FSST	I	<a href="#">Skipper, Appalachian grizzled</a>	Pyrgus wyandot
040292	ST		<a href="#">Shrike, migrant loggerhead</a>	Lanius ludovicianus migrans
010038	FC	IV	<a href="#">Alewife</a>	Alosa pseudoharengus
100248	FS	I	<a href="#">Fritillary, regal</a>	Speyeria idalia idalia
040093	FS	II	<a href="#">Eagle, bald</a>	Haliaeetus leucocephalus
100154	FS	II	<a href="#">Butterfly, Persius duskywing</a>	Erynnis persius persius
030063	CC	III	<a href="#">Turtle, spotted</a>	Clemmys guttata
030012	CC	IV	<a href="#">Rattlesnake, timber</a>	Crotalus horridus
040225		I	<a href="#">Sapsucker, yellow-bellied</a>	Sphyrapicus varius
040319		I	<a href="#">Warbler, black-throated green</a>	Dendroica virens
040038		II	<a href="#">Bittern, American</a>	Botaurus lentiginosus
040052		II	<a href="#">Duck, American black</a>	Anas rubripes
040213		II	<a href="#">Owl, northern saw-whet</a>	Aegolius acadicus
040105		II	<a href="#">Rail, king</a>	Rallus elegans
040320		II	<a href="#">Warbler, cerulean</a>	Dendroica cerulea
040304		II	<a href="#">Warbler, Swainson's</a>	Limnothlypis swainsonii
040266		II	<a href="#">Wren, winter</a>	Troglodytes troglodytes
070020		II	<a href="#">Amphipod, Pizzini's</a>	Stygobromus pizzinii
030068		III	<a href="#">Turtle, eastern box</a>	Terrapene carolina carolina
040037		III	<a href="#">Bittern, least</a>	Ixobrychus exilis exilis

040094		III	<a href="#">Harrier, northern</a>	Circus cyaneus
040040		III	<a href="#">Ibis, glossy</a>	Plegadis falcinellus
040035		III	<a href="#">Night-heron, black-crowned</a>	Nycticorax nycticorax hoactii
040036		III	<a href="#">Night-heron, yellow-crowned</a>	Nyctanassa violacea violacea
040204		III	<a href="#">Owl, barn</a>	Tyto alba pratincola
040062		III	<a href="#">Redhead</a>	Aythya americana
040181		III	<a href="#">Tern, common</a>	Sterna hirundo
060145		III	<a href="#">Rainbow, Notched</a>	Villosa constricta
100150		III	<a href="#">Butterfly, mottled duskywing</a>	Erynnis martialis
010131		IV	<a href="#">Eel, American</a>	Anguilla rostrata
010207		IV	<a href="#">Logperch</a>	Percina caprodes
010040		IV	<a href="#">Shad, American</a>	Alosa sapidissima
020069		IV	<a href="#">Salamander, eastern mud</a>	Pseudotriton montanus montanus
020061		IV	<a href="#">Spadefoot, eastern</a>	Scaphiopus holbrookii
030045		IV	<a href="#">Ribbonsnake, common</a>	Thamnophis sauritus sauritus
030017		IV	<a href="#">Scarletsnake, northern</a>	Cemophora coccinea copei
030024		IV	<a href="#">Snake, eastern hog-nosed</a>	Heterodon platirhinos
030033		IV	<a href="#">Snake, queen</a>	Regina septemvittata
040100		IV	<a href="#">Bobwhite, northern</a>	Colinus virginianus
040272		IV	<a href="#">Catbird, gray</a>	Dumetella carolinensis
040337		IV	<a href="#">Chat, yellow-breasted</a>	Icteria virens virens
040214		IV	<a href="#">Chuck-will's-widow</a>	Caprimulgus carolinensis
040264		IV	<a href="#">Creeper, brown</a>	Certhia americana
040202		IV	<a href="#">Cuckoo, yellow-billed</a>	Coccyzus americanus
040142		IV	<a href="#">Dowitcher, short-billed</a>	Limnodromus griseus
040154		IV	<a href="#">Dunlin</a>	Calidris alpina hudsonia
040240		IV	<a href="#">Flycatcher, willow</a>	Empidonax traillii
040358		IV	<a href="#">Grosbeak, rose-breasted</a>	Pheucticus ludovicianus
040028		IV	<a href="#">Heron, green</a>	Butorides virescens
040229		IV	<a href="#">Kingbird, eastern</a>	Tyrannus tyrannus
040344		IV	<a href="#">Meadowlark, eastern</a>	Sturnella magna
040330		IV	<a href="#">Ovenbird</a>	Seiurus aurocapilla
040312		IV	<a href="#">Parula, northern</a>	Parula americana
040243		IV	<a href="#">Pewee, eastern wood</a>	Contopus virens
040107		IV	<a href="#">Rail, Virginia</a>	Rallus limicola
040065		IV	<a href="#">Scaup, greater</a>	Aythya marila
040391		IV	<a href="#">Sparrow, field</a>	Spizella pusilla
040378		IV	<a href="#">Sparrow, grasshopper</a>	Ammodramus savannarum pratensis

040248		IV	<a href="#">Swallow, northern rough-winged</a>	Stelgidopteryx serripennis
040217		IV	<a href="#">Swift, chimney</a>	Chaetura pelagica
040355		IV	<a href="#">Tanager, scarlet</a>	Piranga olivacea
040180		IV	<a href="#">Tern, Forster's</a>	Sterna forsteri
040273		IV	<a href="#">Thrasher, brown</a>	Toxostoma rufum
040277		IV	<a href="#">Thrush, wood</a>	Hylocichla mustelina
040375		IV	<a href="#">Towhee, eastern</a>	Pipilo erythrophthalmus
040297		IV	<a href="#">Vireo, yellow-throated</a>	Vireo flavifrons
040302		IV	<a href="#">Warbler, black-and-white</a>	Mniotilta varia
040307		IV	<a href="#">Warbler, blue-winged</a>	Vermivora pinus
040340		IV	<a href="#">Warbler, Canada</a>	Wilsonia canadensis
040333		IV	<a href="#">Warbler, Kentucky</a>	Oporornis formosus
040328		IV	<a href="#">Warbler, prairie</a>	Dendroica discolor
040303		IV	<a href="#">Warbler, prothonotary</a>	Protonotaria citrea
040305		IV	<a href="#">Warbler, worm-eating</a>	Helmitheros vermivorus
040313		IV	<a href="#">Warbler, yellow</a>	Dendroica petechia
040332		IV	<a href="#">Waterthrush, Louisiana</a>	Seiurus motacilla
040215		IV	<a href="#">Whip-poor-will</a>	Caprimulgus vociferus
040140		IV	<a href="#">Woodcock, American</a>	Scolopax minor
040269		IV	<a href="#">Wren, marsh</a>	Cistothorus palustris
050040		IV	<a href="#">Weasel, least</a>	Mustela nivalis allegheniensis
060137		IV	<a href="#">Creeper</a>	Strophitus undulatus
100223		IV	<a href="#">Butterfly, frosted elfin</a>	Callophrys irus
010188			<a href="#">Bass, largemouth</a>	Micropterus salmoides
010186			<a href="#">Bass, smallmouth</a>	Micropterus dolomieu
010168			<a href="#">Bass, striped</a>	Morone saxatilis
010183			<a href="#">Bluegill</a>	Lepomis macrochirus
010123			<a href="#">Bullhead, brown</a>	Ameiurus nebulosus
010122			<a href="#">Bullhead, yellow</a>	Ameiurus natalis
010062			<a href="#">Carp, common</a>	Cyprinus carpio
010125			<a href="#">Catfish, channel</a>	Ictalurus punctatus
010120			<a href="#">Catfish, white</a>	Ameiurus catus
010103			<a href="#">Chub, creek</a>	Semotilus atromaculatus
010067			<a href="#">Chub, river</a>	Nocomis micropogon
010106			<a href="#">Chubsucker, creek</a>	Erimyzon oblongus
010190			<a href="#">Crappie, black</a>	Pomoxis nigromaculatus
010189			<a href="#">Crappie, white</a>	Pomoxis annularis
010101			<a href="#">Dace, blacknose</a>	Rhinichthys atratulus

010211		<a href="#">Darter, stripeback</a>	<i>Percina notogramma</i>
010397		<a href="#">Darter, tessellated</a>	<i>Etheostoma olmstedii</i>
010033		<a href="#">Gar, longnose</a>	<i>Lepisosteus osseus</i>
010059		<a href="#">Goldfish</a>	<i>Carassius auratus</i>
010143		<a href="#">Killifish, banded</a>	<i>Fundulus diaphanus</i>
010129		<a href="#">Madtom, margined</a>	<i>Noturus insignis</i>
010163		<a href="#">Perch, pirate</a>	<i>Aphredoderus sayanus sayanus</i>
010166		<a href="#">Perch, white</a>	<i>Morone americana</i>
010206		<a href="#">Perch, yellow</a>	<i>Perca flavescens</i>
010056		<a href="#">Pickerel, chain</a>	<i>Esox niger</i>
010182		<a href="#">Pumpkinseed</a>	<i>Lepomis gibbosus</i>
010374		<a href="#">Quillback</a>	<i>Carpionodes cyprinus</i>
010116		<a href="#">Redhorse, shorthead</a>	<i>Moxostoma macrolepidotum</i>
010041		<a href="#">Shad, gizzard</a>	<i>Dorosoma cepedianum</i>
010072		<a href="#">Shiner, comely</a>	<i>Notropis amoenus</i>
010080		<a href="#">Shiner, common</a>	<i>Luxilus cornutus</i>
010068		<a href="#">Shiner, golden</a>	<i>Notemigonus crysoleucas</i>
010073		<a href="#">Shiner, satinfin</a>	<i>Cyprinella analostana</i>
010091		<a href="#">Shiner, spotfin</a>	<i>Cyprinella spiloptera</i>
010082		<a href="#">Shiner, spottail</a>	<i>Notropis hudsonius</i>
010086		<a href="#">Shiner, swallowtail</a>	<i>Notropis procne</i>
010108		<a href="#">Sucker, northern hog</a>	<i>Hypentelium nigricans</i>
010105		<a href="#">Sucker, white</a>	<i>Catostomus commersoni</i>
010181		<a href="#">Sunfish, green</a>	<i>Lepomis cyanellus</i>
010180		<a href="#">Sunfish, redbreast</a>	<i>Lepomis auritus</i>
010177		<a href="#">Warmouth</a>	<i>Lepomis gulosus</i>
020004		<a href="#">Bullfrog, American</a>	<i>Lithobates catesbeianus</i>
020012		<a href="#">Frog, eastern cricket</a>	<i>Acris crepitans</i>
020008		<a href="#">Frog, green</a>	<i>Lithobates clamitans</i>
020013		<a href="#">Frog, pickerel</a>	<i>Lithobates palustris</i>
020016		<a href="#">Frog, southern leopard</a>	<i>Lithobates sphenoccephalus utricularius</i>
020018		<a href="#">Frog, upland chorus</a>	<i>Pseudacris feriarum</i>
020019		<a href="#">Frog, wood</a>	<i>Lithobates sylvaticus</i>
020065		<a href="#">Newt, red-spotted</a>	<i>Notophthalmus viridescens viridescens</i>
020071		<a href="#">Peeper, spring</a>	<i>Pseudacris crucifer</i>
020043		<a href="#">Salamander, eastern red-backed</a>	<i>Plethodon cinereus</i>
020029		<a href="#">Salamander, four-toed</a>	<i>Hemidactylum scutatum</i>

020035		<a href="#">Salamander, marbled</a>	Ambystoma opacum
020038		<a href="#">Salamander, northern dusky</a>	Desmognathus fuscus
020070		<a href="#">Salamander, northern red</a>	Pseudotriton ruber ruber
020053		<a href="#">Salamander, northern two-lined</a>	Eurycea bislineata
020049		<a href="#">Salamander, spotted</a>	Ambystoma maculatum
020051		<a href="#">Salamander, three-lined</a>	Eurycea guttolineata
020080		<a href="#">Salamander, white-spotted slimy</a>	Plethodon cylindraceus
020059		<a href="#">Toad, eastern American</a>	Anaxyrus americanus americanus
020062		<a href="#">Toad, Fowler's</a>	Anaxyrus fowleri
020006		<a href="#">Treefrog, Cope's gray</a>	Hyla chrysoscelis
020009		<a href="#">Treefrog, green</a>	Hyla cinerea
030041		<a href="#">Brownsnake, northern</a>	Storeria dekayi dekayi
030059		<a href="#">Cooter, eastern river</a>	Pseudemys concinna concinna
030057		<a href="#">Cooter, northern red-bellied</a>	Pseudemys rubriventris
030016		<a href="#">Copperhead, northern</a>	Agkistrodon contortrix mokasen
030022		<a href="#">Cornsnake, red</a>	Pantherophis guttatus
030049		<a href="#">Earthsake, eastern smooth</a>	Virginia valeriae valeriae
030044		<a href="#">Gartersnake, eastern</a>	Thamnophis sirtalis sirtalis
030038		<a href="#">Greensnake, northern rough</a>	Opheodrys aestivus aestivus
030026		<a href="#">Kingsnake, eastern</a>	Lampropeltis getula getula
030027		<a href="#">Kingsnake, mole</a>	Lampropeltis calligaster rhombomaculata
030002		<a href="#">Lizard, eastern fence</a>	Sceloporus undulatus
030029		<a href="#">Milksnake, eastern</a>	Lampropeltis triangulum triangulum
030018		<a href="#">Racer, northern black</a>	Coluber constrictor constrictor
030008		<a href="#">Racerunner, eastern six-lined</a>	Aspidoscelis sexlineata sexlineata
030023		<a href="#">Ratsnake, eastern</a>	Pantherophis alleghaniensis
030006		<a href="#">Skink, broad-headed</a>	Plestiodon laticeps
030004		<a href="#">Skink, common five-lined</a>	Plestiodon fasciatus
030007		<a href="#">Skink, little brown</a>	Scincella lateralis
030005		<a href="#">Skink, southeastern five-lined</a>	Plestiodon inexpectatus
030077		<a href="#">Slider, red-eared</a>	Trachemys scripta elegans
030042		<a href="#">Snake, northern red-bellied</a>	Storeria occipitomaculata occipitomaculata
030020		<a href="#">Snake, northern ring-necked</a>	Diadophis punctatus edwardsii
030051		<a href="#">Turtle, eastern mud</a>	Kinosternon subrubrum subrubrum
030052		<a href="#">Turtle, eastern musk</a>	Sternotherus odoratus
030060		<a href="#">Turtle, eastern painted</a>	Chrysemys picta picta

030050		<a href="#">Turtle, snapping</a>	<i>Chelydra serpentina</i>
030034		<a href="#">Watersnake, northern</a>	<i>Nerodia sipedon sipedon</i>
030019		<a href="#">Wormsnake, eastern</a>	<i>Carphophis amoenus amoenus</i>
040350		<a href="#">Blackbird, Brewer's</a>	<i>Euphagus cyanocephalus</i>
040346		<a href="#">Blackbird, red-winged</a>	<i>Agelaius phoeniceus</i>
040282		<a href="#">Bluebird, eastern</a>	<i>Sialia sialis</i>
040343		<a href="#">Bobolink</a>	<i>Dolichonyx oryzivorus</i>
040361		<a href="#">Bunting, indigo</a>	<i>Passerina cyanea</i>
040363		<a href="#">Bunting, painted</a>	<i>Passerina ciris ciris</i>
040401		<a href="#">Bunting, snow</a>	<i>Plectrophenax nivalis nivalis</i>
040064		<a href="#">Canvasback</a>	<i>Aythya valisineria</i>
040357		<a href="#">Cardinal, northern</a>	<i>Cardinalis cardinalis</i>
040259		<a href="#">Chickadee, boreal</a>	<i>Poecile hudsonica</i>
040258		<a href="#">Chickadee, Carolina</a>	<i>Poecile carolinensis</i>
040113		<a href="#">Coot, American</a>	<i>Fulica americana</i>
040024		<a href="#">Cormorant, double-crested</a>	<i>Phalacrocorax auritus</i>
040353		<a href="#">Cowbird, brown-headed</a>	<i>Molothrus ater</i>
040373		<a href="#">Crossbill, white-winged</a>	<i>Loxia leucoptera</i>
040255		<a href="#">Crow, American</a>	<i>Corvus brachyrhynchos</i>
040256		<a href="#">Crow, fish</a>	<i>Corvus ossifragus</i>
040203		<a href="#">Cuckoo, black-billed</a>	<i>Coccyzus erythrophthalmus</i>
040128		<a href="#">Curlew, long-billed</a>	<i>Numenius americanus</i>
040364		<a href="#">Dickcissel</a>	<i>Spiza americana</i>
040200		<a href="#">Dove, common ground</a>	<i>Columbina passerina</i>
040198		<a href="#">Dove, mourning</a>	<i>Zenaida macroura carolinensis</i>
040069		<a href="#">Duck, long-tailed</a>	<i>Clangula hyemalis</i>
040063		<a href="#">Duck, ring-necked</a>	<i>Aythya collaris</i>
040076		<a href="#">Duck, ruddy</a>	<i>Oxyura jamaicensis</i>
040061		<a href="#">Duck, wood</a>	<i>Aix sponsa</i>
040032		<a href="#">Egret, great</a>	<i>Ardea alba egretta</i>
040367		<a href="#">Finch, house</a>	<i>Carpodacus mexicanus</i>
040366		<a href="#">Finch, purple</a>	<i>Carpodacus purpureus</i>
040221		<a href="#">Flicker, northern</a>	<i>Colaptes auratus</i>
040239		<a href="#">Flycatcher, Acadian</a>	<i>Empidonax virescens</i>
040234		<a href="#">Flycatcher, great crested</a>	<i>Myiarchus crinitus</i>
040284		<a href="#">Gnatcatcher, blue-gray</a>	<i>Polioptila caerulea</i>
040122		<a href="#">Golden-plover, American</a>	<i>Pluvialis dominicus</i>
040371		<a href="#">Goldfinch, American</a>	<i>Carduelis tristis</i>

040047		<a href="#">Goose, barnacle</a>	<i>Branta leucopsis</i>
040045		<a href="#">Goose, Canada</a>	<i>Branta canadensis</i>
040049		<a href="#">Goose, lesser snow</a>	<i>Chen caerulescens caerulescens</i>
040410		<a href="#">Goose, snow</a>	<i>Chen caerulescens</i>
040351		<a href="#">Grackle, boat-tailed</a>	<i>Quiscalus major</i>
040352		<a href="#">Grackle, common</a>	<i>Quiscalus quiscula</i>
040006		<a href="#">Grebe, eared</a>	<i>Podiceps nigricollis</i>
040008		<a href="#">Grebe, pied-billed</a>	<i>Podilymbus podiceps</i>
040360		<a href="#">Grosbeak, blue</a>	<i>Guiraca caerulea caerulea</i>
040365		<a href="#">Grosbeak, evening</a>	<i>Coccothraustes vespertinus</i>
040368		<a href="#">Grosbeak, pine</a>	<i>Pinicola enucleator</i>
040172		<a href="#">Gull, black-headed</a>	<i>Larus ridibundus</i>
040169		<a href="#">Gull, California</a>	<i>Larus californicus</i>
040174		<a href="#">Gull, Franklin's</a>	<i>Larus pipixcan</i>
040165		<a href="#">Gull, great black-backed</a>	<i>Larus marinus</i>
040167		<a href="#">Gull, herring</a>	<i>Larus argentatus</i>
040164		<a href="#">Gull, Iceland</a>	<i>Larus glaucoides</i>
040173		<a href="#">Gull, laughing</a>	<i>Larus atricilla</i>
040166		<a href="#">Gull, lesser black-backed</a>	<i>Larus fuscus</i>
040171		<a href="#">Gull, mew</a>	<i>Larus canus</i>
040170		<a href="#">Gull, ring-billed</a>	<i>Larus delawarensis</i>
040168		<a href="#">Gull, Thayer's</a>	<i>Larus thayeri</i>
040086		<a href="#">Hawk, Cooper's</a>	<i>Accipiter cooperii</i>
040088		<a href="#">Hawk, red-shouldered</a>	<i>Buteo lineatus lineatus</i>
040087		<a href="#">Hawk, red-tailed</a>	<i>Buteo jamaicensis</i>
040090		<a href="#">Hawk, rough-legged</a>	<i>Buteo lagopus johannis</i>
040085		<a href="#">Hawk, sharp-shinned</a>	<i>Accipiter striatus velox</i>
040027		<a href="#">Heron, great blue</a>	<i>Ardea herodias herodias</i>
040218		<a href="#">Hummingbird, ruby-throated</a>	<i>Archilochus colubris</i>
040252		<a href="#">Jay, blue</a>	<i>Cyanocitta cristata</i>
040387		<a href="#">Junco, dark-eyed</a>	<i>Junco hyemalis</i>
040098		<a href="#">Kestrel, American</a>	<i>Falco sparverius sparverius</i>
040119		<a href="#">Killdeer</a>	<i>Charadrius vociferus</i>
040232		<a href="#">Kingbird, Cassin's</a>	<i>Tyrannus vociferans</i>
040220		<a href="#">Kingfisher, belted</a>	<i>Ceryle alcyon</i>
040285		<a href="#">Kinglet, golden-crowned</a>	<i>Regulus satrapa</i>
040286		<a href="#">Kinglet, ruby-crowned</a>	<i>Regulus calendula</i>
040082		<a href="#">Kite, swallow-tailed</a>	<i>Elanoides forficatus forficatus</i>

040177		<a href="#">Kittiwake, black-legged</a>	<i>Rissa tridactyla</i>
040245		<a href="#">Lark, horned</a>	<i>Eremophila alpestris</i>
040253		<a href="#">Magpie, black-billed</a>	<i>Pica hudsonia</i>
040051		<a href="#">Mallard</a>	<i>Anas platyrhynchos</i>
040251		<a href="#">Martin, purple</a>	<i>Progne subis</i>
040078		<a href="#">Merganser, common</a>	<i>Mergus merganser americanus</i>
040079		<a href="#">Merganser, red-breasted</a>	<i>Mergus serrator serrator</i>
040271		<a href="#">Mockingbird, northern</a>	<i>Mimus polyglottos</i>
040112		<a href="#">Moorhen, common</a>	<i>Gallinula chloropus cachinnans</i>
040194		<a href="#">Murre, thick-billed</a>	<i>Uria lomvia</i>
040216		<a href="#">Nighthawk, common</a>	<i>Chordeiles minor</i>
040262		<a href="#">Nuthatch, red-breasted</a>	<i>Sitta canadensis</i>
040261		<a href="#">Nuthatch, white-breasted</a>	<i>Sitta carolinensis</i>
040348		<a href="#">Oriole, Baltimore</a>	<i>Icterus galbula</i>
040347		<a href="#">Oriole, orchard</a>	<i>Icterus spurius</i>
040095		<a href="#">Osprey</a>	<i>Pandion haliaetus carolinensis</i>
040209		<a href="#">Owl, barred</a>	<i>Strix varia</i>
040206		<a href="#">Owl, great horned</a>	<i>Bubo virginianus</i>
040211		<a href="#">Owl, short-eared</a>	<i>Asio flammeus</i>
040138		<a href="#">Phalarope, red</a>	<i>Phalaropus fulicarius</i>
040136		<a href="#">Phalarope, Wilson's</a>	<i>Phalaropus tricolor</i>
040236		<a href="#">Phoebe, eastern</a>	<i>Sayornis phoebe</i>
040197		<a href="#">Pigeon, rock</a>	<i>Columba livia</i>
040054		<a href="#">Pintail, northern</a>	<i>Anas acuta acuta</i>
040287		<a href="#">Pipit, American</a>	<i>Anthus rubescens</i>
040254		<a href="#">Raven, common</a>	<i>Corvus corax</i>
040369		<a href="#">Redpoll, common</a>	<i>Carduelis flammea</i>
040341		<a href="#">Redstart, American</a>	<i>Setophaga ruticilla</i>
040275		<a href="#">Robin, American</a>	<i>Turdus migratorius</i>
040158		<a href="#">Ruff</a>	<i>Philomachus pugnax</i>
040151		<a href="#">Sandpiper, Baird's</a>	<i>Calidris bairdii</i>
040155		<a href="#">Sandpiper, curlew</a>	<i>Calidris ferruginea</i>
040146		<a href="#">Sandpiper, semipalmated</a>	<i>Calidris pusilla</i>
040132		<a href="#">Sandpiper, solitary</a>	<i>Tringa solitaria</i>
040134		<a href="#">Sandpiper, spotted</a>	<i>Actitis macularia</i>
040156		<a href="#">Sandpiper, stilt</a>	<i>Calidris himantopus</i>
040066		<a href="#">Scaup, lesser</a>	<i>Aythya affinis</i>
040075		<a href="#">Scoter, black</a>	<i>Melanitta nigra americana</i>

040205		<a href="#">Screech-owl, eastern</a>	Megascops asio
040060		<a href="#">Shoveler, northern</a>	Anas clypeata
040370		<a href="#">Siskin, pine</a>	Carduelis pinus
040141		<a href="#">Snipe, Wilson's</a>	Gallinago delicata
040108		<a href="#">Sora</a>	Porzana carolina
040388		<a href="#">Sparrow, American tree</a>	Spizella arborea
040386		<a href="#">Sparrow, black-throated</a>	Amphispiza bilineata
040389		<a href="#">Sparrow, chipping</a>	Spizella passerina
040395		<a href="#">Sparrow, fox</a>	Passerella iliaca
040392		<a href="#">Sparrow, Harris'</a>	Zonotrichia querula
040342		<a href="#">Sparrow, house</a>	Passer domesticus
040377		<a href="#">Sparrow, savannah</a>	Passerculus sandwichensis
040398		<a href="#">Sparrow, song</a>	Melospiza melodia
040397		<a href="#">Sparrow, swamp</a>	Melospiza georgiana
040383		<a href="#">Sparrow, vesper</a>	Poocetes gramineus
040393		<a href="#">Sparrow, white-crowned</a>	Zonotrichia leucophrys
040394		<a href="#">Sparrow, white-throated</a>	Zonotrichia albicollis
040294		<a href="#">Starling, European</a>	Sturnus vulgaris
040249		<a href="#">Swallow, barn</a>	Hirundo rustica
040043		<a href="#">Swan, mute</a>	Cygnus olor
040356		<a href="#">Tanager, summer</a>	Piranga rubra
040354		<a href="#">Tanager, western</a>	Piranga ludoviciana
040057		<a href="#">Teal, blue-winged</a>	Anas discors orphna
040056		<a href="#">Teal, green-winged</a>	Anas crecca carolinensis
040189		<a href="#">Tern, Caspian</a>	Sterna caspia
040280		<a href="#">Thrush, gray-cheeked</a>	Catharus minimus
040278		<a href="#">Thrush, hermit</a>	Catharus guttatus
040260		<a href="#">Titmouse, tufted</a>	Baeolophus bicolor
040281		<a href="#">Veery</a>	Catharus fuscescens
040299		<a href="#">Vireo, red-eyed</a>	Vireo olivaceus
040301		<a href="#">Vireo, warbling</a>	Vireo gilvus gilvus
040295		<a href="#">Vireo, white-eyed</a>	Vireo griseus
040081		<a href="#">Vulture, black</a>	Coragyps atratus
040080		<a href="#">Vulture, turkey</a>	Cathartes aura
040316		<a href="#">Warbler, black-throated blue</a>	Dendroica caerulescens
040325		<a href="#">Warbler, blackpoll</a>	Dendroica striata
040323		<a href="#">Warbler, chestnut-sided</a>	Dendroica pensylvanica
040338		<a href="#">Warbler, hooded</a>	Wilsonia citrina

040314		<a href="#">Warbler, magnolia</a>	<i>Dendroica magnolia</i>
040311		<a href="#">Warbler, Nashville</a>	<i>Vermivora ruficapilla</i>
040329		<a href="#">Warbler, palm</a>	<i>Dendroica palmarum</i>
040326		<a href="#">Warbler, pine</a>	<i>Dendroica pinus</i>
040317		<a href="#">Warbler, yellow-rumped</a>	<i>Dendroica coronata cornata</i>
040331		<a href="#">Waterthrush, northern</a>	<i>Seiurus noveboracensis</i>
040289		<a href="#">Waxwing, Bohemian</a>	<i>Bombycilla garrulus</i>
040290		<a href="#">Waxwing, cedar</a>	<i>Bombycilla cedrorum</i>
040059		<a href="#">Wigeon, American</a>	<i>Anas americana</i>
040227		<a href="#">Woodpecker, downy</a>	<i>Picoides pubescens medianus</i>
040226		<a href="#">Woodpecker, hairy</a>	<i>Picoides villosus</i>
040222		<a href="#">Woodpecker, pileated</a>	<i>Dryocopus pileatus</i>
040223		<a href="#">Woodpecker, red-bellied</a>	<i>Melanerpes carolinus</i>
040224		<a href="#">Woodpecker, red-headed</a>	<i>Melanerpes erythrocephalus</i>
040268		<a href="#">Wren, Carolina</a>	<i>Thryothorus ludovicianus</i>
040265		<a href="#">Wren, house</a>	<i>Troglodytes aedon</i>
040131		<a href="#">Yellowlegs, lesser</a>	<i>Tringa flavipes</i>
040336		<a href="#">Yellowthroat, common</a>	<i>Geothlypis trichas</i>
050028		<a href="#">Bat, big brown</a>	<i>Eptesicus fuscus fuscus</i>
050029		<a href="#">Bat, eastern red</a>	<i>Lasiurus borealis borealis</i>
050033		<a href="#">Bat, evening</a>	<i>Nycticeius humeralis humeralis</i>
050030		<a href="#">Bat, hoary</a>	<i>Lasiurus cinereus cinereus</i>
050020		<a href="#">Bat, little brown</a>	<i>Myotis lucifugus lucifugus</i>
050025		<a href="#">Bat, silver-haired</a>	<i>Lasionycteris noctivagans</i>
050069		<a href="#">Beaver, American</a>	<i>Castor canadensis</i>
050051		<a href="#">Bobcat</a>	<i>Lynx rufus rufus</i>
050055		<a href="#">Chipmunk, Fisher's eastern</a>	<i>Tamias striatus fisheri</i>
050103		<a href="#">Cottontail, eastern</a>	<i>Sylvilagus floridanus mallurus</i>
050125		<a href="#">Coyote</a>	<i>Canis latrans</i>
050108		<a href="#">Deer, white-tailed</a>	<i>Odocoileus virginianus</i>
050050		<a href="#">Fox, common gray</a>	<i>Urocyon cinereoargenteus cinereoargenteus</i>
050049		<a href="#">Fox, red</a>	<i>Vulpes vulpes fulva</i>
050085		<a href="#">Lemming, Stone's southern bog</a>	<i>Synaptomys cooperi stonei</i>
050042		<a href="#">Mink, common</a>	<i>Mustela vison mink</i>
050017		<a href="#">Mole, eastern</a>	<i>Scalopus aquaticus aquaticus</i>
050019		<a href="#">Mole, star-nosed</a>	<i>Condylura cristata cristata</i>
050071		<a href="#">Mouse, eastern harvest</a>	<i>Reithrodontomys humulis virginianus</i>

050098		<a href="#">Mouse, house</a>	Mus musculus musculus
050099		<a href="#">Mouse, meadow jumping</a>	Zapus hudsonius americanus
050073		<a href="#">Mouse, northern white-footed</a>	Peromyscus leucopus noveboracensis
050124		<a href="#">Mouse, prairie deer</a>	Peromyscus maniculatus bairdii
050093		<a href="#">Muskrat, large-toothed</a>	Ondatra zibethicus macrodon
050022		<a href="#">Myotis, northern</a>	Myotis septentrionalis septentrionalis
050001		<a href="#">Opossum, Virginia</a>	Didelphis virginiana virginiana
050045		<a href="#">Otter, northern river</a>	Lontra canadensis lataxina
050027		<a href="#">Pipistrelle, eastern</a>	Pipistrellus subflavus subflavus
050038		<a href="#">Raccoon</a>	Procyon lotor lotor
050094		<a href="#">Rat, black</a>	Rattus rattus rattus
050078		<a href="#">Rat, marsh rice</a>	Oryzomys palustris palustris
050095		<a href="#">Rat, Norway</a>	Rattus norvegicus norvegicus
050013		<a href="#">Shrew, Kirtland's short-tailed</a>	Blarina brevicauda kirtlandi
050015		<a href="#">Shrew, least</a>	Cryptotis parva parva
050010		<a href="#">Shrew, pygmy</a>	Sorex hoyi winnemana
050007		<a href="#">Shrew, southeastern</a>	Sorex longirostris longirostris
050047		<a href="#">Skunk, striped</a>	Mephitis mephitis nigra
050048		<a href="#">Skunk, striped</a>	Mephitis mephitis mephitis
050063		<a href="#">Squirrel, eastern fox</a>	Sciurus niger vulpinus
050058		<a href="#">Squirrel, northern gray</a>	Sciurus carolinensis pennsylvanicus
050065		<a href="#">Squirrel, southern flying</a>	Glaucomys volans volans
050059		<a href="#">Squirrel, talkative red</a>	Tamiasciurus hudsonicus loquax
050087		<a href="#">vole, common Gapper's red-backed</a>	Clethrionomys gapperi gapperi
050082		<a href="#">Vole, meadow</a>	Microtus pennsylvanicus pennsylvanicus
050091		<a href="#">Vole, pine</a>	Microtus pinetorum scalopsoides
050041		<a href="#">Weasel, long-tailed</a>	Mustela frenata noveboracensis
050054		<a href="#">Woodchuck</a>	Marmota monax monax
060012		<a href="#">Floater, eastern</a>	Pyganodon cataracta
060025		<a href="#">Mussel, eastern elliptio</a>	Elliptio complanata
070099		<a href="#">Crayfish</a>	Fallicambarus uhleri
070102		<a href="#">Crayfish, Appalachian brook</a>	Cambarus bartonii bartonii
070095		<a href="#">Crayfish, devil</a>	Cambarus diogenes diogenes
070126		<a href="#">Crayfish, Digger</a>	Fallicambarus fodiens
070094		<a href="#">Crayfish, no common name</a>	Cambarus acuminatus
070120		<a href="#">Crayfish, White River</a>	Procambarus acutus
080091		<a href="#">Dragonfly, blue dasher</a>	Pachydiplax longipennis

100043		<a href="#">Armyworm</a>	<i>Pseudaletia unipuncta</i>
100041		<a href="#">Borer, European corn</a>	<i>Ostrinia nubilatis</i>
100220		<a href="#">Butterfly, American copper</a>	<i>Lycaena phlaeas</i>
100262		<a href="#">Butterfly, American lady</a>	<i>Vanessa virginiensis</i>
100245		<a href="#">Butterfly, American snout</a>	<i>Libytheana carinenta</i>
100274		<a href="#">Butterfly, Appalachian brown</a>	<i>Satyrodes appalachia</i>
100254		<a href="#">Butterfly, Baltimore checkerspot</a>	<i>Euphydryas phaeton</i>
100092		<a href="#">Butterfly, black swallowtail</a>	<i>Papilio polyxenes asterius</i>
100196		<a href="#">Butterfly, Brazilian skipper</a>	<i>Calpododes ethlius</i>
100137		<a href="#">Butterfly, brown elfin</a>	<i>Callophrys augustinus</i>
100205		<a href="#">Butterfly, cabbage white</a>	<i>Pieris rapae</i>
100167		<a href="#">Butterfly, carus skipper</a>	<i>Polites carus</i>
100206		<a href="#">Butterfly, checkered white</a>	<i>Pontia protodice</i>
100159		<a href="#">Butterfly, clouded skipper</a>	<i>Lerema accius</i>
100094		<a href="#">Butterfly, clouded sulphur</a>	<i>Colias philodice</i>
100165		<a href="#">Butterfly, cobweb skipper</a>	<i>Hesperia metea</i>
100265		<a href="#">Butterfly, common buckeye</a>	<i>Junonia coenia</i>
100156		<a href="#">Butterfly, common checkered-skipper</a>	<i>Pyrgus communis</i>
100157		<a href="#">Butterfly, common sootywing</a>	<i>Pholisora catullus</i>
100277		<a href="#">Butterfly, common wood-nymph</a>	<i>Cercyonis pegala</i>
100144		<a href="#">Butterfly, confused cloudywing</a>	<i>Thorybes confusis</i>
100230		<a href="#">Butterfly, coral hairstreak</a>	<i>Satyrium titus</i>
100168		<a href="#">Butterfly, crossline skipper</a>	<i>Polites origenes</i>
100177		<a href="#">Butterfly, Delaware skipper</a>	<i>Anatrytone logan</i>
100184		<a href="#">Butterfly, Dion skipper</a>	<i>Euphyes dion</i>
100147		<a href="#">Butterfly, dreamy duskywing</a>	<i>Erynnis icelus</i>
100185		<a href="#">Butterfly, Dun skipper</a>	<i>Euphyes vestris</i>
100188		<a href="#">Butterfly, dusted skipper</a>	<i>Atrytonopsis hianna</i>
100258		<a href="#">Butterfly, eastern comma</a>	<i>Polygonia comma</i>
100225		<a href="#">Butterfly, eastern pine elfin</a>	<i>Callophrys niphon</i>
100238		<a href="#">Butterfly, eastern tailed-blue</a>	<i>Everes comyntas</i>
100093		<a href="#">Butterfly, eastern tiger swallowtail</a>	<i>Papilio glaucus</i>
100231		<a href="#">Butterfly, Edwards' hairstreak</a>	<i>Satyrium edwardsii</i>
100161		<a href="#">Butterfly, European skipper</a>	<i>Thymelicus lineola</i>
100209		<a href="#">Butterfly, falcate orangetip</a>	<i>Anthocharis midea</i>

100162			<a href="#">Butterfly, fiery skipper</a>	Hylephila phyleus
100201			<a href="#">Butterfly, giant swallowtail</a>	Papilio cresphontes
100139			<a href="#">Butterfly, golden-banded skipper</a>	Autochton cellus
100228			<a href="#">Butterfly, gray hairstreak</a>	Strymon melinus
100249			<a href="#">Butterfly, great spangled fritillary</a>	Speyeria cybele
100270			<a href="#">Butterfly, hackberry emperor</a>	Asterocampa celtis
100219			<a href="#">Butterfly, harvester</a>	Feniseca tarquinius
100145			<a href="#">Butterfly, Hayhurst's scallopping</a>	Staphylus hayhurstii
100224			<a href="#">Butterfly, Henry's elfin</a>	Callophrys henrici
100141			<a href="#">Butterfly, hoary edge</a>	Achalarus lyciades
100178			<a href="#">Butterfly, Hobomok skipper</a>	Poanes hobomok
100149			<a href="#">Butterfly, Horace's duskywing</a>	Erynnis horatius
100148			<a href="#">Butterfly, Juvenal's duskywing</a>	Erynnis juvenalis
100160			<a href="#">Butterfly, least skipper</a>	Ancyloxypha numitor
100163			<a href="#">Butterfly, Leonard's skipper</a>	Hesperia leonardus
100175			<a href="#">Butterfly, little glassywing</a>	Pompeius verna
100279			<a href="#">Butterfly, little wood-satyr</a>	Megisto cymela
100217			<a href="#">Butterfly, little yellow</a>	Eurema lisa
100252			<a href="#">Butterfly, meadow fritillary</a>	Boloria bellona
100079			<a href="#">Butterfly, monarch</a>	Danaus plexippus
100090			<a href="#">Butterfly, mourning cloak</a>	Nymphalis antiopa
100173			<a href="#">Butterfly, northern broken dash</a>	Wallengrenia egeremet
100143			<a href="#">Butterfly, northern cloudywing</a>	Thorybes pylades
100272			<a href="#">Butterfly, northern pearly-eye</a>	Enodia anthedon
100197			<a href="#">Butterfly, Ocola skipper</a>	Panoquina ocola
100236			<a href="#">Butterfly, olive juniper hairstreak</a>	Callophrys gryneus gryneus
100211			<a href="#">Butterfly, orange sulphur</a>	Colias eurytheme
100263			<a href="#">Butterfly, painted lady</a>	Vanessa cardui
100257			<a href="#">Butterfly, pearl crescent</a>	Phyciodes tharos
100359			<a href="#">Butterfly, Peck's skipper</a>	Polites peckius
100200			<a href="#">Butterfly, pipevine swallowtail</a>	Battus philenor
100259			<a href="#">Butterfly, question mark</a>	Polygonia interrogationis
100264			<a href="#">Butterfly, red admiral</a>	Vanessa atalanta
100235			<a href="#">Butterfly, red-banded hairstreak</a>	Calycopis cecrops
100268			<a href="#">Butterfly, red-spotted purple</a>	Limenitis arthemis astyanax

100174		<a href="#">Butterfly, sachem</a>	Atalopedes campestris
100082		<a href="#">Butterfly, silver-spotted skipper</a>	Epargyreus clarus
100255		<a href="#">Butterfly, silvery checkerspot</a>	Chlosyne nycteis
100146		<a href="#">Butterfly, sleepy duskywing</a>	Erynnis brizo
100216		<a href="#">Butterfly, sleepy orange</a>	Eurema nicippe
100142		<a href="#">Butterfly, southern cloudywing</a>	Thorybes bathyllus
100226		<a href="#">Butterfly, southern hairstreak</a>	Satyrium favonius
100202		<a href="#">Butterfly, spicebush swallowtail</a>	Papilio troilus
100239		<a href="#">Butterfly, spring azure</a>	Celastrina ladon
100234		<a href="#">Butterfly, striped hairstreak</a>	Satyrium liparops
100158		<a href="#">Butterfly, swarthy skipper</a>	Nastra lherminier
100269		<a href="#">Butterfly, tawny emperor</a>	Asterocampa clyton
100169		<a href="#">Butterfly, tawny-edged skipper</a>	Polites themistocles
100247		<a href="#">Butterfly, variegated fritillary</a>	Euptoieta claudia
100266		<a href="#">Butterfly, viceroy</a>	Limenitis archippus
100227		<a href="#">Butterfly, white M hairstreak</a>	Parrhasius m-album
100153		<a href="#">Butterfly, wild indigo duskywing</a>	Erynnis baptisiae
100180		<a href="#">Butterfly, Zabulon skipper</a>	Poanes zabulon
100204		<a href="#">Butterfly, zebra swallowtail</a>	Eurytides marcellus
100026		<a href="#">Deerfly</a>	Chrysops vittatus vittatus
100042		<a href="#">Earworm, corn</a>	Heliathis zea
100030		<a href="#">Gnat</a>	Culicoides arboricola
100031		<a href="#">Gnat</a>	Culicoides hinmani
100032		<a href="#">Gnat</a>	Culicoides guttipennis
100033		<a href="#">Gnat</a>	Culicoides footei
100015		<a href="#">Gnat</a>	Culicoides villosipennis
100016		<a href="#">Gnat</a>	Culicoides stellifer
100017		<a href="#">Gnat</a>	Culicoides snowi
100020		<a href="#">Gnat</a>	Culicoides nanus
100290		<a href="#">Moth, buck</a>	Hemileuca maia
100100		<a href="#">Moth, catalpa sphinx</a>	Ceratomia catalpae
100040		<a href="#">Moth, codling</a>	Cydia pomonella
100296		<a href="#">Moth, Five-spotted hawk</a>	Manduca quinquemaculata
100047		<a href="#">Moth, gypsy</a>	Lymantria dispar
100312		<a href="#">Moth, hummingbird clearwing</a>	Hemaris thysbe
100095		<a href="#">Moth, Luna</a>	Actias luna
100289		<a href="#">Moth, pinkstriped oakworm</a>	Anisota virginiana
100098		<a href="#">Moth, Polyphemus</a>	Antheraea polyphemus

100284			<a href="#">Moth, regal</a>	<i>Citheronia regalis</i>
100286			<a href="#">Moth, rosy maple</a>	<i>Dryocampa rubicunda</i>
100310			<a href="#">Moth, small-eyed sphinx</a>	<i>Paonias myops</i>
100101			<a href="#">Moth, snowberry clearwing</a>	<i>Hemeris diffinis</i>
100307			<a href="#">Moth, Southern pine sphinx</a>	<i>Lapara coniferarum</i>
100287			<a href="#">Moth, spiny oakworm</a>	<i>Anisota stigma</i>
100317			<a href="#">Moth, Virginia-creeper sphinx</a>	<i>Darapsa myron</i>
100300			<a href="#">Moth, waved shinx</a>	<i>Ceratonia undulosa</i>
100294			<a href="#">Moth, whitelined sphinx</a>	<i>Hyles lineata</i>
100193			<a href="#">Roadside-skipper, common</a>	<i>Amblyscirtes vialis</i>
110230			<a href="#">Tick, American dog</a>	<i>Dermacentor variabilis</i>
110232			<a href="#">Tick, brown dog</a>	<i>Rhipicephalus sanguineus</i>
110228			<a href="#">Tick, lone star</a>	<i>Amblyomma americanum</i>
110231			<a href="#">Tick, rabbit</a>	<i>Haemaphysalis leporispalustris</i>
110229			<a href="#">Tick, winter</a>	<i>Dermacentor albipictus</i>

\* FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened;  
 FC=Federal Candidate; FS=Federal Species of Concern; CC=Collection Concern

\*\* I=VA Wildlife Action Plan - Tier I - Critical Conservation Need; II=VA Wildlife Action Plan - Tier II -  
 Very High Conservation Need; III=VA Wildlife Action Plan - Tier III - High Conservation Need;  
 IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need

Compiled on 1/28/2014, 10:52:00 AM V517948.0 report=1 searchType= R dist= 4828.032 poi= 38,52,15.6 -77,03,22.0

audit no. 517948 1/28/2014 10:52:00 AM Virginia Fish and Wildlife Information Service  
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# The CENTER for CONSERVATION BIOLOGY

About | What | Resources

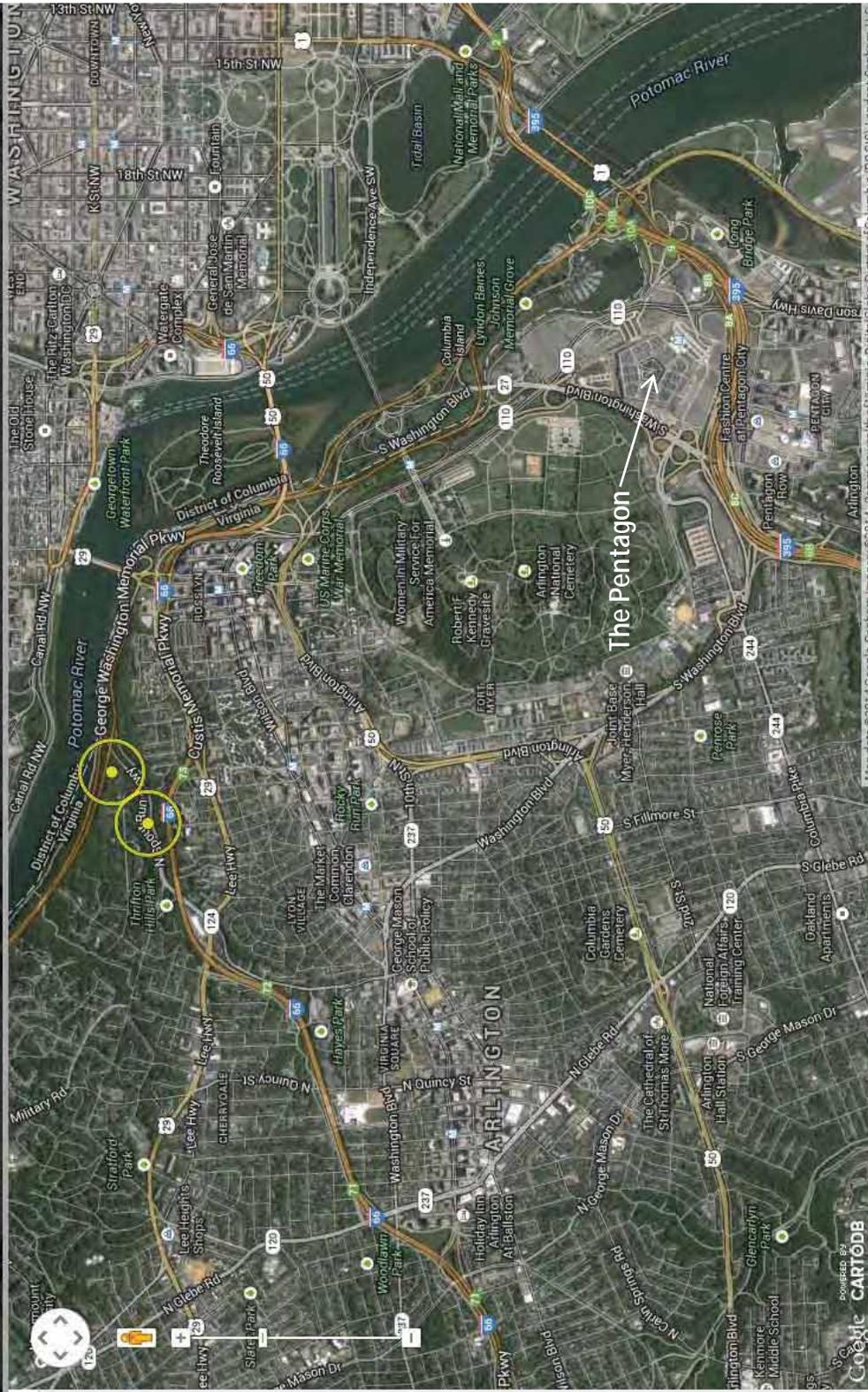
News | Give to CCB

HELP / FAQ

# MAPPING PORTAL

## Layers

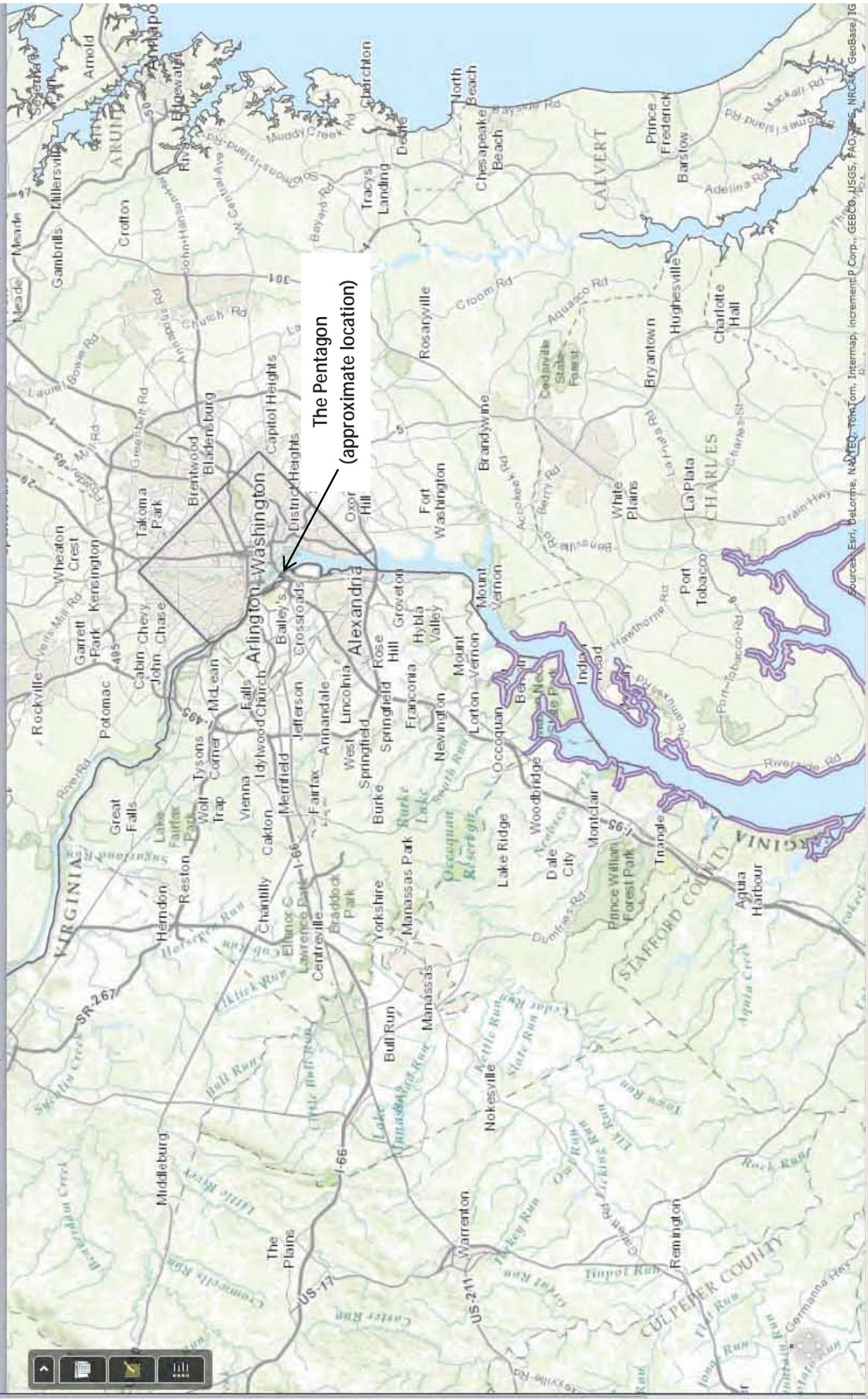
- Bald Eagle
- Eagle Nests
- Eagle Nests Buffer 330'
- Eagle Nests Buffer 660'
- > A 660' "secondary buffer" around each eagle nest, where human activities are considered to impact the integrity of the "primary buffer" (e.g. construction of high-density developments, multi-story buildings, new roadways).
- [More info](#)
- Waterbirds
  - Colonial Waterbirds 2003
  - Colonial Waterbirds 2008
  - Chesapeake Bay Herons 2013
- Osprey
  - Chesapeake Bay Osprey Nests 1995-1996
  - OspreyWatch Nests
- Other Species
  - Nightjar Survey Network Routes



Map data ©2014 Google, Sanborn Imagery ©2014, Commonwealth of Virginia, DigitalGlobe, District of Columbia (DC GIS), Landsat, Sanborn U.S.

POWERED BY **Google** **CARTO** **DB**

Done



The Pentagon  
(approximate location)

F. VIRGINIA DEPARTMENT OF CONSERVATION &  
RECREATION – DIVISION OF NATURAL HERITAGE  
REVIEW PACKAGE

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**INFORMATION SERVICES ORDER FORM**  
**Updated 11/10**



**Mail or Email to: Project Review Coordinator**  
**DCR Division of Natural Heritage**  
**217 Governor Street**  
**Richmond, VA 23219**  
**Voice: (804) 371-2708 Fax: (804) 371-2674**  
**nhreview@dcr.virginia.gov**

**ENVIRONMENTAL REVIEW SERVICES:**

- Project Review** (30 calendar day turnaround)..**\$90 per site**; add **\$35 for 1-5** natural heritage occurrences (rare plants, rare animals, significant communities and karst) and **\$60 for 6** or more occurrences.  
Multi-quad project area **\$90 per quad**.
- Project Review with Accompanying Map...\$250 per site**; for projects with potential impact to Natural Heritage Resources including alternative energy projects, written comments with 8.5 X 11 map displaying Natural Heritage Screening Coverage.
- Priority Service** (5 business day turnaround)..**\$500 surcharge**

**Details:** Describe project in the space below, please include detailed project description, project location information including **latitude, longitude**, acreage, and existing site conditions (photographs if available). Attach additional information as necessary. In order to ensure an accurate assesement, please submit **an electronic copy of a site map** (preferably from a USGS topo map with identified project boundaries) and all other information to **nhreview@dcr.virginia.gov** or fax a map to: **Environmental Review Coordinator @(804) 371-2674**. Please include the project title on all correspondence. **Incomplete submittal of information will delay the review process.**

**Project Title:** Pentagon Master Plan Update Environmental Assessment

**Project Description:**

Washington Headquarters Service is preparing an EA for an update to the Pentagon Reservation Master Plan. The Update will guide development of the Reservation over the next 20 years. Approximately 145 acres of the 220-acre Reservation are impervious surfaces, covered by pavement and structures. Most of the vegetation on site consists of mowed grass and landscape plantings with the exception of a narrow band of natural vegetation along the Boundary Channel/Pentagon Lagoon. The Channel/ Lagoon connects to the Potomac River. No surface waters or wetlands are located on the Reservation. Most development associated with the Master Plan Update would occur on previously-disturbed, impervious surfaces. The

implementation of the Update would result in a small reduction in impervious surface on the Reservation and would include the planting additional vegetation. Thus, the volume of stormwater runoff to the Potomac River would not increase, and its quality would improve.



**INFORMATION SERVICES ORDER FORM**  
**Updated 11/10**



**Natural Heritage Resource Reports & Distribution Maps**

- Custom NHR Maps (describe, call for more information).....\$80/hour
- Custom NHR Reports (describe, call for more information).....\$60/hour

**SUBSCRIPTION SERVICES: [Hyperlink to an example of the license agreement](#)**

**Natural Heritage Data Explorer Subscription Service**

- (unlimited access per subscription year, complete a digital license agreement is required).....\$1000/yr.

**Digital Conservation Sites Subscription Service** (specify area of interest; complete a digital license agreement is required)

- 1 county or 12 quads or less.....\$1000/yr.
- 13-100 quads.....\$3500/yr.
- Statewide coverage.....\$6000/yr.

Please provide details in the space below: **(failure to provide information will delay subscription processing)**

**Conditions:**

1. Digitized DCR natural heritage resource locational data for GIS or map production, whether provided by DCR digitally or entered by the client from tables or reports, may not be used without first completing a data licensing agreement with DCR Division of Natural Heritage. A license form is available on request.
2. Although DCR-DNH data are closely quality controlled, DCR-DNH makes no warranty as to the fitness of the data for any purpose.
3. Any publication of data provided by DCR, whether as text, table or map, must acknowledge Virginia DCR-Natural Heritage Program, and include the date the data were provided by DCR
4. If fees are assessed, an invoice will be included with the response. **Please do not pre-pay.** Payment is due within 30 days of receipt. **Minimum charge for hourly fees is \$40.**

I understand and agree to the above conditions:  Yes (Required for Fee Services)



**INFORMATION SERVICES ORDER FORM**  
**Updated 11/10**



**INFORMATION SERVICES ORDER FORM**

DCR maintains lists of natural heritage resources monitored by the Natural Heritage Program. These lists provide information on taxonomy, rarity and federal/state legal statuses. These reports are not site specific and are **NOT** to be substituted for a project review or for on-site surveys required for environmental assessments of specific project areas.

Due to staff and budget constraints we ask that you use the online service whenever possible to download these lists of natural heritage resources:

**Hyperlink to on-line reports ( these may change as they are updated by inventory staff)**

[The Natural Communities of Virginia, 2nd Approximation](#)

**Natural Heritage Resources of Virginia: Rare Animals (PDF)**

**Natural Heritage Resources of Virginia: Rare Plants (PDF)**

[County lists of natural heritage resources can be generated using the Internet Database Search Tool:](#)

**Or requested below :**

**Send data and invoice (if applicable) to:** (Please be sure to include a phone number and e-mail so we may contact you if we have any questions regarding your data needs)

**Name:** Craig Carver

**Company:** AECOM

**Address:** 675 N Washington St Ste 300

**City:** Alexandria

**State/Zip:** VA 22314

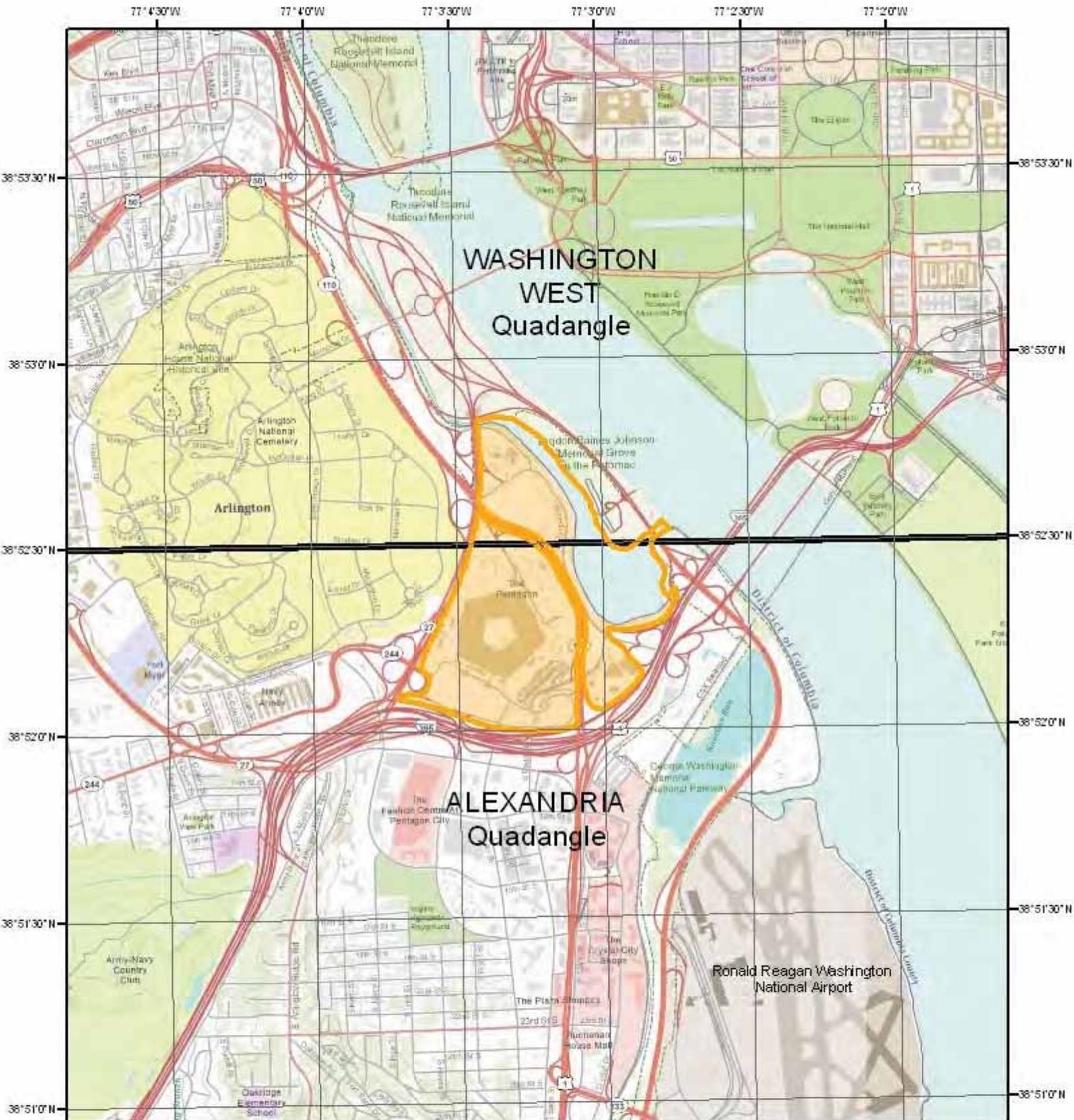
**Phone:** 703-706-0129

**Fax:**

**Email:** craig.carver@aecom.com

**Taxpayer ID #:** N/A

Note that payment will be made via corporate credit card issued in my name (Craig Carver).



### Pentagon Reservation & Vicinity

-  Project Action Area
-  Pentagon Master Plan Area
-  Reference Grids for USGS Quadangle Maps

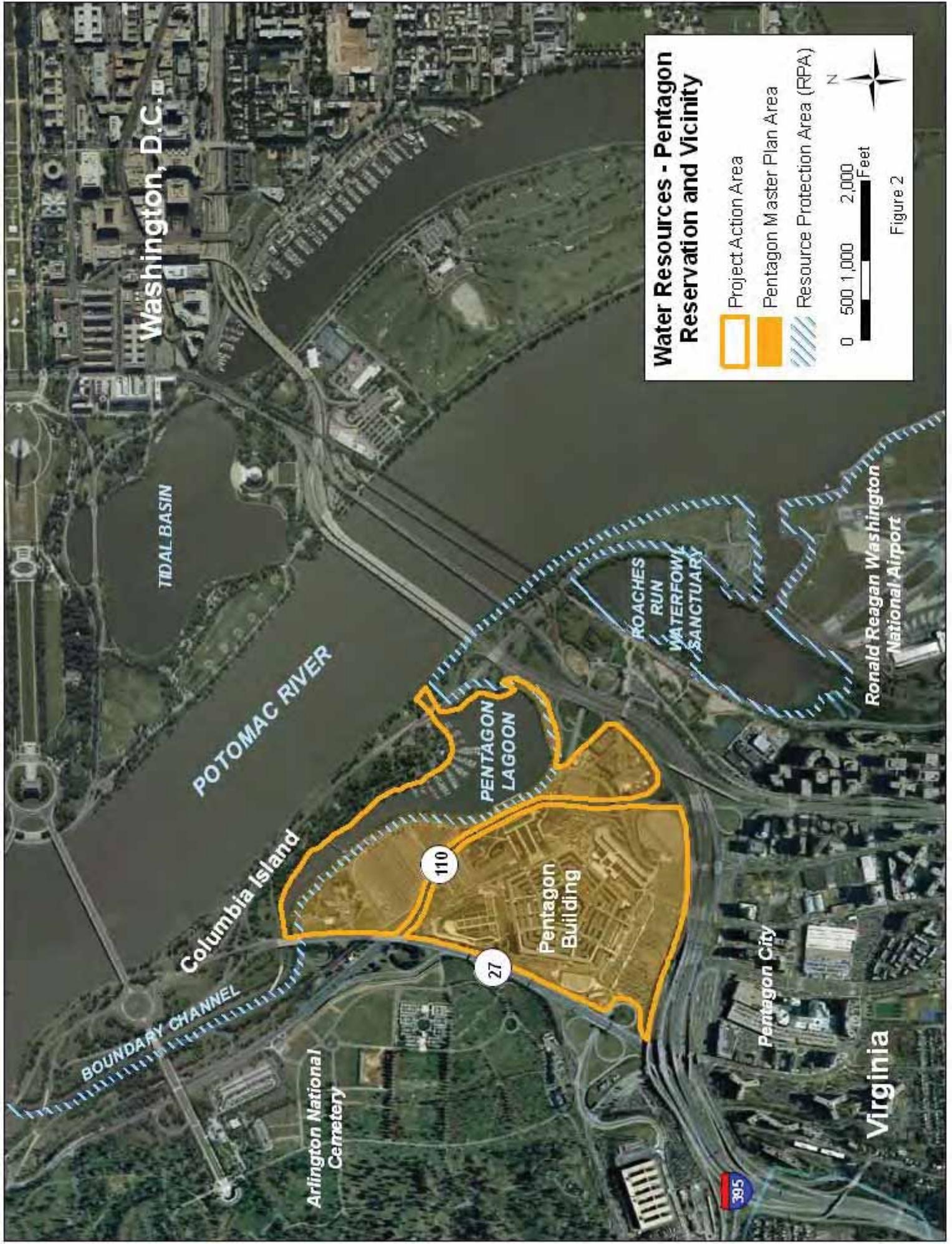


Source: USGS

Figure 1

Alexandria Quadangle  
Washington West Quadangle

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Washington, D.C.

TIDAL BASIN

POTOMAC RIVER

Columbia Island

BOUNDARY CHANNEL

Arlington National Cemetery

110

27

PENTAGON LAGOON

Pentagon Building

ROACHES RUN WATERFLOW SANCTUARY

Ronald Reagan Washington National Airport

Pentagon City

Virginia

395

### Water Resources - Pentagon Reservation and Vicinity

-  Project Action Area
-  Pentagon Master Plan Area
-  Resource Protection Area (RPA)

0 500 1,000 2,000 Feet



Figure 2

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**COMMONWEALTH of VIRGINIA**  
**DEPARTMENT OF CONSERVATION AND RECREATION**

600 East Main Street, 24<sup>th</sup> Floor  
Richmond, Virginia 23219  
(804) 786-6124

February 28, 2014

Craig Carver  
AECOM  
675 Washington Street, Suite 300  
Alexandria, VA 22314

Re: Pentagon Master Plan Update EA

Dear Mr. Carver:

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

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

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

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

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

A fee of \$90.00 has been assessed for the service of providing this information. Please find enclosed an invoice for that amount. Please return one copy of the invoice along with your remittance made payable to the Treasurer of Virginia, **DCR - Division of Natural Heritage, 600 East Main Street, 24<sup>th</sup> Floor, Richmond, VA 23219**. Payment is due within thirty days of the invoice date. Please note the change of address for remittance of payment as of July 1, 2013. Late payment may result in the suspension of project review service for future projects.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Gladys Cason (804-367-0909 or [Gladys.Cason@dgif.virginia.gov](mailto:Gladys.Cason@dgif.virginia.gov)). This project is located within 2 miles of a documented occurrence of a state listed animal. Therefore, DCR recommends coordination with VDGIF, Virginia's regulatory authority for the management and protection of this species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

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

Sincerely,



Alli Baird, LA, ASLA  
Coastal Zone Locality Liaison

Cc: Amy Ewing, VDGIF

## G. FEDERAL COASTAL CONSISTENCY DETERMINATION

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# FEDERAL CONSISTENCY DETERMINATION PENTAGON RESERVATION MASTER PLAN UPDATE ARLINGTON COUNTY, VIRGINIA

Pursuant to Section 307 of the Coastal Zone Management Act of 1972, as amended, and 15 C.F.R. 930 Subpart C, a Federal Consistency Determination has been prepared for the Washington Headquarters Service's (WHS's) Proposed Action to implement the Master Plan Update for the Pentagon Reservation in Arlington County, Virginia. WHS is required to determine the consistency of the Proposed Action and potential effects on Virginia's coastal resources or coastal uses with the Virginia Coastal Zone Management Program (VCP).

This consistency determination represents an analysis of the Proposed Action in light of established VCP Enforceable Policies and Programs. Submission of this consistency determination reflects the commitment of WHS to comply to the maximum extent practicable with those Enforceable Policies and Programs. The Proposed Action would be implemented and operated in a manner consistent with the VCP. WHS has determined that the Proposed Action would have less than significant effects on land and water uses and natural resources of the Commonwealth of Virginia's coastal zone and is consistent to the maximum extent practicable with the enforceable policies of the VCP.

---

## 1. PROPOSED ACTION

The Proposed Action is to implement the Pentagon Reservation Master Plan Update, which would guide development on the Pentagon Reservation over the next 20 years. The Update consists of 22 projects that would be implemented within the boundaries of the Pentagon Reservation. Those projects include new security measures to control vehicular and pedestrian access; the relocation and modernization of certain existing facilities; the demolition of older, vacant facilities; the repurposing of former laydown and construction areas associated with the recently-completed Pentagon Renovation project; and the creation of a more "green" and sustainable campus through the use of surface parking combined with stormwater management techniques to reduce water quality impacts to the Potomac River and Chesapeake Bay.

The Pentagon Reservation covers 238 acres immediately north of Interstate 395 (I-395) in Arlington County, Virginia (Figures 1 and 2). Approximately 159 acres of the Reservation consist of buildings, pavement, or otherwise impervious surfaces. The entirety of the Pentagon Reservation has been disturbed through the original construction of the Pentagon and subsequent ancillary development and redevelopment. All of the proposed Master Plan Update projects would be built in previously-disturbed areas of the Reservation.

The entire Pentagon Reservation is located within a Chesapeake Bay Resource Management Area (RMA). None of the proposed projects would disturb tidal or non-tidal wetlands, nor would any of the projects involve construction in, on or over bodies of surface water or in 100-foot Resource Protection Areas (RPAs). The implementation of the Proposed Action over a 20-year period would further minimize effects on coastal zone resources. Permeable surfaces on the Pentagon Reservation would increase by approximately 7.5 percent as a result of the Proposed Action, which would have correspondingly beneficial effects on the quality and volume of stormwater runoff from the Reservation.

Table 1 lists the projects comprising the Proposed Action. The locations of the individual projects are illustrated in Figure 3.

**Table 1**  
**Master Plan Update Projects**

Map ID <sup>1</sup>	Project
1	Secure Access Lane
2	West End Safety Upgrades
3	South Parking Improvements
4	Pentagon South Pedestrian Safety Project
5	Metro Entrance Facility Visitor Pedestrian Access Control Point (ACP)
6	Metro Entrance Facility Employee Pedestrian ACP
7	Classified Waste Destruction
8	Cogeneration/Combined Heat and Power
9	Pentagon Power Security Upgrade
10	Helipad Control Tower/Fire Station
11	Center Courtyard Stage
12	Corridor 8 Exterior Bridge Canopy
13	Corridor 8 Pedestrian ACP
14	Pentagon Electric Upgrade (East Utility Tunnel)
15	Boundary Channel Vehicular and Pedestrian ACP
16	North Parking Lot Improvements
17	Relocate Impound Lot/Construction Trailers
18	North Village Modifications
19	Pentagon Security Operations Center
20 <sup>2</sup>	Motor Pool
21 <sup>3</sup>	Stormwater Quality Improvements to meet TMDL Action Plan ( multiple locations TBD – not shown on Figure 3)
22	Pentagon Memorial Visitor Center

1. Corresponds to numbers show on Figure 3.
2. Not shown on Figure 3; project site on the Pentagon Reservation to be determined.
3. Not shown on Figure 3; the number of individual improvements and their locations on the Pentagon Reservation would vary.

## 2. ENFORCEABLE POLICIES

The Commonwealth of Virginia has developed and implemented the federally-approved VCP encompassing nine enforceable policies for the coastal area pertaining to:

- Fisheries management
- Subaqueous lands management
- Wetlands management
- Dunes management
- Non-point source pollution control
- Point source pollution control
- Shoreline sanitation
- Air pollution control
- Coastal lands management

A summary analysis of how the Proposed Action would affect each of the enforceable policies is presented below. This analysis is based on the more detailed analyses contained in the environmental assessment, which is expected to be issued for public review in August 2014.

WHS is consulting with the National Capital Planning Commission, National Parks Service, U.S. Commission of Fine Arts, Virginia Department of Transportation, Virginia Department of Historic Resources, and Arlington County to identify potential effects on resources under the jurisdictions of those agencies that could potentially result from the implementation of the Proposed Action.

## **Fisheries Management**

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

*The State Tributyltin (TBT) Regulatory Program has been added to the Fisheries Management program. The General Assembly amended the Virginia Pesticide Use and Application Act as it related to the possession, sale, or use of marine antifoulant paints containing TBT. The use of TBT in boat paint constitutes a serious threat to important marine animal species. The TBT program monitors boating activities and boat painting activities to ensure compliance with TBT regulations promulgated pursuant to the amendment. The MRC, DGIF, and Virginia Department of Agriculture and Consumer Services share enforcement responsibilities (Virginia Code §3.2-3904 and §3.2-3935 to §3.2-3937).*

*Consistent to the Maximum Extent Practicable? Yes*

**Analysis** – By reducing the quantity of and improving the quality of stormwater runoff from the Pentagon Reservation, the Proposed Action would have indirect positive effects on the water quality of the Potomac River and the Boundary Channel/Pentagon Lagoon, both of which are designated as anadromous fish use area. None of the projects involve construction in, on, or over water, nor do they include the use of paints containing TBT.

## **Subaqueous Lands Management**

*The management program for subaqueous lands establishes conditions for granting or denying permits to use state-owned bottomlands based on considerations of potential effects on marine and fisheries resources, wetlands, adjacent or nearby properties, anticipated public and private benefits, and water quality standards established by the DEQ Water Division. The program is administered by the MRC (Virginia Code §28.2-1200 through §28.2-1213).*

*Consistent to the Maximum Extent Practicable? N/A*

**Analysis** – None of the projects included in the Proposed Action would require the use or disturbance of state-owned bottomlands. Therefore, this policy is not applicable.

## **Wetlands Management**

*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.*

*(i) The tidal wetlands program is administered by the MRC (Virginia Code §28.2-1301 through §28.2-1320).*

*(ii) The Virginia Water Protection Permit program administered by the DEQ includes protection of wetlands—both tidal and non-tidal. This program is authorized by Virginia Code §62.1-44.15.20 and §62.1-44.15-21 and the Water Quality Certification requirements of §401 of the Clean Water Act of 1972.*

**Consistent to the Maximum Extent Practicable? YES.**

**Analysis** – No tidal or non-tidal wetlands are located in the footprints of the projects included in the Proposed Action. In part, the project sites were selected to avoid impacts on wetlands. The Proposed Action would have indirect positive effects on wetlands in the Boundary Channel/Pentagon Lagoon by reducing the volume and improving the quality of stormwater runoff from the Pentagon Reservation.

## **Dunes Management**

*Dune protection is carried out pursuant to the Coastal Primary Sand Dune Protection Act and is intended to prevent destruction or alteration of primary dunes. This program is administered by the Marine Resources Commission (Virginia Code §28.2-1400 through §28.2-1420).*

**Consistent to the Maximum Extent Practicable? N/A**

**Analysis** – This policy is not applicable to the Proposed Action because no primary sand dunes are located within the Master Plan Area.

## **Non-point Source Pollution Control**

*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 DEQ (Virginia Code §62.1-44.15:51 et seq.).*

**Consistent to the Maximum Extent Practicable? YES.**

**Analysis** – In accordance with 9VAC 25-880, stormwater pollution prevention plans would be developed for projects disturbing more than 2,500 square feet of land, consistent with the Pentagon's location in a Chesapeake Bay RMA and as a prerequisite for obtaining coverage under a General Permit for Discharges of Stormwater from Construction Activities. Projects disturbing more than 10,000 square feet of land would adhere to the provisions of the Virginia Erosion and Sediment Control Handbook to minimize erosion and sediment impacts on downstream watercourses resulting from exposed, disturbed, and/or stockpiled soils and the temporary loss of impervious and/or vegetative cover. Overall, the implementation of the Proposed Action would result in an approximately 7.5 percent increase in permeable or pervious surfaces on the 238-acre Pentagon Reservation, which would have a positive impact on the quality and quantity of stormwater runoff generated on the Pentagon Reservation.

## **Point Source Pollution Control**

*The point source program is administered by the State Water Control Board pursuant to Virginia Code §62.1-44.15. Point source pollution control is accomplished through the implementation of the National Pollutant Discharge*

*Elimination System (NPDES) permit program established pursuant to §402 of the federal Clean Water Act and administered in Virginia as the VPDES permit program. The Water Quality Certification requirements of §401 of the Clean Water Act of 1972 is administered under the Virginia Water Protection Permit program.*

**Consistent to the Maximum Extent Practicable?** YES.

**Analysis** – No new, permanent point sources would be created as a result of the Proposed Action. Consistent with the Pentagon Reservation’s location in a Chesapeake Bay RMA, construction contractors would be required to obtain a General Permit for Discharges of Stormwater from Construction Activities in accordance with 9VAC 25-880 for projects disturbing more than 2,500 square feet of land. The preparation of a stormwater pollution prevention plan would be a condition of receiving coverage under the General Permit for each project, as applicable. Best management practices would be followed during the construction of the Master Plan Update projects to minimize soil erosion and control non-point source pollution.

### **Shoreline Sanitation**

*The purpose of this program is to regulate the installation of septic tanks, set standards concerning soil types suitable for septic tanks, and specify minimum distances that tanks must be placed away from streams, rivers, and other waters of the Commonwealth. This program is administered by the Department of Health (Virginia Code §32.1-164 through §32.1-165).*

**Consistent to the Maximum Extent Practicable?** N/A

**Analysis** – No septic tanks would be installed or demolished as part of the Proposed Action. Therefore, this policy is not applicable.

### **Air Pollution Control**

*The program implements the federal Clean Air Act to provide a legally enforceable State Implementation Plan for the attainment and maintenance of the National Ambient Air Quality Standards. This program is administered by the State Air Pollution Control Board (Virginia Code §10.1-1300 through 10.1-1320).*

**Consistent to the Maximum Extent Practicable?** YES.

**Analysis** – The Pentagon Reservation is located in Arlington County, Virginia which is within a nonattainment area for fine particulate matter, or PM<sub>2.5</sub> (particulate matter with a diameter ≤ 2.5 micrometers); a moderate nonattainment zone for 8-hour ozone (O<sub>3</sub>); a maintenance area for carbon monoxide (CO); and an attainment area for all other criteria pollutants (NO<sub>2</sub>, PM<sub>10</sub>, Pb, and SO<sub>2</sub>). The State Implementation Program applicable to the Virginia nonattainment area in which the Pentagon is located is the *Plan to Improve Air Quality in the Wahington, DC-MD-VA Region, State Implementation Plan for 8-Hour Ozone*, prepared by the Metropolitan Washington Council of Governments on May 23, 2007.

The emissions generated by construction activities, including emissions of criteria pollutants from construction equipment and fugitive dust, would not be significant. A General Conformity Rule applicability analysis conducted for the construction and demolition activities associated with the Proposed Action, which conservatively estimated that those activities would occur within one calendar year, determined that emissions would remain well below the applicable *de minimis* thresholds for criteria

pollutants. Adherence to BMPs stipulated in erosion and sediment control plans prepared for each project, as applicable, such as the wetting of pavement and seeding of soils exposed for extended periods, would minimize fugitive dust. Overall, emissions would vary throughout the Proposed Action's 20-year implementation period and would subside to pre-implementation levels following the completion of the proposed projects.

Long-term emissions from the commuting vehicles of Pentagon employees would remain the same because no increase in on-Reservation personnel is anticipated. Such emissions may ultimately be reduced through increased use of mass transit alternatives identified in the Transportation Management Plan that is being prepared concurrently with the Master Plan Update. Circulation improvements prescribed in the Master Plan Update could reduce the volume and duration of idling traffic, which could improve air quality on the Reservation by reducing the volume of vehicular emissions associated with idling traffic. In addition, Project 7, Classified Waste Destruction would reduce emissions of greenhouse gases (GHG) by more than 2,800 metric tons of carbon dioxide equivalents (MTCO<sub>2e</sub>), which is more than one-half of the annual emissions from the existing classified waste destruction facility.

Overall, the implementation of the Master Plan Update would result in a net increase in long-term air emissions associated with the operation of new facilities on the Pentagon Reservation (the proposed facilities that would primarily contribute to these increased emissions would include Project 7, Classified Waste Destruction; Project 8, Cogeneration/Combined Heat and Power; and Project 9, Pentagon Power Security Upgrade). Such an increase would likely exceed Major Source Thresholds. Because the Pentagon Reservation is located in a nonattainment area for nitrogen oxides (NO<sub>x</sub>), volatile organic compounds (VOC), and PM<sub>2.5</sub>, it is also likely that new stationary sources would be subject to nonattainment New Source Review (NSR) requirements.

At this stage of planning, specific details that would allow for the estimation of operational air emissions from those facilities are not available. However, it is anticipated that VDEQ air permit modification applications will be prepared for the projects that would exceed the Pentagon's existing air permit thresholds. The determination of NSR applicability will be made once the projects have reached the final design stage, their emissions are estimated, and air permits developed.

A major source Prevention of Significant Deterioration (PSD) and/or nonattainment area NSR would likely be required during the future air permit process. According to the GCR §51.853(j), for "actions subject to preconstruction NSR or PSD programs under the Act", the conformity is presumed and these actions are exempt from further GCR determination. Therefore, a quantification of operational emissions under the Proposed Action is not warranted.

Adherence to applicable regulatory requirements would ensure that air quality impacts from these projects would be less than significant.

## Coastal Lands Management

*Coastal Lands Management is a state-local cooperative program administered by DEQ's Water Division and 84 localities in Tidewater, Virginia established pursuant to the Chesapeake Bay Preservation Act (Virginia Code §§ 62.1-44.15:67 through 62.1-44.15:79) and Chesapeake Bay Preservation Area Designation and Management Regulations (Virginia Administrative Code 9 VAC 25-830-10 et seq.).*

*Consistent to the Maximum Extent Practicable?* YES.

**Analysis** – None of the proposed Master Plan Update projects would occur within 100-foot RPAs associated with Pentagon Lagoon, nor would they involve the filling or disturbance of tidal and non-tidal wetlands. The project sites were chosen in part to avoid disturbing RPAs and wetlands.

As discussed above, permeable surfaces on the Pentagon Reservation would increase as a result of the Master Plan Update. Correspondingly, this would result in improvements to the volume and quality of stormwater runoff from the Reservation.

Consistent with its location in a Chesapeake Bay Resource Management Area (RMA), projects disturbing more than 2,500 square feet of land would be required to obtain a General Permit for Discharges of Stormwater from Construction Activities. Stormwater Pollution Prevention Plans would be prepared for each project as a condition of receiving a General Permit. Projects disturbing more than 10,000 square feet of land would adhere to the requirements set forth in the Virginia Erosion and Sediment Control Handbook. Such projects would implement specified BMPs to minimize erosion and sediment impacts on downstream watercourses resulting from exposed, disturbed, and/or stockpiled sources and the temporary loss of impervious and/or vegetative cover.

None of the proposed Master Plan Update projects would add a new point source of nutrient or sediment discharges on the Pentagon Reservation. The implementation of the Master Plan Update would include LID measures and other stormwater BMPs and would result in an overall reduction in impervious surface on the Reservation, thereby reducing the volume and improving the quality of stormwater runoff to the Potomac River and ultimately the Chesapeake Bay. Further, the implementation of these measures will enable the Pentagon to achieve the nutrient and sediment reductions in stormwater runoff that will be specified in its Chesapeake Bay Total Maximum Daily Load Action Plan, currently under development.

### **3. SUMMARY OF FINDINGS**

WHS has determined that the Proposed Action, which would be implemented in accordance with associated mitigation measures, would be consistent to the maximum extent practicable with the federally-approved enforceable policies of the VCP, pursuant to the Coastal Zone Management Act of 1972, as amended, and in accordance with 15 C.F.R. Part 930, Subpart C.

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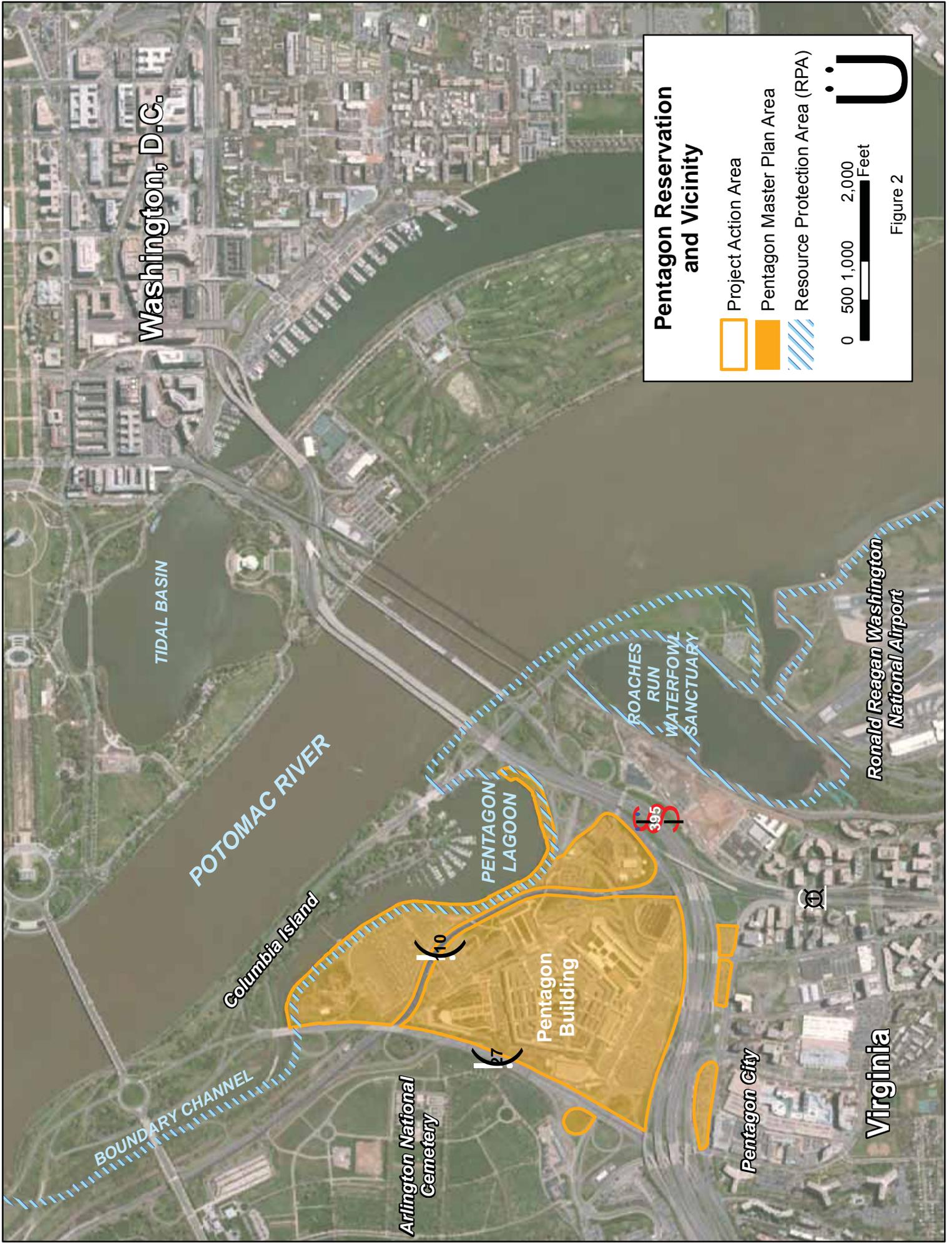
Figure 1

Ronald Reagan Washington National Airport

0 0.25 0.5 1 Miles



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Washington, D.C.

TIDAL BASIN

POTOMAC RIVER

Columbia Island

Arlington National Cemetery

PENTAGON LAGOON

Pentagon Building

ROACHES RUN WATERFOWL SANCTUARY

Ronald Reagan Washington National Airport

Pentagon City

Virginia

**Pentagon Reservation and Vicinity**

-  Project Action Area
-  Pentagon Master Plan Area
-  Resource Protection Area (RPA)

0 500 1,000 2,000 Feet



Figure 2

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Figure 3

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