3.0 Impact Evaluation Methodology

This chapter outlines the approach used to evaluate impacts for each resource topic and includes descriptions of the data sources, study area, methods and assumptions, and the relevant regulatory environment and permitting requirements applicable to each alternative. The introduction provides an overview of the approach to assessing impacts applicable to all resource topics.

3.1 Introduction

In accordance with Council on Environmental Quality (CEQ) regulations, direct, indirect, and cumulative impacts are assessed for each of the alternatives evaluated in the Draft Environmental Impact Statement (EIS). Direct impacts are defined as those that are caused by the action and occurring at the same time and place; while indirect impacts are defined as those reasonably foreseeable impacts caused by the action but occurring later in time or farther removed in distance. They include effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems (40 Code of Federal Regulations [CFR] §1508.8). Cumulative impacts are those that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7).

These impacts are described in the following terms for each resource topic examined in the Draft EIS. This EIS does not attempt to assign one overall intensity, type, or duration for each resource topic under each alternative but to characterize a plurality of impacts.

Intensity

Intensity refers to the severity of impacts. The Draft EIS uses two intensity thresholds and also identifies where information is insufficient to make a determination.

Insufficient information: indicates that insufficient data exists to make a final conclusion with regards to intensity and type, per 40 CFR 1502.22 (incomplete or unavailable information). Potential impacts are stated conditionally and qualitatively.

No Measurable impacts: indicates that the impact is localized and not measurable at the lowest level of detection.

Major impact: indicates the effect is severely adverse, highly noticeable, and considered to be significant.

Beneficial and adverse impacts that are measurable, but not major, are not assigned an intensity.

Type

Type describes the beneficial or adverse nature of the impact. Impacts that improve the state of a resource are considered beneficial, while impacts that degrade a resource are considered adverse.

Duration

Duration describes the temporal considerations of how long the impacts are expected to last. Short-term impacts are defined as either those associated with the construction period, or those lasting less than 1 year; while long-term impacts are defined as those occurring throughout the operational period of the consolidated FBI Headquarters (HQ).

Context

Context refers to the spatial and social scale over which impacts would occur. National Environmental Policy Act (NEPA) regulations require that the significance of an action be analyzed in several contexts, from the macro level (society, national) through the micro level (locality). The Draft EIS evaluates impacts for the site/parcel, locality, and regional level for each resource topic.

As required by section 102(2)(C) of NEPA, the Draft EIS must assess the significance of impacts. A determination of significance requires considerations of both the context and intensity of an impact. 40 CFR 1508.27 outlines the considerations used when evaluating the significance of an impact for both the natural and human environment. The Draft EIS categorizes significant impacts as major, adverse impacts.

The exchange of the J. Edgar Hoover (JEH) parcel is a component of each action alternative. The real estate transaction transferring the JEH parcel from Federal Government ownership into private ownership would not have any direct impacts at the same time and place as the Proposed Action. However, indirect impacts may occur later in time as a result of any future redevelopment of the JEH parcel. Agencies identify future conditions or activities that are reasonably foreseeable in order to understand the indirect impacts that may occur.

To assess the potential indirect impacts from the exchange of JEH to a private exchange partner, the Draft EIS identifies two reasonable foreseeable design scenarios (RFDSs) that are components of each action alternative. The RFDSs in the Draft EIS are an estimate of what could be reasonably developed on the JEH parcel in the foreseeable future based on the Pennsylvania Avenue Development Corporation (PADC) guidelines and D.C. zoning requirements. It is important to underscore that the RFDSs have been developed for analysis purposes only, and they are not General Services Administration (GSA) suggestions or proposals for future use or design of the JEH parcel. GSA would no longer control the JEH parcel once the exchange occurs, and as such the analysis of the RFDSs are less extensive than the site alternatives. The indirect impacts resulting from the exchange of the JEH parcel are discussed in section 4.2. The direct and indirect impacts resulting from the consolidation of Federal Bureau of Investigation (FBI) HQ are described in section 5.2, 6.2, and 7.2 for the Greenbelt, Landover, and Springfield sites, respectively. Cumulative impacts for each site alternative as well as the JEH parcel, including those associated with climate change, are discussed in chapter 8, *Cumulative Impacts*.

Direct Impacts: Occur at the same time and place as the Proposed Action.

Indirect Impacts: Occur later in time or are farther removed in distance but still reasonably foreseeable.

Cumulative Impacts: Result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

EXCHANGE OF JEH

- The exchange of the JEH parcel is a component of the Greenbelt, Landover, and Springfield Alternatives.
- The exchange itself would not result in any direct impacts.
- Reasonably Foreseeable Development Scenarios (RFDSs) are used to estimate indirect impacts from the exchange of JEH.

3.2 Earth Resources

Potential impacts to earth resources are related to geologic resources, topography, and soil disturbance, including the potential for soil erosion or compaction and other soil limitations. The consolidation of FBI HQ has the potential to affect geologic resources and soils as a result of construction under the action alternatives. Likewise, the construction of a consolidated FBI HQ and redevelopment of the JEH parcel may in turn be affected by soil and geologic conditions.

3.2.1 Data Sources

A variety of data sources were consulted in the preparation of the Draft EIS. Geologic information was obtained from geologic reports and maps for Washington, D.C. (JEH parcel), Fairfax County (Springfield) and Prince George's County, Maryland (Greenbelt and Landover); as well as the U.S. Geological Survey (USGS) Physiographic Divisions in the conterminous United States (U.S). Soil data was obtained from the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey spatial and tabular data for Washington, D.C. (JEH parcel), Fairfax County (Springfield) and Prince George's County (Greenbelt and Landover). While GSA has conducted preliminary geotechnical investigations at the Greenbelt, Landover, and Springfield sites in support of the exchange partner and procurement process, this data was not available in time for inclusion in the EIS. Information on topography was obtained from the USGS National Elevation Dataset (NED) 1-meter resolution raster datasets for Fairfax County, Virginia (Springfield) and Prince George's County, Maryland (Greenbelt and Landover); as well as the Washington, D.C. Geographic Information System (GIS) 2-foot elevation contours.

3.2.2 Study Area

The study area for earth resources includes all land within the boundaries of the site alternatives and the JEH parcel, as well as those areas where earth would be disturbed to implement the recommended transportation mitigation measures.

3.2.3 Methodology and Assumptions

Following the review of available data, the impacts to earth resources were evaluated in terms of disturbance, erosion susceptibility, and compaction potential.

Short- and long-term impacts were assessed by comparing available information on existing topography, soils, and geologic conditions and processes with available information on construction and operation of the project. Potential impacts include changes to the local topography that would occur beyond that which would result from natural erosion and deposition. Potential impacts to geology include changes from construction activities, including excavation for buildings, temporary access roads, and staging areas (temporary and permanent).

The following thresholds were used to determine the degree of impacts to geologic resources, topography, and soils in the study areas:

No Measurable Impact: Soils, topography, and/or geologic resources would not be disturbed or measurably altered from existing conditions.

Adverse: Disturbance to soils, topography, and/or geologic resources would occur over localized areas, and result in short-term changes to the soil character or local geologic characteristics. Impacts to undisturbed areas would be minimal. Erosion and/or compaction would occur in localized areas but would be controlled through best management practices (BMPs) to minimize impacts and restore site conditions. Mitigation would be relatively simple to implement and would likely be successful.

Major Adverse: Disturbance would occur over a large area. Impacts to geology or soils would be readily apparent and would result in short- and long-term changes to the character of the geology or soils over a large area, both inside and outside of the project boundaries. Erosion and compaction control would be required to offset adverse impacts, and mitigation/restoration would be required when project activities are completed.

Beneficial: Beneficial impacts are those that would improve or reverse deterioration of geologic resources, and soil erosion, compaction, and other soil disturbances impacts. Due to the nature of the Proposed Action, beneficial impacts are not expected.

3.3 Water Resources

Potential impacts to water resources are related to impacts on the quality, quantity, and uses of surface water and groundwater; surface water flow and hydrology; and the areal extent, functions, and values of wetlands and floodplains. The construction and operation of a consolidated FBI HQ has potential to cause both adverse and beneficial impacts to water resources as described in the following sections.

3.3.1 Data Sources

The analysis of potential impacts to water resources are based on review of existing literature; available spatial data; Federal, state, and local regulations; water quality standards; information provided by GSA and other agencies; and professional judgment. The following data sources were consulted for the Affected Environment for each alternative and the JEH parcel:

- **FEMA Floodplains:** The Federal Emergency Management Agency (FEMA) defines a floodplain as "any land area susceptible to being inundated by floodwaters from any source" (FEMA 2015a). Floodplains and areas subject to coastal storm surge are shown as high-risk areas or Special Flood Hazard Areas on FEMA Flood Hazard Boundary Maps (FHBMs) and Flood Insurance Rate Maps (FIRMs). These are official community maps issued by FEMA that provide a depiction of flood hazards for each community and for properties located within it, including flood hazard boundaries and base flood elevations. FIRMs and FHBMs for the area surrounding each site analyzed in the Draft EIS were used to determine the presence of floodplains or high flood risk areas on or near each site.
- **National Wetlands Inventory (NWI):** the U.S. Fish and Wildlife Service (USFWS) maintains the NWI to provide map data and other resource information to produce timely and relevant wetland management and decision support tools (USFWS 2015a). The NWI Wetlands Mapper, an online tool that integrates digital map data with other wetlands information, was used to determine the presence of wetlands on or near each of the alternative sites analyzed in the Draft EIS.
- **National Hydrography Dataset (NHD)**: The USGS NHD is used to portray a map depiction of surface water features. The NHD represents the national drainage network with features such as rivers, streams, canals, lakes, ponds, coastline, dams, and stream gages (USGS 2015). The NHD was used to map surface water systems and determine the presence of surface water bodies on or near each of the alternative sites analyzed in the Draft EIS.

3.3.2 Study Area

The study area for impacts to water resources includes all water resources within the boundaries of the site alternatives and the JEH parcel, as well as those areas where earth would be disturbed to implement the recommended transportation mitigation measures. Direct impacts are also evaluated qualitatively for larger waterways downstream of these areas that may be impacted by changes in water quality and volume from these sources. The Potomac River is included for all locations. The Anacostia River is considered for the JEH parcel, the Greenbelt Alternative, and the Landover Alternative. Landover also considers Cattail Branch and Beaverdam Creek, while the Springfield Alternative considers downstream impacts to Long Branch and Accotink Creek

3.3.3 Methodology and Assumptions

The impact threshold is determined primarily by comparing the effect of the action alternatives on the resource to a relevant standard based on applicable or relevant/appropriate regulations or guidance, relevant literature and research, or best professional judgment. Conclusions were based on overall impacts to water resources occurring within the study area, and a determination of impact duration, intensity, and context was ascribed to each alternative.

3.3.3.1 Surface Water, Hydrology, and Groundwater Resources

The following thresholds were used to determine the degree of impacts to surface water, hydrology, and groundwater resources in the study areas.

No Measurable Impact: Chemical, physical, or biological impacts to water resources, including stormwater hydrology would not be detectable, would meet water quality standards or criteria, and would be within historical or desired conditions. All permit requirements would be met.

Adverse: Chemical, physical, or biological impacts to surface water, hydrology, and groundwater resources, including stormwater hydrology, would be detectable and would have observable negative consequences on hydrologic connectivity, organisms, or natural ecological processes on a local scale. All permit requirements would be met.

Major Adverse: Chemical, physical, or biological impacts to surface water, hydrology, and groundwater resources, including stormwater hydrology, would be frequently altered from the historical baseline or desired conditions, and would have observable negative consequences on a regional scale. Water quality standards would not be met, and the success of mitigation could not be guaranteed.

Beneficial: For water resources, beneficial impacts are those that, when compared to existing conditions, result in changes to chemical, physical, or biological effects on surface water, hydrology, and groundwater resources, including stormwater hydrology that would result in positive trends toward compliance with water quality standards and stormwater management criteria; and improve hydrologic regimes by reducing flashiness, increasing stormwater filtration, improving aquatic habitat, or creating other improvements.

3.3.3.2 Wetlands

Several factors are considered when evaluating impacts to wetlands, including size, wetland integrity, and connectivity.

Size: The intensity of impacts to wetlands depends on the size of the wetlands affected. A small area of impact in a large wetland would be likely to have less of an effect than a large area of impact in a small wetland. The change in the size of a wetland, as a result of an impact, would also influence the integrity and connectivity of the wetland and vice versa.

Integrity: Highly intact wetlands with little prior disturbance would be more susceptible to impacts from direct development than those that were previously degraded by development or other activities. The loss of the functions and values of a higher quality wetland would be a greater loss than that of a lower quality wetland.

Connectivity: The relationship and hydrologic connection of wetlands to other wetlands or waters of the U.S. is also important in determining the degree of impact or project benefits. Impacts to areas with more complex associations of wetlands would be more likely to affect the connectivity of the area than impacts on areas with fewer natural community types.

The following thresholds were used to determine the degree of impacts on wetland resources in the study areas:

No Measurable Impact: There would be no detectable effects on size, integrity, or connectivity of wetlands.

Adverse: The impact would be sufficient to cause a measurable or perceptible effect on one of the three parameters (size, integrity, and connectivity) but would be localized in terms of area and the nature of the impact. Permanent loss of wetland acreage could occur; however, this would not occur over large areas and the overall viability of the wetland would not be affected. Mitigation would likely be necessary, and would likely be successful. Wetland functions or values would not be degraded in the long term.

Major Adverse: The impact would result in a measurable effect on all three parameters (size, integrity, and connectivity) or a permanent loss of large wetland areas. The impact would be substantial and highly noticeable. The character of the wetland would be changed so that the functions or values typically provided by the wetland would be substantially altered. Mitigation would be necessary, and may not be successful.

Beneficial: The impact would be sufficient to cause a measurable effect on one or more of the three parameters (size, integrity, and connectivity) or would result in a permanent restoration of wetland acreage. The character of the wetland would be changed so that the functions or values typically provided by the wetland would be restored or improved.

3.3.3.3 Floodplains

The establishment of impervious surfaces, buildings, or other structures in floodplains generally introduces barriers that could affect floodplain function both on-site and downstream, and could increase the risk of damage to life and property. Barriers could also affect the natural dispersal of plants and animals, and impact the connectivity of those communities that are important for the ability of the floodplain to provide beneficial functions and values.

Floodplains are the lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands, and including, at a minimum, that area subject to temporary inundation by a regulatory flood. Executive Order (EO) 11988, Floodplain Management, requires an examination of impacts to floodplains and of the potential risk involved in placing facilities within floodplains as well as the protection of floodplain values. EO 11988 requires that Federal agencies “avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative.” Per EO 11988, GSA must avoid floodplains unless the Agency determines that there is no practicable alternative. Impacts to floodplain functions and values would be assessed for all sites. These assessments would be based on the known and potential 100-year and 500-year floodplains within the study area, review of existing literature and studies, and professional judgment.

The severity of impacts on floodplains depends largely on the size of the impacted area and the watershed. A small area of impact in a large floodplain would be likely to have less of an effect than a large area of impact in a small floodplain. The change in the size of a floodplain as a result of an impact would also influence the integrity and connectivity of the floodplain and vice versa.

The following thresholds were used to determine the degree of impacts to floodplains in the study areas:

No Measurable Impact: there would be no detectable effects on floodplains.

Adverse: Impacts would result in a detectable and measurable, but relatively localized change to floodplain functions and values. Impacts could be consequential and mitigation measures would likely be needed, but would likely be successful.

Major Adverse: Impacts would result in a change to floodplain functions and values that would have substantial consequences on a regional scale. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed.

Beneficial: The effect on floodplains would be measurable or perceptible and would result in a permanent restoration of floodplain areas. The character of the floodplain would be changed so that the functions or values typically provided by the floodplain would be restored and/or improved.

3.3.4 Relevant Regulatory and Permitting Requirements

In order to mitigate adverse impacts to water resources, there are permitting and regulatory processes that would apply across the water resource categories described in the following sections. Section 404 of the Clean Water Act (CWA) (33 CFR, Parts 320–330) outlines permit guidelines that require proposed projects to follow the mitigation sequence of avoid, minimize, and compensate. Impacts must first be avoided to the extent practicable, then unavoidable impacts must be minimized, and finally compensation. Compensatory mitigation includes on-site, off-site, or a combination of options usually within the watershed where impacts are proposed. Mitigation measures include restoration, creation, enhancement, or preservation methods. Compensatory mitigation projects require development of a mitigation plan. The new 2015 Clean Water Rule refines the definition of waters that are considered to be waters of the U.S. Under the rule, an adjacent body of water is protected if it is within the 100-year floodplain, but not more than 1,500 feet from a waterway covered under the CWA.

This section specifically highlights regulatory requirements applicable at a Federal level as well as for the State of Maryland because of the presence of water resources at the Greenbelt site. The Commonwealth of Virginia has similar state and local permitting requirements and environmental controls; however, given the minimal nature of expected impacts to water resources at this sites, they are not described.

3.3.4.1 Regulatory Requirements for the Redevelopment of JEH

Future redevelopment of the JEH parcel would be subject to 21 D.C. Regulations (DCR) §§1150–1158. This regulation establishes criteria to protect designated groundwater resources and provides enforcement and monitoring requirements. It requires that all ground waters be free from pollution in the form of oil, carcinogens, toxicants, and other substances in concentrations that might present a health hazard or render the ground water unusable. Additionally, it requires all ground waters to be free from domestic, industrial, agricultural, or other man-induced, non-thermal components of discharges in concentrations which, alone or in combination with other substances or components of discharges:

- Are harmful to plants, animals or other organisms;
- Are carcinogenic, mutagenic, teratogenic, or toxic in toxic amounts to human beings;
- Are acutely toxic to biological species of the aquatic community within surface waters affected by the ground water at the point of contact with surface waters;
- Pose a serious danger to the public health, safety or welfare;
- Create or constitute a nuisance; or
- Impair the reasonable and beneficial use of adjacent waters within and outside the District

The Department of Energy and Environment defines several categories of stormwater management BMPs. These BMPs would reduce impervious surfaces and increase opportunities for infiltration of precipitation and stormwater runoff, thereby retaining stormwater and reducing runoff. These BMPs include green roofs, rainwater harvesting, impervious surface disconnection, permeable pavement systems, bioretention, filtering systems, infiltration, open channel systems, ponds, wetlands, storage practices, proprietary practices, and tree planting and preservation (Department of Energy and Environment 2013). Soil erosion and sediment control BMPs include road stabilization, sediment barriers, dikes and diversions, sediment traps and basins, downdrains and flumes, inlet and outlet protections, dewatering, site preparation techniques, and soil stabilization with vegetation (DOH 2003). Examples include silt fences, dry and wet swales, riprap, piping of stormwater, and stream restoration. Implementation of low-impact development (LID) techniques would also prevent stormwater impacts and provide benefits.

3.3.4.2 *Surface Water, Groundwater, and Hydrology*

In order to mitigate adverse impacts to water resources, there are permitting and regulatory processes that would apply across the water resource categories described in the following sections. Section 404 of the CWA (33 CFR, Parts 320–330) outlines permit guidelines that require proposed projects to follow the mitigation sequence of avoid, minimize, and compensate. Impacts must first be avoided to the extent practicable, then unavoidable impacts must be minimized, and finally compensation. Compensatory mitigation includes on-site, off-site, or a combination of options usually within the watershed where impacts are proposed. Mitigation measures include restoration, creation, enhancement, or preservation methods. Compensatory mitigation projects require development of a mitigation plan.

Federal projects are subject to various regulations requiring reduction in stormwater runoff. A consolidated FBI HQ would be developed in accordance with Section 438 of the Energy Independence and Security Act (EISA) of 2007, which details stormwater runoff retention standards. EISA requirements for stormwater involve the replication of the natural hydrology and water balance of the site typically by retaining to the 95th to 98th percentile of rainfall events. Runoff leaving a project site with a footprint greater than 5,000 square feet must have the same temperature, rate, volume, and flow duration as predevelopment stormwater runoff, to the maximum extent technically feasible (USEPA 2009). These performance standards could be attained through on-site stormwater management practices that mimic natural processes, including the use of sustainable design and building practices, LID, and green infrastructure tools. Many BMPs and LID practices use natural processes such as infiltration, evaporation, and storage to restore natural hydrology. Examples of these practices include reduction of impervious surfaces, reforestation or revegetation, and preservation and improvement to floodplains and riparian areas. A system to capture, store, and reuse stormwater would result in a reduction of stormwater runoff to surrounding surface waters thereby preventing additional erosion.

Additionally, EO 13693 requires appropriate green infrastructure features on federally owned property to help with s stormwater management. Other Federal, state, and local regulations govern stormwater management in the project area, including the Stormwater Management Act of 2007 and state regulations for stormwater management under Code of Maryland Regulations 26.17.02. Similar to EISA, these regulations also require a project to maintain predevelopment stormwater runoff characteristics. Additional minimum control requirements include the maintenance of 100 percent of predevelopment groundwater recharge and channel stability.

Leadership in Energy and Environmental Design

Implementation of Leadership in Energy & Environmental Design (LEED) strategies and practices to achieve a Gold rating has the potential to improve future stormwater management through retention, reuse, and water quality enhancements. The new HQ would be required to achieve LEED Gold, in compliance with GSA policy. Mitigation of stormwater impacts and achievement of the necessary level of stormwater retention would require the implementation of multiple types of stormwater BMPs.

The LEED program has credits intended to manage stormwater quality and quantity, as well as overall water efficiency, in order to minimize or avoid adverse impacts to water and earth resources. LEED Gold certification requires the creation and implementation of an Erosion and Sedimentation Control Plan for all construction activities as a prerequisite. The Erosion and Sedimentation Plan would be required to conform to the erosion and sedimentation requirements of the 2003 U.S. Environmental Protection Agency (USEPA) Construction General Permit or local erosion and sediment control standards and codes, whichever is more stringent. The Erosion and Sedimentation Control Plan would ensure pollution from construction activities is minimized or avoided by controlling soil erosion, waterway sedimentation and airborne dust generation by accomplishing the following objectives:

- Prevent loss of soil during construction by stormwater runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse.
- Prevent sedimentation of storm sewer or receiving streams.
- Prevent polluting the air with dust and particulate matter.

3.3.4.3 Wetlands

Federal agencies must comply with several guidelines and regulations regarding wetland management. These rules emphasize a process of wetland avoidance, minimization, and compensation. EO 11990, Protection of Wetlands, requires Federal agencies to consider alternatives to wetland sites and to limit potential damage if an activity affecting a wetland cannot be avoided. Specifically, Section 1 of the EO states that an agency is required to "minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands." The Public Buildings Service (PBS) Wetland Impact Management Desk Guide provides guidance on wetlands regulations, and management of impacts to wetlands, including permits. GSA activities in a wetland should also abide by guidelines found in Action Decision Memorandum 1095.5, Consideration of Wetlands in Decisionmaking.

Other Federal, state, and local regulations govern disturbance and wetland management on the site. According to USEPA guidelines, the U.S. Army Corps of Engineers (USACE) regulates development in jurisdictional wetlands pursuant to Section 404 of the CWA (33 CFR Parts 320–330). Section 404 specifically regulates the discharge of dredged and fill material into wetlands and other waters of the U.S. through a permitting process. Further clarification of waters of the U.S. is provided in the 2015 Clean Water Rule. The placement of dredged or fill material is only allowed if no other practicable and less damaging alternative exists, and if waters of the U.S. would not be degraded.

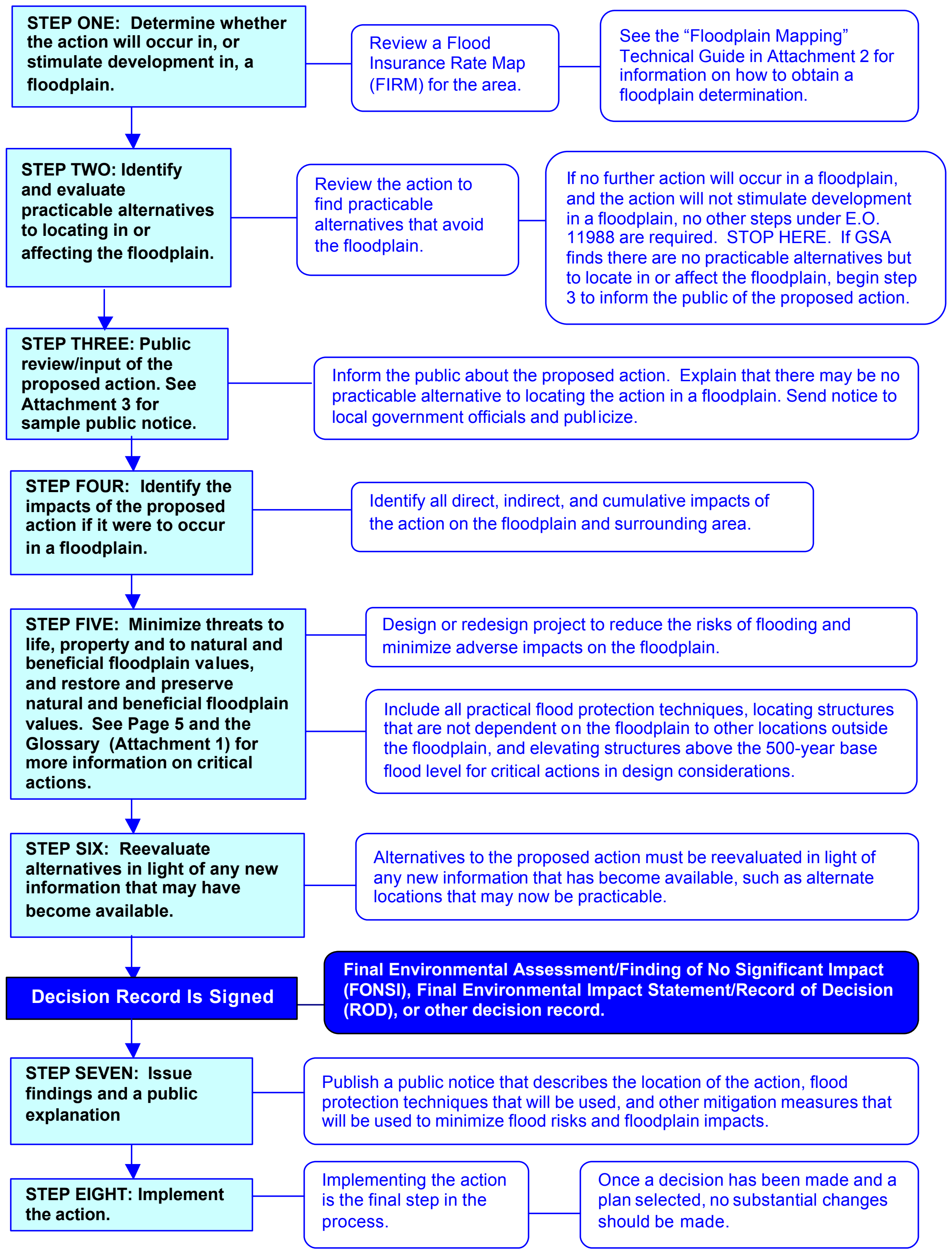
In Maryland, the Maryland Department of the Environment (MDE) provides protection for wetlands and wetland buffers and regulation of construction and development in wetlands through the Code of Maryland Regulations (Title 26, Subtitles 23 and 24) and the Non-tidal Wetlands Protection Act.

Mitigation Measures

Any impacts to wetlands during construction could be minimized through the implementation of sediment and erosion control BMPs such as sediment barriers, timber matting, and vehicles with low pressure tires. Following construction, temporary wetland disturbance should be mitigated through restoration of the original wetland contours and revegetation with native species. Wetland impacts due to erosion and sedimentation could be reduced or prevented through the use of permanent stormwater management and LID measures such as those previously discussed. If impacts are unavoidable, mitigation would be required to offset the filled wetlands and replace lost functions and values.

In Maryland, mitigation and monitoring would be required for any authorized impacts to wetlands and/or the associated 25-foot wetland buffer. Submission of a mitigation proposal along with the joint permit application would be required if the Proposed Action would result in the loss of more than 5,000 square feet of wetlands. Wetland mitigation for unavoidable losses through the Maryland Wetlands and Waterways program requires "no net loss" for non-tidal wetland acreage, functions, and quality. The non-tidal wetland program has regulations similar to those authorized under Section 404 of the CWA with some differences. The Maryland program requires a 25-foot wetland buffer, which includes activity restrictions, around non-tidal wetlands. Maryland also regulates isolated wetlands as well as the alteration of wetland vegetation and hydrology during an action. Permanent, unavoidable loss of wetland acreage or functions is mitigated through creation, restoration, preservation, or enhancement of non-tidal wetlands. Acreage replacement ratios determine the amount of wetland mitigation required for all types of non-tidal wetlands. Some examples of replacement ratios are: 1: 1 for herbaceous emergent wetlands; 2: 1 for scrub-shrub and forested wetlands; and 1: 1 for permanent conversion of forested wetlands to herbaceous emergent wetlands (MDE 2011). The use of wetland restoration should always be the first compensatory mitigation option considered.

Figure 3-1: GSA's Eight Step Floodplain Evaluation Process



3.3.4.4 Floodplains

Federal agencies must comply with several guidelines and regulations regarding floodplain development and management. These rules attempt to balance the need for development with a process of floodplain avoidance, minimization, preservation, and restoration. EO 11988, Floodplain Management, requires Federal agencies to avoid floodplain development and any adverse impacts from the use or modification of floodplains when there is a feasible alternative. Specifically, Section 1 of the EO states that an agency is required "to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities."

EO 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input, and the associated Federal Flood Risk Management Standard (FFRMS) reinforce the guidelines stated in EO 11988. FFRMS encourages the consideration of existing natural features during the development of alternatives. In accordance with this EO, the alternatives planning process considered the natural character of the Greenbelt site in the configuration of site elements in the conceptual site plan, as recommended by FFRMS. Additionally, the FFRMS guides agencies to use a higher flood elevation to ensure that proposed projects account for uncertainties associated with climate change.

In Maryland, regulations put forth under the Code of Maryland Regulations 26.17.04 restrict the alteration of and construction within waterways, including changes to the 100-year floodplain of free-flowing waters. A project that proposes these changes must obtain a permit. Floodplain disturbance should not increase the average shear stress of a reach unless channel stability is retained, should not reduce the natural meander width of the stream, should not alter the hydraulic functions of the floodplain, and must provide a minimum of 1 foot of freeboard above the 100-year frequency flood event.

The Prince George's County floodplain ordinance is similar to MDE regulations and meets the requirements put forth by FEMA. The Prince George's County ordinance also discourages floodplain development. However, development is allowed in certain situations with a permit. Any loss of floodplain storage must be mitigated by an equal amount of compensatory volume. Prince George's County regulates development within the 100-year floodplain by requiring a permit for activity that would affect a floodplain.

In addition to Federal, state, and local regulatory requirements, GSA has its own guidance on development on or near floodplains.

GSA's Eight Steep Floodplain Evaluation Process

In compliance with GSA's Floodplain Management Desk Guide, GSA has evaluated the Proposed Action in accordance with the eight-step process required for actions that stimulate development in a floodplain, as shown in figure 3-1. GSA would inform the bidder/buyer of the parcel that the parcel contains land within the 100-year floodplain.

When there is no feasible alternative to floodplain development, GSA must minimize adverse impacts, use mitigation measures as described by the eight-step process, and notify Federal, regional,, state, tribal, and local floodplain management agencies, and the public to allow for legal review and comments. The responsibilities of GSA include consideration of alternatives to avoid development, and if not feasible, minimization of adverse impacts and notification of the public detailing the need for the proposed floodplain development. Additionally, GSA activities in a floodplain should abide by guidelines found in *Action Decision Memorandum 1095.6, Consideration of Floodplains in Decisionmaking.*

JEH EXCHANGE:

Step 1: The JEH parcel is located partially within the 100-year and 500-year floodplains, based on the best available information provided by FEMA effective FIRM data, as shown in Section 4.1.2).

Step 2: Public involvement occurred during the public scoping process for the Draft EIS and would continue through throughout the NEPA process. A detailed description of public involvement in the site selection process and public and agency scoping activities is provided in chapter 9, *Public Involvement*.

Step 3: Indirect impacts from future redevelopment would be estimated based on the two RFDSs. Ultimately, the exchange partner would be responsible for identifying design alternatives to minimize impacts to the floodplain. The only practicable alternative to the exchange of the JEH parcel would be the No-action Alternative; however, this would not accomplish the need for the Proposed Action.

Step 4: Because the JEH parcel is already developed, there would be no net loss of the beneficial natural values of the floodplain from future redevelopment. The exchange partner would be required to adhere to appropriate building practices for construction in a floodplain, such as not changing the natural flood channel, developing a flood management plan, or adhering to building codes for construction in a floodplain. Therefore, there would be no measurable impacts to floodplains.

Step 5: The building practices outlined in step 4 would ensure that threats to life, property, and natural and beneficial floodplain values would remain minimal.

Step 6: Exchange of the JEH parcel would not directly impact floodplains, but there would be an indirect impact from any future development on the parcel after the property has been exchanged. Indirect impacts to floodplains are estimated based on two RFDSs in the Draft EIS. The exchange partner would be responsible, as required by the Washington, D.C. Department of Energy and Environment for implementing any BMPs and developing design alternatives. In compliance with GSA's Floodplain Management Desk Guide, GSA would inform the bidder/buyer of the property that the property is located within the 100-year and 500-year floodplains.

Step 7: Public notification regarding siting of the Proposed Action in the 100-year floodplain at the JEH parcel would not be provided following selection of an action alternative.

Step 8: This step would occur after the decision document has been signed. The public would have an additional opportunity to comment on the Final EIS and Record of Decision.

GREENBELT SITE

Step 1 : The footprint of the Greenbelt Alternative would occur partially within 100-year riverine floodplains, based on the best available information provided with the revised preliminary floodplain data as well as the effective FEMA FIRM data, as described in Section 5.1.1.7.

Step 2: Public involvement occurred during the NEPA public scoping process. A presentation of the site and potential site constraints, including floodplains, were presented to the public. A detailed description of public involvement in the site selection process and public and agency scoping activities is provided in chapter 9, *Public Involvement*.

Step 3: Practicable alternatives to locating the Proposed Action in a floodplain include the No-action Alternative, the Landover Action Alternative, or Springfield Action Alternative. The affected environment at the Landover and Springfield sites and consequences resulting from the Proposed Action for each alternative are examined in chapters 6, *Landover Site* and 7, *Springfield Site*, respectively. Indirect impacts from future redevelopment associated with the Proposed Action at the JEH parcel can only be estimated based upon the RFDSs. It would be the ultimate responsibility of the exchange partner to identify potential building alternatives to minimize impacts to the floodplain.

Step 4: Most of the area surrounding the Greenbelt site is already developed. For those undeveloped areas that would be impacted, the Federal, state, and local regulations and permitting requirements discussed in this chapter provide firm guidance on floodplain management and development and associated protection against the loss of life or property. A main element of these regulations is the process of avoidance, minimization, preservation, and restoration. Any future development in the area following the consolidation of FBI HQ at the Greenbelt site would be required to follow these rules, which would minimize impacts to and protect lives, property, and floodplain functions and values.

Step 5: Measures to reduce unavoidable impacts and restore floodplain values would be considered. The conceptual site plan for the Greenbelt site implements some of these measures, including the avoidance of placing buildings within the floodplain, and the reduction of the required standoff of campus elements from the secure perimeter; however, clearing and the construction of perimeter fencing would occur in the floodplain.

Step 6: Site-specific development alternatives for the Greenbelt site would not be identified until and unless the site is officially selected for the Proposed Action.

Step 7: If one of the action alternatives is chosen, public notification regarding siting of the consolidated FBI HQ in a portion the 100-year floodplain at the Greenbelt site would be provided at that time. Mitigation measures and flood protection techniques would be presented.

Step 8: This step would occur after the decision document has been signed. The public would have an additional opportunity to comment on the Final EIS and decision document.

Permitting Requirements

To ensure compliance with the state water quality standards and protect the water quality of the surface waters on- and off-site, the Proposed Actions at the Greenbelt site require several permits and approvals. Permits are required for disturbance to non-tidal wetlands, any portion of the 25-foot wetland buffer, streams, and associated floodplains as well as any action that would "change the course, current, or cross-section of a non-tidal stream or body of water." Activities that require a permit include filling, grading, destroying or removing vegetation, excavating or dredging, changing existing drainage patterns or flood retention capacity, and disturbing the water level or water table (MDE n.d.). A Waterway and 100-Year Floodplain (Non-tidal Wetlands and Waterways) Section 401 permit through MDE and Section 404 permit certification through USACE regulate wetlands and waterways. To receive authorization from USACE and Maryland, a "Joint Federal/State Application for the Alteration of any Floodplain, Waterway, Tidal or Non-tidal Wetland in Maryland" would need to be completed and submitted. The joint authorization ensures that construction activities protect fish habitat, prevent erosion, and do not alter flood risks on upstream and downstream land. A permit or authorization is provided by MDE in cooperation with Federal, state, and local agencies. Under CWA Section 401, a State Water Quality Certification is also required and is typically part of the non-tidal wetlands and waterways authorization. Because the consolidation of FBI HQ at the Greenbelt site has the potential to alter a stream or floodplain, the submittal would require an engineering analysis, description of environmental impacts of the action, and measures to reduce or prevent adverse impacts. The application process attempts to prevent or reduce impacts and, as such, requires applicants to provide reasons why the impacts are necessary and unavoidable in addition to showing how impacts are to be minimized. Construction also requires erosion and sediment control and stormwater management plan approvals.

Alterations to streams, wetlands, and floodplains and in some cases wetland or stream buffers require Federal, state, and local permits. In order for a USACE Section 404 permit (State Programmatic General Permit authorization) to be valid, a project must also obtain Maryland Non-tidal Wetlands and Waterways authorization (Waterway and 100-Year Floodplain permit), a Waterway Construction authorization, a Water Quality Certification (Section 401), and a Coastal Zone Consistency determination. Prince George's County also requires permits for alteration to streams, wetlands, and floodplains.

To regulate discharge of pollutants, the project must apply for and obtain a General or Individual Permit for Stormwater Associated with Construction Activity before construction begins. In addition to this Federal/state National Pollutant Discharge Elimination System (NPDES) permit, the Greenbelt site would need to obtain a general county permit for stormwater because the proposed disturbance would affect more than 1 acre of land. Furthermore, the Proposed Action must comply with sediment and erosion control and stormwater management plans. Possible permitting requirements for groundwater include an NPDES General Construction Permit for discharges of dewatered groundwater, if necessary

Both the CWA and Maryland surface water quality standards offer protection for surface waters and require permits for discharges to waterways and approval of stormwater management and pollution prevention plans. Through the Chesapeake Bay Total Maximum Daily Load (TMDL), Maryland, Prince George's County, and Federal land have specific sediment and nutrient limits allocated by sector (e.g., agriculture, urban/suburban, and wastewater) that must be met in order for water quality standards to be met within the bay. Sediment targets are met through a focus on the implementation of urban stormwater management projects outlined in various Watershed Implementation Plans. Prince George's County regulates riparian areas with slopes greater than 15 percent, depending on soil characteristics, as well as perennial and intermittent streams as defined in Section 24-101 of the Prince George's County Code. USACE regulates perennial, intermittent, and ephemeral streams but not ditches or drainages located in uplands as defined in both the CWA and the 2015 Clean Water Rule.

3.3.4.5 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA), signed by Congress in 1972 and administered by the National Oceanic and Atmospheric Administration (NOAA), is designed to "preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone" (16 U.S.C. §1451 et seq.). Section 307 of the CZMA, outlines provisions for Federal consistency with the CZMA. It requires Federal actions that would have reasonably foreseeable effects on coastal land or water uses and natural resources to be consistent with the enforceable policies of each state's Federally approved coastal management program. Federal actions must be consistent to the maximum extent practicable with the enforceable policies of a state coastal management program. Upon the identification of the Preferred Alternative, GSA would prepare a Federal consistency determination which would be reviewed by the relevant state agency for concurrence.

The District does not have a designated coastal zone and is exempt from the conditions of the CZMA, including development of a Coastal Zone Management Plan and associated policies. Therefore, Federal agencies do not need to prepare a Federal consistency determination under the CZMA for actions taken in the District.

Prince George's County is within the Maryland coastal zone, and therefore Federal actions require submission of a Federal consistency determination to ensure that the proposed Federal action is consistent with state coastal management policies. The Maryland Department of Natural Resources (MDDNR) administers the state's CZMA program, which is composed of state, regional, and local agencies that work under state laws, policies, and objectives to protect and restore coastal resources while also allowing for appropriate development. If the Greenbelt or Landover Alternatives are identified as the Preferred Alternative, a Coastal Zone consistency determination would be required. CWA Section 404 permits must be consistent with the Coastal Zone Management Program guidelines.

Fairfax County is within the Virginia coastal zone, and therefore Federal actions require submission of a Federal consistency determination to ensure that the proposed Federal action is consistent with enforceable policies of the state's coastal management policies. These policies include the requirements of the Virginia Erosion and Sediment Control Handbook, Third Edition (1992), and stormwater management criteria consistent with water quality protection provisions of the Virginia Stormwater Management Regulations, Chesapeake Bay Preservation Ordinance, and the Virginia Chesapeake Bay Preservation Act. The Virginia Chesapeake Bay Preservation Act requires that the counties and municipalities near tidal waters in the Commonwealth incorporate general water quality protection measures into their comprehensive plans, and zoning and subdivision ordinances. It also requires defining and protecting Chesapeake Bay Preservation Areas. Fairfax County designates are corridors of environmentally sensitive land are considered coastal resources as Resource Protection Areas (RPAs), while the remainder of the county is included in a Resource Management Areas (RMAs). RMAs require less stringent performance criteria, and include those areas of the county not included in the RPAs.

3.3.4.6 Mitigation Strategies

Minimization and mitigation of impacts associated with stormwater pollutant loading potential could be achieved through adherence to the provisions of the General Construction Permit, stormwater pollution prevention plan, and implementing BMPs that address site and activity specific water resource protection needs. Further guidance and strategies for managing stormwater and associated sediment erosion can be found in the various Watershed Implementation Plans associated with the Chesapeake Bay TMDL. Stormwater and sediment and erosion control management involve planning and design principles and BMPs to control both stormwater volume and water quality. Principles to be considered include conservation of natural features, protection and avoidance of natural resources and sensitive areas including soils, minimization of disturbance, stormwater runoff control, expeditious soil stabilization, and on-site sediment retention.

Stormwater management can be achieved through structural and nonstructural measures. Stormwater BMPs use natural processes such as infiltration, evaporation, and transpiration to retain, detain, and store runoff. LID incorporates these processes to mimic predevelopment hydrology. Prior to design and implementation of BMPs and LID, the infiltration potential of the soils at the site must be evaluated. LID techniques include pervious pavement, green roofs, rain gardens, rain cisterns, and bioswales. Examples of structural BMPs include bioretention, infiltration trenches, retention ponds, and swales. Nonstructural BMPs include conservation of natural areas, vegetated swales, and disconnection of runoff from impervious areas and redirection to pervious areas. Environmental site design is the use of these nonstructural stormwater management BMPs and site design techniques to achieve natural stormwater runoff and reduce impacts to natural resources. Another option is the retrofitting of existing stormwater BMPs to improve retention or detention capacity and water quality treatment. Retrofitting examples include the addition of constructed wetlands, plantings, and pool storage to existing detention basins. The design of sediment and erosion control must support the stormwater management plan. Designs must consider natural features and drainage and implement controls appropriate for the conditions and planned work. Categories of sediment and erosion control are those for grading and stabilization, water conveyance, erosion control (structural), filtering, dewatering, and sediment trapping. BMP examples are silt fences, matting, revegetation, inlet and outlet protection, riprap, and check dams. Water conveyance BMPs range from swales and berms to diversion pipes and drains. Dewatering practices include sediment tanks, filters, and subsurface drains. Discharges of dewatered groundwater would require a NPDES General Construction Permit.

As detailed by MDE, example BMPs for development activity in non-tidal wetlands, wetland buffers, streams, and 100-year floodplains include:

- Place or store fill, construction material, or debris outside the boundary of the water resources and in a location and a manner that does not alter the surface or subsurface flow into or out of the resources.
- Use mats or operational techniques to prevent damage to the resources when heavy equipment is in use.
- Use appropriate vegetation for stabilization.
- Restore original grades and elevations to temporarily disturbed areas following construction.
- Prohibit instream activity in Indian Creek from March 1 through June 15 to protect aquatic species.
- Use stormwater management practices to control stormwater runoff from the construction site.

Various stormwater and erosion and sediment control BMPs and LID techniques could reduce potential contamination of groundwater through the processes of infiltration and filtration. One example could be to construct a temporary groundwater treatment system to reduce groundwater pollutants prior to discharge.

3.4 Biological Resources

Potential impacts to biological resources are related to impacts to vegetation, aquatic wildlife species, terrestrial wildlife species, and special status species. The construction and operation of a consolidated FBI HQ has potential to cause both adverse and beneficial impacts to biological resources as described in the following sections.

3.4.1 Data Sources

The analysis of potential impacts to biological resources was based on review of existing literature; available databases and information regarding ecoregions; state and county data, including Natural Heritage Program data; analysis of aerial photography; and site visits.

3.4.2 Study Area

The study area for impacts to biological resources includes all land within the boundaries of the site alternatives and the JEH parcel, as well as those areas where earth would be disturbed or human activities would increase to implement the recommended transportation mitigation measures. Impacts are evaluated for aquatic species downstream of these areas with habitat that may be impacted by changes in water quality and volume from these sources.

3.4.3 Methodology and Assumptions

Direct impacts to vegetation and wildlife occur when vegetated areas that include plant and wildlife habitats are cleared for the construction of buildings and roads. Indirect impacts on vegetation and wildlife consist of a reduction in on-site habitat diversity and suitability for use by plants and wildlife.

The following guidelines are used to determine the intensity of adverse impacts to biological resources:

No Measurable Impact: There would be no changes to biological resources that would noticeably alter the abundance, distribution, quantity, or quality of existing populations.

Adverse: Changes to biological resources would be readily measurable in terms of abundance, distribution, quantity, or quality of populations and could occur over a large area. Mitigation measures could be necessary to offset adverse impacts and would likely be successful. Viability of wildlife or plant populations would likely not be affected in the long term and the community, if left alone, would recover.

Major Adverse: Impacts to biological resources would be readily apparent and would substantially change wildlife populations over a large area in and out of the study areas. Extensive mitigation would be needed to offset adverse impacts, and its success would not be assured.

Beneficial: A change to biological resources would be readily measurable in terms of abundance, distribution, quantity, or quality of populations. Populations of plant and wildlife species could change substantially over a large area.

3.4.4 Relevant Regulatory and Permitting Requirements

Endangered Species Act

Analysis of the potential for impacts on special status species is required by the Endangered Species Act of 1973 (16 U.S.C. §1531 et seq.) and protects critically imperiled species from extinction as a “consequence of economic growth and development untempered by adequate concern and conservation. It is administered by two Federal agencies, USFWS and NOAA. To be considered for listing, the species must meet one of five criteria (section 4(a)(1)):

1. There is the present or threatened destruction, modification, or curtailment of its habitat or range.

2. There is an over-utilization for commercial, recreational, scientific, or educational purposes.

3. The species is declining due to disease or predation.

4. There is an inadequacy of existing regulatory mechanisms.

5. There are other natural or manmade factors affecting its continued existence.

Species are listed according to the following designations:

Endangered (E): any species that is in danger of extinction throughout all or a significant portion of its range.

Threatened (T): any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Candidate (C): a species under consideration for official listing.

In addition to the Endangered Species Act, state agencies, have programs to protect endangered and threatened species. Each state administers its own conservation and protection program and provides species lists through their natural heritage program. In Maryland, the Maryland Department of Natural Resources (MDDNR) administers the natural heritage program, in accordance with the Nongame and Endangered Species Conservation Act (Annotated Code of Maryland 10-2A-01) and Code of Maryland Regulations 08.03.08 which contain the official State Threatened and Endangered Species list. MDDNR ranks each special status species according to its rarity in the State of Maryland. In Virginia, the natural heritage program is administered by the Virginia Department of Conservation and Recreation (VADCR). VADCR categorizes special status species according to conservation status, which indicates the secure or imperiled status of each species, as well as a legal status that mirrors the Federal Designation.

Migratory Bird Treaty Act

Migratory birds are protected under the Migratory Bird Treaty Act of 1918 (MBTA) (16 U.S.C. 703-712; 40 Stat. 755) as amended. "[I]t shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship, export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any migratory bird, any part, nest, or egg of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or part, of any such bird or any part, nest, or egg thereof…"(16 U.S.C. 703). Any take of a migratory bird would require a permit from the USFWS. The regulations governing migratory bird permits are found in 50 CFR part 13 (General Permit Procedures) and 50 CFR part 21 (Migratory Bird Permits).

Preventing Bird strikes

According to the American Bird Conservancy, up to a billion birds die in collisions with glass each year (2015). Under each action alternative, the risk of in-flight bird collisions increases due to the implementation of new buildings with windows at the Landover and Greenbelt sites, and a taller building with more windows than the current warehouses at the Springfield site. The information needed to evaluate impacts related to bird strikes would not be available until the design phase. However, as part of the LEED Gold accreditation for this project, GSA, in cooperation with the exchange partner, may implement interior and exterior lighting and material modifications and a facade monitoring plan required for credit SSpc55 to reduce bird injury and mortality from in-flight collisions with the Main Building.

3.5 Land Use, Planning Studies and Zoning

Land use and zoning impacts attributable to a project are determined by changes to the site and the surrounding area, including changes in density and use, induced development, spurred revitalization, or increased vacancy. Such changes are typically a function of the scale of the proposed development, proximity of other uses to the project site, existing zoning, the availability of vacant or underutilized land, the condition of surrounding buildings, and outside development forces.

While the affected environment for zoning is described for each of the site alternatives, development on a Federally controlled site is not subject to zoning. However, GSA and the exchange partner would cooperate with state and local officials through the development process. This EIS assumes there are no measurable impacts to zoning for the redevelopment of the JEH parcel, since each RFDS scenario is predicated on compliance with the proposed D-7 zoning regulations.

3.5.1 Data Sources

To evaluate impacts to land use and zoning, zoning and land use data obtained from Washington, D.C., Prince George's County, Maryland, Maryland Department of Planning, and Fairfax County, Virginia, was used in conjunction with the local and regional land use plans described in the Draft EIS to draw qualitative conclusions about impacts under each alternative.

3.5.2 Study Area

The study area for impacts to land use, planning studies, and zoning includes all land within the boundaries of the site alternatives and the JEH parcel, as well as those areas within 0.25 mile of each site. Additionally, the use and any other defining features of parcels whose acquisition may be required to implement the transportation mitigation measures is considered. When considering impacts under planning studies, a broader geographic context is examined, whose boundaries are based on each plan's boundaries.

3.5.3 Methodology and Assumptions

The determination of direct land use impacts associated with the FBI HQ consolidation is based on physical changes to the actual development site and consistency with existing land use plans, zoning, or policies. The determination of indirect land use impacts associated with the Proposed Action are based on changes that occur within adjacent parcels or a larger study area induced or because of the Proposed Action, including commercial, retail, and residential changes and the related effects on regional plans and initiatives.

Land use and zoning impacts attributable to a project are determined by the extent to which changes to the site and the surrounding area, including changes in density, use, and zoning are compatible with future land use/comprehensive plans. Such changes are typically a function of the scale of the proposed development, proximity of other uses to the project site, existing zoning, the availability of vacant or underutilized land, the condition of surrounding buildings, and outside development forces. The determination of direct land use impacts are based on physical changes to the actual development site and consistency with existing land use plans, zoning, or policies. The determination of indirect land use impacts are based on changes that occur within adjacent parcels or a larger study area, including commercial, retail, and residential changes and the related effects on regional plans and initiatives.

The following guidelines are used to determine the intensity of beneficial impacts to land use and zoning:

No Measurable Impact: The use of the parcel would not change from the existing condition.

Adverse: Changes to land use on the site would be incompatible with adjacent or nearby land uses and would be inconsistent with future land use and comprehensive plans, but limited in intensity or scale.

Major Adverse: Changes to land use on the site would substantially conflict with land use over a large area surrounding the site, and would constrain or inhibit the effective implementation of future land use and comprehensive plans.

Beneficial: Changes to land use on the site would be compatible with surrounding land uses and would support the effective implementation of future land use and comprehensive plans.

3.6 Visual Resources

Visual impacts are defined as changes in aesthetics/ visual resources that occur when (1) features are altered, introduced, made less visible, or are removed, such that the resultant effect on public views is perceptibly incongruous with the existing established character of the landscape; and (2) access to public views is substantially diminished or eliminated by screening or blocking of the affected view, and/ or physical access to public viewing positions is substantially restricted or eliminated.

Visual resources include scenic areas, vistas or thoroughfares, and locations that provide natural-appearing or aesthetically-pleasing places or views. This includes natural views such as shorelines, and manmade views such as unique buildings, landscaping, parks, and other types of cultural features. Typically, visual resource descriptions focus on those that are recognized as highly valued. For instance, they may be specific places, vistas, and scenic overlooks identified by a visitor's association.

However, visual resources are also recognized as views and vistas that people are accustomed to seeing and often take for granted as a general part of the landscape. Visual resources are an important part of the quality and sensory experience of an area. Users often encounter an area first and foremost through a visual interaction or their "view" of a place. Views are generally composed of, and often described in terms of foreground, middle-ground and background depending on the site.

Study Area

The study area for visual resources is the proposed sites at Greenbelt and Landover, Maryland, and Springfield, Virginia, and the 0.25-mile viewshed, corresponding with the Area of Potential Effect (APE), surrounding the sites.

3.6.1 Methodology and Assumptions

Viewshed impacts are described using broad estimates based on the Floor-to-Area Ration (FAR) and heights of comparable government campuses in the NCR, as the Proposed Action does not define specific building footprints.

The visual resources of a project site include the features and characters of its landforms, vegetation, water surfaces, and physical modifications caused by human activities, which give the landscape its visually aesthetic qualities. The proposed methodology to analyze the visual resources and aesthetics of the three sites includes the following steps:

Step 1: Determine if any scenic resources, views, and/or vistas exist within the viewshed of the various aspects of the project.

Step 2: Determine whether the project would have effects on the identified visual resources, views, and/or vistas during both construction and operation.

Step 3: Determine whether the project would create a new source of substantial light, shadow, and/or glare that would adversely affect day or nighttime views in the area.

Determination of visual resources and associated project impacts are based on personal observation, applicable planning document review, public input, research activities for evidence, and visual simulations using ArcScene and ArcMap modeling.

Using ArcScene, a sun-shadow analysis model was used to determine shadows that would be cast by the Main Building at the each site alternative using sunlight for a given date and time. Shadows cast by the Main Building could extend outside the site boundary and adversely impact the visual character of the surrounding neighborhoods. The analysis for each site applied the projected height of the Main Building to the entirety of its developable area to visualize the worst-case scenario for shadows from the Main Building throughout the year. The sun-shadow analysis was computed at 8:00 AM and 4:00 PM during the summer solstice (June 20) and winter solstice (December 21) to capture shadow extremes within a year.

An adverse impact occurs when the building(s) would have a resultant effect on public views that appear out of place, discordant, or distracting when compared with the inherent, established character of the landscape. The magnitude of an adverse visual impact depends on the site's visual sensitivity and the magnitude of the proposal.

No Measurable Impact: there would be no changes to the existing visual character of the site and its environs.

Adverse: Changes would be noticeable and could be distracting or visually co-dominant with other features (attention would be drawn to the change about as frequently as to other features in the landscape).

Major Adverse: Changes would be the focus of attention and would tend to become the subject of the view.

Beneficial: A beneficial effect occurs when the project would complement, improve, or enhance the character (including quality and value) of the landscape. Changes would be noticeable and could be visually co-dominant with other features but would be appropriate to the context of the landscape and contribute to overall landscape features.

3.7 Cultural Resources

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires Federal agencies to take into account the effects of their undertakings on historic properties. The historic preservation review process mandated by Section 106 is outlined in regulations issued by the Advisory Council on Historic Preservation (ACHP), "Protection of Historic Properties" (36 CFR Part 800) as amended August 5, 2004. GSA has initiated consultation under Section 106 of the NHPA to identify any affected archaeological or historic resources, assess, and seek ways to avoid, minimize, or mitigate any adverse effects.

3.7.1 Data Sources

Information on archaeological and historic resources were obtained in a variety of ways. Digital data and hard copy maps and reports were obtained from the Washington, D.C. Historic Preservation Office (DC SHPO), the Maryland Historical Trust (MHT) and Virginia Department of Historic Resources (VDHR) information systems and libraries. This research was complemented by site surveys to identify any additional potential cultural resources that would be affected by the Proposed Action.

3.7.2 Study Area

Each of the study areas for cultural resources contains an area defined at the Area of Potential Effect (APE) connected to the Section 106 process. The APE is defined in the regulations implementing the Section 106 review process as "The geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking." [36 CFR Part 800.16(d)]. The APE for this project consists of two distinct areas to account for potential direct and indirect impacts on historic resources at each site. The ground disturbance APE comprises the project site in its entirety where there is potential for direct impacts from the construction of the new FBI HQ or indirect impacts from the exchange of the JEH parcel. The viewshed APE consists of a quarter-mile radius from the project site boundary for potential visual, indirect impacts from the construction of a consolidated FBI HQ. The historic viewshed APE for the JEH parcel is larger given the prominence and visibility of the JEH parcel along Pennsylvania Avenue, and includes the entirety of the Pennsylvania Avenue National Historic Site and National Mall Historic District.

In accordance with the regulations implementing Section 106 of the NHPA, GSA has determined the APE of the Proposed Action in consultation with DC SHPO, MHT, and VDHR.

3.7.3 Methodology and Assumptions

While direct and indirect impacts to cultural resources under NEPA are not described with identical terminology as effects on historic properties under the NHPA (i.e., no effect, no adverse effect, or adverse effect), there is a similarity. NHPA requires Federal agencies to consider the effects of their actions (termed “undertakings” under NHPA) on historic properties at the earliest possible planning stage so as to preserve a full range of alternatives to avoid, minimize, or mitigate adverse impacts to historic properties. An impact is considered “adverse” when an undertaking alters any of the characteristics of a historic property that qualify the property for inclusion in the National Register of Historic Places (NRHP) in a manner that would diminish the integrity of the resource’s location, design, setting, materials, workmanship, feeling, or association.

Additionally, “adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.” The goal is the avoidance, minimization, or mitigation of adverse effects. Within the APE potential impacts can be divided into direct and indirect impacts. Direct impacts are those that occur at the same time and place as the Proposed Action. Indirect impacts occur later in time or are farther removed in distance but still reasonably foreseeable.

For the Draft EIS, the following equivalence would be used for impacts to cultural resources under NEPA and effects on cultural resources under NHPA:

No Measurable Impact: The impact is at the lowest level of detection with neither adverse nor beneficial consequences. For purposes of Section 106, the determination of effect would be no adverse effect.

Adverse: For structures and landscapes, impacts would alter character defining features, elements, or landscape patterns but would not diminish the integrity of the structure or landscape to the extent that its National Register eligibility is jeopardized. For archaeological resources, the site(s) would be disturbed but not obliterated. The determination of effect for Section 106 would be an adverse effect.

Major Adverse: For structures and landscapes, impacts would alter character defining features, elements, or landscape patterns, diminishing the integrity of the structure or landscape to the extent that it is no longer eligible to be listed in the National Register. For archaeological resources, the site(s) would be obliterated. The determination of effect for Section 106 would be an adverse effect.

Beneficial: The character-defining features of the historic district, structure, or archaeological resource would be stabilized/preserved in accordance with the Secretary of the Interior’s Standards for the Treatment of Historic Properties, and would not diminish the attributes that contribute to their eligibility for listing in the National Register.

3.8 Socioeconomics and Environmental Justice

Socioeconomic impacts are related to changes in population and demographics as a result of the Proposed Action alternatives. Impacts are considered in the context of the local economy within the county in which the site alternative resides and the region of influence (ROI). Impacts to businesses that provide services to residents and commuters, such as retail establishments, food facilities, and others are evaluated qualitatively. Impacts to the quality of life of residents, specifically: housing, schools, and public facilities, and community services, such as police, fire, and medical services are also described qualitatively. Benchmarks for some impacts, such as population, housing, and construction employment have been created by identifying the greatest annual change over a recent historical period or using the latest statistics on these resources to create a quantitative threshold for the magnitude of impacts on each resource. Environmental justice impacts and impacts to children are assessed based on whether an action would disproportionately and adversely impact these sensitive populations

3.8.1 Data Sources

The primary data source used for localized data on demographics and housing characteristics is the U.S. Census Bureau (U.S. Census). The U.S. Census’ 5-year annual average estimates provided by the American Community Survey were used to show historic population trends, racial and ethnicity characteristics, income levels, and poverty statistics. Statistics in all sections may report information for 2013 as a 5-year annual average statistic of information obtained between 2009 and 2013. Information presented in this way is identified as the annual average that occurred over this period. Population projections were obtained from the Metropolitan Washington Council of Governments (MWCOG). Current and historical employment statistics and unemployment rates were collected from the U.S. Department of Labor’s Bureau of Labor Statistics - Local Area Unemployment Statistics. Assumptions on the number of construction workers that would be required for the projects were based on approach contained in the recent Development of St. Elizabeth’s Campus Environmental Impact Statement (St. Elizabeth’s EIS), which identified a multiplier of construction workers required per square foot of developable space. Average construction workers’ salaries were also obtained from this document. Information on sales taxes, income taxes, property taxes, and state and county tax revenue was collected from state departments of revenue, the counties within the ROI, the District of Columbia, and relevant research sites, laws, and reports.

Schools and childcare centers within 1 mile of each of the site alternatives were identified. Information on educational enrollment statistics at the county level was obtained directly from schools or school districts. Potential impacts to children were analyzed by reviewing the proximity of schools, childcare centers, and neighborhoods to the site alternatives and the potential for children to be impacted by construction, traffic, noise, and air quality impacts.

Information on community services such as police, fire, and medical services, recreation services, and community facilities such as churches and libraries were obtained from geographic information systems and local government, county, and private organizations’ websites.

Demographic and poverty information at the census tract level was used to assess environmental justice impacts. U.S. Census data on census tracts within 1 mile of the site alternatives were collected. Census tracts that had a poverty level greater than 20 percent were identified as low income populations. Census tracts that contained a total minority (Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, Hispanic or Latino, some other race, or two or more races) population that was 10 percent or more than the county's minority population within which that census tract was located, were identified as minority areas. All of the census tracts identified as either a minority area or a low income area were identified as sensitive populations for the impact analysis.

3.8.2 Study Area

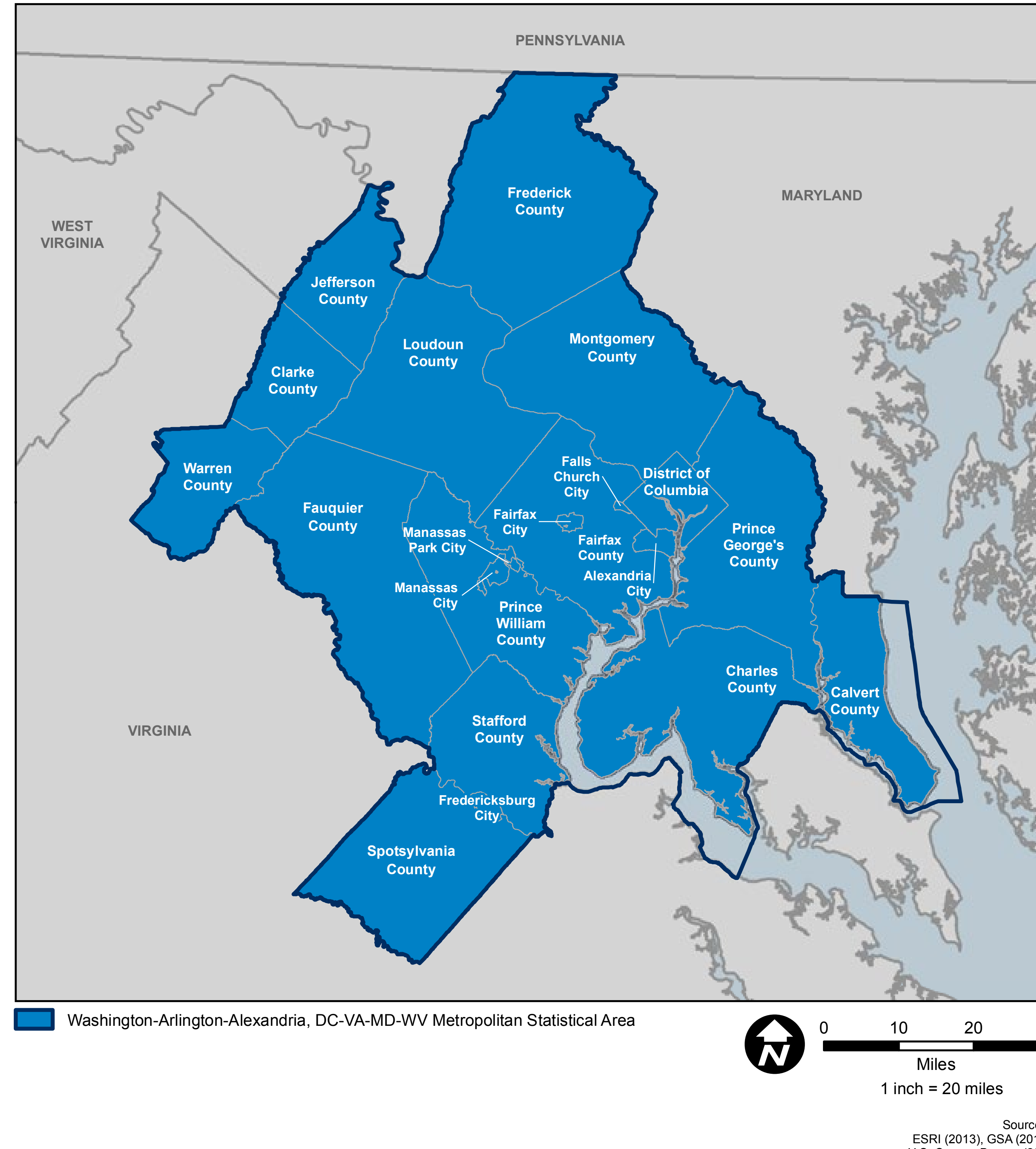
The ROI for socioeconomics and environmental justice is defined as the geographical area within which the principal direct and indirect socioeconomic effects of actions associated with project-related activities are likely to occur, and where most consequences for local jurisdictions are expected. For the socioeconomic analysis of the Draft EIS, the ROI is defined as the Washington-Arlington-Alexandria Metropolitan Statistical Area (Washington, D.C., MSA)[1]. The MSA encompasses the primary area where the potential for project direct, indirect, and induced social and economic impacts are likely to be highest and the area within which the construction workforce for the proposed alternatives would primarily be drawn. The geographic scope of the Washington, D.C., MSA encompasses 22 counties and independent cities that make up the Washington, D.C., metropolitan region (U.S. Census 2003). Figure 3-2 outlines the boundary of the Washington, D.C., MSA.

3.8.3 Methodology and Assumptions

The analysis of potential impacts on socioeconomic resources (population, housing, employment, income, taxes, schools and community services, recreation and other community facilities, environmental justice, and protection of children) was completed using a localized approach specific to each site location. Information was obtained for this analysis on the counties or Washington, D.C. within which the alternatives were located along with the Washington, D.C., MSA and the Commonwealth of Virginia and the State of Maryland.

[1] *The current Washington-Arlington-Alexandria Metropolitan Statistical Area (Washington, D.C. MSA), as defined by the U.S. Census, contains the following 22 counties or independent governments: Frederick County, Maryland; Montgomery County, Maryland; Washington, D.C.; Calvert County, Maryland; Charles County, Maryland; Prince George's County, Maryland; Arlington County, Virginia; Clarke County, Virginia; Fairfax County, Virginia; Fauquier County, Virginia; Loudoun County, Virginia; Prince William County, Virginia; Spotsylvania County, Virginia; Stafford County, Virginia; Warren County, Virginia; Alexandria city, Virginia; Fairfax city, Virginia; Falls Church city, Virginia; Fredericksburg city, Virginia; Manassas city, Virginia; Manassas Park city, Virginia; and Jefferson County, West Virginia (U.S. Census 2003).*

Figure 3-2: Washington-Arlington-Alexandria Metropolitan Statistical Area.



3.8.3.1 Population, Housing, Employment, Income, and Taxes

Recent historic extreme changes in population, housing, and construction employment or the latest statistics on these resources were used to determine the level at which significant impacts to these resources would occur. Recent historic extreme changes in population, employment, and housing were determined based on the total year-over-year changes of these resources during a recent historical period. In addition, the most recent values for housing, population, and employment were used to determine additional impacts to these resources. If a change in population is less than the greatest recent historical extreme, then this change is not considered significant and no impacts are assessed, as s change in population in and of itself is not adverse or beneficial. The adverse or beneficial nature of an impact resulting from a change in population is included in the discussion of impacts to housing, employment, income, recreation, and community services as a change in population impacts these resources in different ways. No measurable impact was determined if the total net change in a resource, such as housing, before and after the action alternative would be zero. The most recent income and tax revenue values were used to describe impacts to the area's tax revenues. As the total amount of employees relocating and their place of relocation is not known, there cannot be a quantitative analysis of these impacts. Therefore, there are no established hard thresholds for impacts to these resources. All spending associated with construction or renovation is assumed to be new dollars spent in the regional economy. Impacts to sales, employment, and income would have both direct and indirect impacts to the local economy. Direct impacts would result from dollars spent on construction at the site, and this spending would be concentrated within the construction industry. Indirect impacts would result from purchases of goods and services and salary payments by those businesses that have been contracted to support or provide materials for the construction under this alternative. Induced impacts would occur throughout Washington, D.C., and the Washington, D.C., MSA as a result of spending by employees or construction workers that receive income as a result of an alternative. The St. Elizabeth's EIS used the RIMS II model to determine the number of construction workers and construction worker salary that would be associated with the redevelopment of the St. Elizabeth's site. The amount of developable square footage of this site along with the number of construction workers needed to develop the site along with their average salaries was used for this analysis to determine how many construction workers (along with their average salaries) would be required for the alternatives under analysis in the Draft EIS. On average, in the St. Elizabeth's EIS, there were 0.0028 jobs per gross square foot (GSF) of developable space and each construction worker earned $46,902.37 on average annually (adjusted for inflation to 2015 dollars).

The following guidelines were used to determine the degree of impacts on housing, employment, income, and taxes in the study areas:

No Measurable Impacts: No measurable impacts would occur if impacts would be limited to a small geographic area or if impacts would not be expected to substantively alter social, fiscal, and/or economic conditions of any individual(s), group(s), business(es), government(s) or community(ies).

Adverse: An adverse impact to housing, employment, income, or taxes would occur if there is no capacity to sustain a change in these resources or if a change in these resources would negatively affect an (some) individual(s), group(s), business(es), government(s) or community(ies). For example, an increase in available housing would slightly decrease housing prices, which would result in an adverse impact to home sellers because their home prices, independent of other factors affecting home prices, would be reduced.

Major Adverse: Major adverse impacts would be readily detectable and observed, extend to a wide geographic area, possibly regionally, and would have a substantial influence on social and/or economic conditions of individuals, groups, businesses, governments, or communities. A major adverse change in population, housing, or employment would occur if the change in these resources is greater than the greatest positive or negative year-over-year change in recent history in the site-specific county or the ROI. A major impact to income and taxes would occur if the impacts to these resources are anticipated to result in a greater than 10 percent total decrease in the total income and taxes in the site-specific county or the ROI from the latest year for which information is available for these resources

Beneficial: A beneficial impact to housing, employment, income, or taxes would occur if a change in these resources would positively affect an (some) individual(s), group(s), business(es), government(s) or community(ies). For example, an increase in available housing would provide additional housing for local residents and slightly decrease housing prices by increasing housing supply, benefiting homebuyers because housing prices would be reduced.

Washington, D.C., Metropolitan Statistical Area

Information provided on the Washington, D.C., MSA is common to all affected environments and is presented here for reference.

Population

The population in the Washington, D.C., MSA increased at a rate of 12.5 percent between 2000 and 2013, peaking to 5.8 million as of the latest U.S. Census information in 2013 (See table 3-1).[2]

MWCOG[3], which contains a slightly different boundary from the Washington, D.C., MSA, forecasts that the population of the metropolitan area would grow by 1.8 million people by 2040, resulting in a total population of 7,042,966 in 2040, which represents a 34 percent increase in population from 2010 (table 3-2).

Between 2009 and 2013, 56 percent of the average annual population of the Washington, D.C., MSA, identified themselves as white alone. Approximately 26 percent of census respondents identified themselves as Black or African American alone in the Washington, D.C., MSA. The remaining 18 percent of respondents in the Washington, D.C., MSA identified themselves as other minority populations. Table 3-3 summarizes the racial composition of the Washington, D.C., MSA.

Housing

There were approximately 2.3 million housing units in the Washington, D.C., MSA in 2013. The Washington, D.C., MSA had a housing unit vacancy rate of 8 percent on average annually, between 2009 and 2013 (table 3-4).

Table 3-1: Population. 2000, 2009-2013

County/Area	2000	2009-2013[1]	Percent Change, 2000-2013
Washington, D.C. MSA	5,119,490	5,759,330	12.5%

[a]This statistic is an annual average statistic from 2009-2013.
Source: U.S. Census Bureau (2013, 2000)

Table 3-2: Population Projections, 2020-2040

County/Area	Year					2020 – 2040	
	2020	2025	2030	2035	2040	Total Change	Percent Change
Washington, D.C. MSA	5,945,206	6,277,833	6,564,198	6,820,892	7,042,966	1,097,760	34%

Source: Metropolitan Washington Council of Governments, (2014)

Table 3-3: Racial Characteristics, 2009-2013[a]

County/Area	Total Population	White alone	Black or African American alone	American Indian and Alaska Native alone	Asian alone	Native Hawaiian and Other Pacific Islander alone	Some other race alone	Minority Population[b]
Washington, D.C. MSA	5,759,330	56.1%	25.5%	0.4%	9.3%	0.1%	8.7%	51.7%

[a]These statistics are annual average statistics from 2009-2013.
[b]This is the total population minus the population of persons identifying themselves as non-Hispanic white alone. Minority population is separate from race and includes the Hispanic ethnicity.
Source: U.S. Census Bureau (2013)

Table 3-4: Housing Supply, 2009–2013[a]

Geographic Area	Total Number of Housing Units	Percent Change in Number of Housing Units (2000 to 2013)	Total Number of Occupied Housing Units	Total Number of Vacant Housing Units	Percent of Total Housing Units that are Vacant	Total number of Renter-Occupied Units	Percent of Housing Units Available for Rent
Washington, D.C.	2,249,459	N/A	2,091,301	158,158	7.60%	725,793	5.30%

[a] These statistics are annual average statistics from 2009-2013.
Note: "N/A" indicates that information on housing was not available.
Source: U.S. Census Bureau (2013b, 2010b, 2000a)

[2] The current geographic boundaries for the MSA represent the boundaries as they existed in 2000. However, the geographic boundaries for counties and cities included in these combined area statistics have likely changed between 1900 and 2010. Therefore, the statistics in table 3-1 and in the supporting paragraph are reflective of the total population of these areas as their boundaries existed at the time their statistics were recorded and are not based on the boundaries that existed in 2010.

[3] The population projection model is based on the 1983 definition of the Metropolitan Statistical Area (MSA) that includes the District of Columbia, Calvert County, Charles County, Frederick County, Montgomery County, and Prince George's County in Maryland; and Alexandria, Arlington County, Fairfax, Fairfax County, Falls Church, Loudoun County, Manassas, Manassas Park, Prince William County, and Stafford County in Virginia (MWCOG 2015a). The 1983 definition of the MSA is not the current Washington D.C. MSA definition used in this document. current geographic boundaries for the MSA represent the boundaries as they existed in 2000. However, the geographic boundaries for counties and cities included in these combined area statistics have likely changed between 1900 and 2010. Therefore, the statistics in table 3-4 and in the supporting paragraph are reflective of the total population of these areas as their boundaries existed at the time their statistics were recorded and are not based on the boundaries that existed in 2010.

Table 3-5: Employment and Income, 2001, 2009–2013[a]

Geographic Area	Employed Labor Force 2013 (number)	Employment Change 2001 - 2013 (percent)	Median Household Income, 2009 – 2013*	Percentage of People Living Below Poverty, 2009-2013*
Washington, D.C. MSA	3,092,700	+ 13.1%	$90,540	8.2%

[a]This statistic is an annual average statistic from 2009 to 2013.
Source: U.S. Census Bureau (2013a); BLS (2013)

Table 3-6: Jobs by Industry, 2013

Industry	Washington, D.C. MSA	
	2013	Percent Change 2001-2013
Total employment	4,019,399	16.4%
Farm employment	10,752	-12.5%
Forestry, fishing, and related activities	3,273	(D)
Mining	(D)	(D)
Utilities	8,309	(D)
Construction	(D)	(D)
Manufacturing	57,571	(D)
Wholesale trade	71,248	(D)
Retail trade	316,461	3.6%
Transportation and warehousing	86,532	(D)
Information	93,241	(D)
Finance and insurance	160,815	(D)
Real estate and rental and leasing	188,198	(D)
Professional, scientific, and technical services	(D)	(D)
Management of companies and enterprises	(D)	(D)
Administrative and waste management services	251,942	(D)
Educational services	129,519	(D)
Health care and social assistance	347,852	(D)
Arts, entertainment, and recreation	(D)	(D)
Accommodation and food services	(D)	(D)
Other services, except public administration	285,699	21.1%
Federal, civilian	389,596	15.5%
Military	66,531	-15.9%
State and local	314,560	17.0%

Note: (D) indicates data not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.
Source: BEA (2013)

Employment and Income

Between 2001 and 2013, the total employed labor force (including Armed Forces) increased by approximately 13 percent in the Washington, D.C., MSA. In 2013, the total employed labor force in the Washington, D.C., MSA, was 3,092,700 people. The median household income in the Washington, D.C., MSA was $90,540 during this period. Table 3-5 presents employed labor force, median household income, and the percentage of all people living below poverty in the Washington, D.C., MSA.

Within the Washington, D.C., MSA in 2013, Federal employment was the largest industry by total number of jobs, at 10 percent of all jobs, followed by the health care and social assistance industry which made up 9 percent of all jobs. Total jobs in the construction industry were not reported for 2013. Table 3-6 summarizes the total number of jobs, by industry, in 2013 and the total change in jobs for each industry between 2001 and 2013 for Washington, D.C. and the Washington, D.C., MSA (BEA 2013).

3.8.3.2 Schools and Community Services, Recreation, and Other Community Facilities

Social impacts are those that may be borne by individuals, groups, businesses, or communities who could experience a change in their social structure and context under the action alternatives. These resources are reviewed in the affected environment section at the county area or within a 1-mile radius of the alternative sites and 1/4-mile of the JEH parcel. These resources are not analyzed at the level of the Washington, D.C., MSA. Qualitative impacts to schools for each alternative have been determined based on changes in the school age population that would result from relocating employees that could lead to a change in student enrollment and changes in taxes that could fund schools. Impacts to community services, recreation resources, and community facilities have been determined qualitatively based on the ability of these resources to adapt to changes resulting from the FBI HQ consolidation and funding of these resources. Short and Long-term impacts for these resources are divided into impacts that happen temporarily (short-term) and would eventually stop vs. impacts that are expected to continue into the future with no end date (long-term). The following guidelines were used to determine the degree of impacts on schools, community services, recreation, and other community facilities in the study areas[4]:

No Measurable Impact: No measurable impacts would occur if impacts would be limited to a small geographic area or if impacts would not be expected to substantively alter social, fiscal, and/or economic conditions of these resources.

Adverse: An adverse impact to schools, community services, recreation resources, and other community facilities would occur if there is no capacity to sustain a change in these resources or if a change in these resources would negatively affect current users of these resources.

[4] There may be insufficient information to determine specific impacts to schools, community services, recreation, and other community facilities. Where this is the case, a determination of insufficient information has been made.

Major Adverse: Major adverse impacts would be readily detectable and observable, extend to a wider geographic area, possibly regionally, or would impact many individuals, groups, businesses, and communities. These impacts would have a substantial influence on social, fiscal, and/or economic conditions of these resources.

Beneficial: A beneficial impact to schools, community services, recreation resources, and other community facilities would occur if a change in these resources would positively affect current users of these resources.

3.8.3.3 Environmental Justice and Protection of Children

On February 11, 1994, President Clinton issued EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. EO 12898 directs agencies to address environmental and human health conditions in minority and low-income communities so as to avoid the disproportionate placement of any adverse effects from Federal policies and actions on these populations. As defined by the Environmental Justice Guidance under NEPA (CEQ 1997a), "minority populations" include persons who identify themselves as Asian or Pacific Islander, Native American or Alaskan Native, Black (not of Hispanic origin), or Hispanic. Race refers to census respondents' self-identification of racial background. Hispanic origin refers to ethnicity and language, not race, and may include persons whose heritage is Puerto Rican, Cuban, Mexican, and Central or South American.

A minority population exists where the percentage of minorities in an affected area either exceeds 50 percent or is meaningfully greater than in the general population. For the purposes of this analysis, if the total percentage of minorities in a census tract is 10 percent greater than the population of minorities within that census tract's respective county or district, then it is considered to have a meaningfully greater minority population than in the general population. Low-income populations are identified using the Census Bureau's statistical poverty threshold, which is based on income and family size. The Census Bureau defines a "poverty area" as a census tract with 20 percent or more of its residents below the poverty threshold. A census tract is a small geographic subdivision of a county and typically contains between 1,500 and 8,000 persons (U.S. Department of Commerce 2000).

EO 13045, *Protection of Children from Environmental Health and Safety Risk*, requires Federal agencies, to the extent permitted by law and mission, to identify and assess environmental health and safety risks that might disproportionately affect children. This EO, dated April 21, 1997, further requires Federal agencies to ensure that their policies, programs, activities, and standards address these disproportionate risks. EO 13045 defines environmental health and safety risks as "risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest (such as the air we breathe, the food we eat, the water we drink and use for recreation, the soil we live on and the products we use or are exposed to)." The following guidelines were used to determine whether or not there would be an environmental justice impact or an impact that violated EO 13045, Protection of Children, would occur to low-income populations, minority populations, or populations of children within a 1-mile radius of the site alternatives.

Environmental Justice: An environmental justice impact is considered to have occurred if the impact from an action alternative disproportionately and adversely affects a minority or low-income community.

Protection of Children: An impact to a population of children is considered to have occurred if the impact from an action alternative disproportionately and adversely affects a population of children.

EO 12898
FEDERAL ACTIONS TO ADDRESS ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS

The general purposes of this EO are as follows:

- To focus the attention of Federal agencies on human health and environmental conditions in minority communities and low-income communities with the goal of achieving environmental justice.
- To foster nondiscrimination in Federal programs that substantially affect human health or the environment.
- To improve data collection efforts on the impacts of decisions that affect minority communities and low-income communities and encourage more public participation in Federal decision-making by ensuring documents are easily accessible (e.g., in multiple languages and readily available).

ENVIRONMENTAL JUSTICE AND PROTECTION OF CHILDREN

- Minority population exists where the percentage of minorities in an affected area either exceeds 50 percent or is meaningfully greater than in the general population.
- For the purposes of this analysis, if the total percentage of minorities in a census tract is 10 percent greater than the population of minorities within that census tract's respective county or district, then it is considered to have a meaningfully greater minority population than in the general population
- The Census Bureau defines a "poverty area" as a census tract with 20 percent or more of its residents below the poverty threshold.

3.9 Public Health and Safety/ Hazardous Materials

The Draft EIS evaluates public health and safety risks to FBI employees and the general public that could be associated with hazardous materials or environmental contamination in the project area, as well as health and safety risks associated with the proposed construction, maintenance, and implementation of new FBI HQ. This analysis also considers the overall security and accessibility of each site and the surrounding area, including the safety risks to FBI staff, visitors, and the public from intentional destructive acts. Impacts for this resource area are analyzed, using information from Phase I environmental site assessments (ESAs) conducted for each of the sites, information obtained from contaminated site databases maintained by USEPA, and information provided by GSA and FBI staff familiar with the security, construction, and maintenance considerations related to each of the site alternatives.

3.9.1 Data Sources

The following data sources were incorporated into the analysis for each alternative and the JEH parcel:

Phase I ESA: Phase I ESA reports were produced by GSA in 2014 for each of the four sites analyzed in the Draft EIS. The Phase I ESA reports document the potential presence of environmental contamination and hazardous materials at each site.

USEPA EnviroMapper: The USEPA EnviroMapper is a map-based interactive online search tool maintained by USEPA that enables users to search for contaminated sites and hazardous waste generators within a specified radius of a site.

RCRAInfo Search: USEPA's RCRAInfo Search is an online database maintained to provide identification and location data for specific hazardous waste handlers, as well as a wide range of information on treatment, storage, and disposal facilities regarding permit/closure status, compliance with Federal and State regulations, and cleanup activities.

CERCLIS Database: The CERCLIS database is an online database maintained by USEPA that provides information on hazardous waste sites, potentially hazardous waste sites, and remedial activities, including sites that are on the National Priorities List (NPL) or being considered for the NPL. The NPL is the list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the U.S. and its territories.

3.9.2 Study Area

The study area for analysis of impacts to public health and safety includes the JEH site and the proposed sites at Greenbelt and Landover, Maryland, and Springfield, Virginia. In addition, the study area for each site includes the vicinity surrounding each site, which varies in size on a site-by-site basis according to each site's proximity to known contaminated sites, sensitive land uses, and high population densities.

3.9.3 Methodology and Assumptions

The hazardous materials and public health section provides a qualitative analysis of the risk to FBI employees and the general public that could be associated with hazards in the study areas, as well as the proposed construction, maintenance, and implementation of the action alternatives. Impacts on public health and safety would result from increased risk of exposure to hazardous materials, hazardous wastes, environmental contamination, construction site safety hazards, or intentional destructive acts.

The following guidelines are used to determine the intensity of adverse impacts to public health:

No Measurable Impact: The impact to public health would not be measurable or perceptible. There would be no existing hazardous materials on-site and no increase in the amount of hazardous materials or hazardous wastes handled, stored, used, or disposed.

Adverse: The impact to public health and safety would be detectable and result in noticeable effects on a local scale. Mitigation measures may be necessary and would likely be successful. The action would result in an increase in the amount of hazardous materials or waste to be handled, stored, used, or disposed, but all hazardous or toxic materials and/or wastes could be safely and adequately managed in accordance with all applicable regulations and policies with limited exposures or risks.

Major Adverse: The impact to public health and safety would be readily apparent and result in substantial, noticeable effects related to hazardous materials and public health on a regional scale. Extensive mitigation measures would be needed, and success would not be guaranteed. The action would result in a substantial increase (more than 100 percent) in the amount of materials or waste to be handled, stored, used, or disposed, and this could not be safely or adequately handled or managed by the proposed staffing, resulting in unacceptable risk, exceedance of available waste disposal capacity, or probable regulatory violation. Site contamination conditions may preclude development of the site for the proposed use. Impacts would be capable of causing imminent and substantial endangerment to human health and the environment would represent a significant impact.

Beneficial: Improvements to public health and safety would be readily apparent. The risk of exposure to hazardous materials or other public safety hazards would be measurably reduced.

3.9.4 Relevant Regulatory Requirements

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, was enacted by Congress on December 11, 1980. This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. Over 5 years, $1.6 billion was collected and the tax went to a trust fund for cleaning up abandoned or uncontrolled hazardous waste sites. CERCLA:

- established prohibitions and requirements concerning closed and abandoned hazardous waste sites;
- provided for liability of persons responsible for releases of hazardous waste at these sites; and
- established a trust fund to provide for cleanup when no responsible party could be identified.

The law authorizes two kinds of response actions: Short-term removals are actions that may be taken to address releases or threatened releases requiring prompt response. Long-term remedial response actions permanently and significantly reduce the dangers associated with releases or threats of releases of hazardous substances that are serious, but not immediately life threatening. Long-term remedial response actions can be conducted only at sites listed on the NPL.

CERCLA also enabled the revision of the National Contingency Plan (NCP). The NCP provided the guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, or contaminants (USEPA 2015a).

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) of 1976, which amended the Solid Waste Disposal Act, addresses solid (Subtitle D) and hazardous (Subtitle C) waste management activities. The Hazardous and Solid Waste Amendments of 1984 strengthened RCRA's waste management provisions and added Subtitle I, which governs underground storage tanks.

Regulations promulgated pursuant to Subtitle C of RCRA (40 CFR Parts 260-299) establish a "cradle-to-grave" system governing hazardous waste from the point of generation to disposal. RCRA hazardous wastes include the specific materials listed in the regulations (commercial chemical products, designated with the code "P" or "U"; hazardous wastes from specific industries/sources, designated with the code "K"; hazardous wastes from nonspecific sources, designated with the code "F") and materials which exhibit a hazardous waste characteristic (ignitability, corrosivity, reactivity, or toxicity) designated with the code "D".

Regulated entities that generate hazardous waste are subject to waste accumulation, manifesting, and recordkeeping standards. Facilities that treat, store, or dispose of hazardous waste must obtain a permit, either from USEPA or from a state agency that USEPA has authorized to implement the permitting program. Subtitle C permits contain general facility standards such as contingency plans, emergency procedures, recordkeeping and reporting requirements, financial assurance mechanisms, and unit-specific standards. RCRA also contains provisions (40 CFR Part 264 Subpart S and Part 264.10) for conducting corrective actions that govern the cleanup of releases of hazardous waste or constituents from solid waste management units at RCRA-regulated facilities.

Although RCRA is a Federal statute, many states implement the RCRA program. Currently, USEPA has delegated its authority to implement various provisions of RCRA to 48 of the 50 states, including Maryland, Virginia, and Washington, D.C.

Most RCRA requirements are not industry-specific but apply to any company that generates, transports, treats, stores, or disposes of hazardous waste (USEPA 2015b).

LOCAL AND STATE AGENCIES CONSULTED IN DEVELOPING THE TRANSPORTATION STUDY AREAS INCLUDE:

- DDOT
- Maryland SHA
- M-NCPPC
- Prince George's County
- City of Greenbelt
- Fairfax County DOT
- VDOT

3.10 Transportation

Potential impacts to transportation are analyzed for the major transportation system components or modes of transportation, which include traffic, public transit (Metrorail and bus), pedestrian environment, bicycle facilities, parking, and truck access. Impacts to transportation are evaluated based on changes to vehicle delay, intersection capacity, vehicle queuing, and safety.

3.10.1 Study Area

The vehicular traffic study area for each site alternative generally includes the area that encompasses all analyzed intersections, but it does not have a clearly defined boundary because not every intersection was analyzed within the general areas described for each site. The JEH parcel study area, on the other hand, has a definitive study area edge due to the concentration of intersections in the urban downtown area. The vehicular study area of the alternative sites incorporates all of the intersections agreed upon for detailed study by GSA and the local and state transportation agencies, as well as the adjacent merge/diverge/weaves along I-495 and/or I-95 for the existing ramps that would serve the proposed FBI vehicle trips at the site alternatives. The vehicular traffic study area for each site includes intersections between the proposed sites and regional highway network or last major decision point before entering a freeway facility. The determination of intersections to include for detailed study further considered the intersections along roadways reasonably anticipated to carry a substantial portion of employee vehicle traffic percent based on trip generation data.

The vehicular study areas for each of the sites include the following number of intersections:

- Greenbelt – 13 intersections
- Landover – 24 intersections
- Springfield – 23 intersections
- JEH – 32 intersections

The study area analyzed for the other transportation modes generally includes all areas within a 0.5-mile buffer of the site. A 0.5-mile radius was chosen in consultation with the Washington Metropolitan Area Transit Authority (WMATA) and is an industry standard for analyzing those pedestrian trips which are comfortably accessible to transit, and is commonly used as a typical walk-shed. The Metrorail impact evaluation for the JEH parcel and the Landover site was refined from the 0.5-mile radius to more effectively evaluate impacts. Given its location in downtown Washington, D.C., there are numerous Metrorail entrances for those stations within 0.5 mile of the JEH parcel, so only those entrances closest to the parcel for each Metrorail line were included in the analysis. At the Landover site, there are no Metrorail stations within 0.5 mile of the site, so impacts were evaluated for the closest Metrorail Station, which is just under 2 miles from the site. To be consistent among non-vehicular traffic modes, the bicycle and parking impacts were also evaluated within a 0.5-mile radius from the site.

3.10.2 Future Analysis Conditions

In addition to evaluating the existing condition of each transportation system component for each site and for the JEH parcel, the Draft EIS examines three future conditions as described in the following sections. The analysis projects future conditions for Greenbelt, Landover, and Springfield to 2022, the opening year of the consolidated FBI HQ. Future conditions at JEH are projected to 2025, the estimated opening year for a privately redeveloped site.

3.10.2.1 No-build Condition

The No-build Condition describes the future condition at each Consolidated FBI HQ site without the addition of FBI employee trips and provides a baseline for comparison to evaluate impacts for each action alternative. It assumes that future conditions would be different from current conditions as a result of future development and changes in the transportation network in the vicinity. These are changes that would occur regardless of whether the site is selected for the Consolidated FBI HQ. Changes in traffic and transit use from the Existing Condition are forecasted based on the addition of trips generated by planned development projects with approved site plans by the local jurisdiction and background growth, and take into consideration proposed improvements or changes to the existing roadway and transit network. The No-build Condition is analogous to the No-action Alternative; however, it is unique in that impacts associated with non-project related actions are detailed and quantified to provide a comprehensive baseline against which impacts from the consolidation of FBI HQ can be assessed.

The No-build Condition for Springfield and Landover assume no change in trip generation from the Existing Condition for the sites themselves. The No-build Condition for the Greenbelt site is unique. The Greenbelt site is located in the North Core portion of Greenbelt Station. The North Core currently has development approvals for a mixed-use town center with office, retail, hotel, and residential uses as described in Section 2.4.5.2. There are key differences in the characteristics of the North Core under the No-build Condition as compared to the Build Condition that limit the ability to evaluate the transportation impacts of the FBI HQ consolidation at Greenbelt.

These differences are as follows:

- Under the No-build Condition at the Greenbelt site, the configuration of the street network and the location of intersections in the North Core portion is substantially different than what is anticipated under the Build Condition.
- The total square footage of new development under the No-build Condition is substantially higher than under the Build Condition. Therefore, the amount of development proposed for the No-build Condition as part of the North Core would have a higher number of trips generated than assumed for the FBI HQ consolidation, making it difficult to understand the traffic impacts that would result from the Proposed Action alone.
- The locations of different portions of the development and their respective parking access locations within the No-build Condition would produce different internal trip distribution patterns within the North Core than what is anticipated under the Build Condition.

To fully evaluate the transportation impacts associated with the FBI HQ consolidation at Greenbelt, the No-build Condition was revised to better analyze the impacts associated with the FBI HQ consolidation. The No-build Condition developed for the analysis uses the same street network and intersection locations as the Build Condition and only incorporates the square footage associated with the portion of North Core development that would be implemented if FBI HQ were consolidated at the Greenbelt site, west of Greenbelt Station Parkway and east of the rail line. These adjustments allow an "apples to apples" comparison of the transportation impacts for the Greenbelt site between the No-build and Build Conditions. The Greenbelt Transportation Impact Assessment (TIA) (Appendix C) includes an additional qualitative analysis for the full development potential for the site. Table 3-7 compares the amount and type of development analyzed under the Greenbelt No-build analysis to the total amount of proposed development, also what is referred to as the No-action Alternative and what is analyzed by all other resource topics.

For the JEH parcel, a No-action Alternative is studied instead of the No-build Condition reflecting the FBI remaining at the JEH parcel and assumes the existing level of FBI employee trips in addition to background growth and roadway and transit improvements.

3.10.2.2 Build Condition

The Build condition describes the future condition at each site with the addition of FBI employee trips and without any mitigations. The methodology used to analyze the build condition is described in detail in sections 3.10.4.2 and 3.10.4.3.

3.10.2.3 Build with Mitigation Condition

To address impacts on the transportation system caused as a result of the Proposed Action, consolidation of the FBI HQ sites, mitigation measures are recommended in this section for each mode of transportation analyzed. The goal of the mitigations proposed is to improve the functioning of each transportation system component to an equal or greater level described for the No-build Condition.

3.10.3 Regulatory Requirements and Agreements

National Capital Planning Commission Requirements

There a number of other assumptions that are considered in transportation analysis including those determined by regulatory requirement. An example of one assumption of this nature is the parking ratios developed for each alternative site as stated in the Federal Elements section of the Comprehensive Plan for the National Capital (NCPC 2004). In response to regional congestion and air quality levels, the National Capital Planning Commission (NCPC) has recommended that parking be provided only for those Federal employees who are unable to use other travel modes. To accomplish this policy, NCPC has created parking ratio goals for Federal facilities based on their location to available transit services, walking distances and conditions in the surrounding area, and other criteria. Parking ratios are the number of parking spaces available per employee population. Suburban facilities within 2,000 feet of Metrorail should have one parking space for every three employees (1:3) according to NCPC; therefore, the amount of parking at the Greenbelt and Springfield sites has been determined based on this requirement. Suburban facilities beyond 2,000 feet of Metrorail should have 1.5 parking spaces for every employee (1.5:1) phasing to two parking spaces for every employee; therefore, the amount of parking at the Landover site has been determined based on this 1.5:1 requirement.

Table 3-7: Greenbelt No-action Alternative and No-build Condition Comparison

	Condition	
Use	No-action Alternative	No-build
Office (GSF)	1.86 million	350,000
Retail (GSF)	1.4 million	100,000
Residential (Units)	800	800
Hotel (keys)	550	300

Jurisdictional Agreements

Prior to initiating the transportation analysis, it was essential to determine what analysis tools, data parameters, and assumptions would provide the basis of the analysis. In coordination with GSA, the project team met with the appropriate state transportation and local planning agencies depending on the site location to come to an agreement on the assumptions to follow for each site. These transportation agreements were summarized in the District Department of Transportation (DDOT) Scoping Form and the Site Agreements for Greenbelt, Landover, and Springfield.

DDOT, through its comprehensive transportation review process (DDOT 2012), requires that a scoping form be approved prior to analysis outlining the agreed upon level of detail, the data parameters, and type of analysis. In the case of the alternative sites, similar parameters and assumptions were agreed to within Site Agreements coordinated with Maryland-National Capital Park and Planning Commission (M-NCPPC) and Maryland State Highway Administration (Maryland SHA) in the case of the Greenbelt and Landover sites, and with the Virginia Department of Transportation (VDOT) and the Fairfax County Department of Transportation (FCDOT) in the case of the Springfield site. These parameters and assumptions include a study area, trip generation, trip distribution, modal split, analysis years, analysis methods, and No-action Alternative/No-build Condition transportation assumptions (background growth, planned developments, and planned roadway improvements).

Because access to the Greenbelt, Landover, and Springfield sites is available by Interstate, the site agreements with Maryland and Virginia include guidance to analyze the Interstate facilities. This includes which software to use, the specific facilities to study, the time period and EIS Condition, and pass/fail analysis threshold.

Appendix A contains all jurisdictional agreements.

3.10.4 Transportation Impact Analysis Process

The transportation impact analysis process covers the collection of data, formulating key assumptions, and analysis of selected facilities. The process of analyzing transportation impacts starts by collecting data such as vehicle volumes, traffic signal timings, and transit passengers. Analysis assumptions must then be crafted that cover the trip generation, modal split, and trip distribution. Once the assumptions are determined the collected data can then be evaluated using a transportation planning toolbox to determine how well each transportation facility functions. The next sections explain each of these components of the transportation impact analysis process.

3.10.4.1 Data Collection and Analysis

Data collection is an integral component to discerning transportation impacts. A variety of data was collected for the transportation analysis including sidewalk locations and conditions; bicycle paths and facilities; transit services, locations, and ridership; types and locations of parking; truck access locations; and traffic counts, roadway lane geometry, and traffic signal timings.

Analysis of the pedestrian network within the study area includes examining the state of sidewalk and trail or foot path accommodations, how well they are maintained, and the amount of use they can support due to elements such as width and/or Americans with Disabilities Act (ADA) compliance (see Section 3.10.4.3 for more information regarding ADA) at intersections. Other considerations when analyzing the pedestrian network include the width or character of roadways between sidewalks, the frequency of crosswalks, walkway connections, and how the pedestrian network may be fragmented by various barriers within a study area.

The bicycle network within a study area is also analyzed when assessing overall transportation impacts. This analysis includes the review of bicycle lanes and facilities as well as Bikeshare services, multi-use paths, and roadways with bicycle accommodations such as signage and sharrows. Sharrows are shared lane arrow pavement markings, but not actual marked bicycle lanes. Similar to the analysis of pedestrian networks, analyzing bicycle networks is necessary to determine gaps in the network and where additional facilities or path connections would support the network.

A large portion of transportation planning deals with the analysis of public transit which includes Metrorail, rail, local and commuter bus, shuttles, ridesharing (slugging), and carsharing. In order to analyze transportation impacts to Metrorail and rail, a large volume of data is collected in the areas of station location, accessibility, frequency of service, infrastructure, ridership (number of entries and exits), and capacity. As for local, commuter, and intercity bus service, an assessment is made to determine the number of service providers, number of bus routes, frequency of service, ridership by bus route if available, and travel direction on the various routes, as well as ridership calculated at the bus stop level if available. This analysis also includes shuttle and circulator service as well. Parking and truck access are essential elements of transportation planning as they determine things such as vehicle capacity, the impacts of parking on surrounding properties, safety, and the likelihood for delay at access points. Types of parking can include pay-to-park lots, surface lots, parking garages, and on-street parking.

Lastly, a critical component of transportation planning is vehicular traffic and congestion. Because many land uses produce vehicle trips that need to be accommodated, traffic data for a given study area is crucial to discern transportation impacts of development. Traffic analysis includes analysis of overall capacity, delay, and queue length. Interstate or freeway components require additional analysis including merge, diverge, and weave analysis. In addition, controlled access facilities require analysis of gate entry processes to ensure a queue of vehicles does not interfere with other traffic operations.

Traffic data for the FBI Consolidated HQ sites were collected during the spring and fall of 2014 and the early winter of 2015, with traffic counts obtained as recently as March 2015 and pedestrian, parking, and bicycle observations collected through May 2015. Data for the JEH parcel was collected as early as the summer of 2014 through the early winter of 2015. The intersection counts were obtained between the hours of 6:30 AM and 9: 0 AM and 4:00 PM and 7:00 PM. Intersection counts include vehicular, truck, bicycles, and pedestrian volumes. Automated Traffic Recorder (ATR) counts were collected for Interstate mainlines, some interchange ramps not counted as part of the intersection counts, and other select roadway segments over at least a 24-hour weekday period in November 2014 and January 2015. The traffic counts collected were used in combination with traffic signal timings obtained from Maryland SHA for the Maryland sites, DDOT for the JEH parcel site, and VDOT for the Springfield site. Traffic counts were recorded on non-holiday Tuesdays, Wednesdays, and Thursdays to measure “typical” traffic conditions along the roadway network. Mondays, Fridays, and holidays tends to have lower and more variable traffic volumes since people tend to be on holiday and/or telework during this time.

3.10.4.2 Primary Transportation Assumptions: Trip Generation, Modal Split, and Trip Distribution

Once all the necessary data is collected, it serves as the baseline to forecast future transportation volumes in a given study area. This process involves three main assumptions: trip generation, modal split, and trip distribution. The trip generation step determines the number of person trips that would be generated by a particular land use based on factors such as the size of the development or the number of employees or residential units and the time of day. Once total person trip generation is calculated, the second assumption, modal split, represents how the total number of person trips are assigned to the various available transportation modes within a study area. Possible transportation modes include single-occupancy vehicles (SOVs), carpools/vanpools, bicycles, walking, commuter bus, local bus, Metrorail, or commuter rail. Lastly, trip distribution represents the identification of each origin and destination for each person trip generated. This process determines the number of trips apportioned across the transportation network. A more detailed explanation of these three assumptions is provided at the end of this section. As mentioned at the beginning of Section 3.10, the transportation impact analysis considers impacts across several different conditions and depends on the three primary assumptions of trip generation, modal split and trip distribution to forecast the future trip volumes for each condition.

The No-build Conditions followed separate processes depending on the site and are described in chapters 4-7. **The Build Condition was similar for each site; therefore, the specific assumptions and resulting calculations are summarized in the following section.**

Build Condition Trip Generation

The process of trip generation calculation is based on forecasting the number of AM and PM peak hour trips generated by the proposed development. There are several proposed trip generators for the site including an estimated 11,055 FBI employees, a 500-seat Mission Briefing Center, and a fleet of pool cars, according to the FBI. Based on an estimate for commuter-based pool car use, there would be less than five trips produced. It is also assumed that the approximately 400 non-seated contractors providing custodial, food, fitness center, health, and other services would travel outside the peak hours. Therefore, no trips were added to the trip generation calculation for commuter-based pool car use or non-seated contractors. The process for forecasting the FBI employee and Mission Briefing trips is discussed next.

Many employees choose to or are scheduled to begin or end work earlier or later than the peak hours, to avoid traffic, to schedule shared childcare responsibilities, to take advantage of quiet time at work, and other reasons. The ITE Trip Generation Manual has identified estimates for peak hour trip generation rates for different types of office buildings based on various studies; however, most of these studies are in suburban rather than urban environments, “having little or no transit service, nearby pedestrian amenities, or travel demand management (TDM) programs” (ITE 2012). In addition, FBI employee patterns of arrivals and departures, including the number of employees who would be off-site or on field work at any given time is not typical of most office uses. For these reasons, it was determined that the future FBI trip generation rate is not accurately represented by the ITE Trip Generation Manual; therefore, a special study was undertaken to determine appropriate trip generation rates using the current FBI Headquarters, which houses more than 50 percent of staff. As stated in the Trip Generation Manual, “when practical, the user is encouraged to supplement the data in this document with local data that have been collected at similar sites” (ITE 2012)

Table 3-8: J. Edgar Hoover Building Existing Peak Hour Person Trips

Source	Independent Variable	Time Period	IN	OUT	TOTAL
Turnstiles (11/12/13, 12/4/13, and 1/9/14) Survey (9/16/14 - 9/18/14)	5,045 employees	AM Peak Hour	1,361	102	1,463
		PM Peak Hour	98	1,259	1,357
Existing number of employees at JEH Building		5,045			
AM peak hour trip generation rate		0.290			
PM peak hour trip generation rate		0.269			

Table 3-9: Build Condition Trip Generation

Future FBI Person Trips	Time Period	Enter/Exit Per-centages		Proportion of Trips during the Peak Hour	Future Employee Per-son Trips		
		IN	OUT		IN	OUT	TOTAL
Employees (based on JEH Turnstile Counts and Surveys)							
11,055	AM Peak Hour	93%	7%	29%	2,982	224	3,206
	PM Peak Hour	5%	95%	26.9%	149	2,825	2,974
Briefing Center (based on the Old Post Office Redevelopment Transportation Study)							
250	AM Peak Hour	100%	--	36%	90	--	90
	PM Peak Hour	--	100%	29%	--	73	73
Total People							
11,305	AM Peak Hour	--	--	--	3,072	224	3,296
	PM Peak Hour	--	--	--	149	2,898	3,046

Source: Greenbelt Site Transportation Agreement, Springfield Site Transportation Agreement, and Landover Site Transportation Agreement

Morning peak hour rates were calculated based on FBI turnstile counts obtained from the FBI representing all persons entering the JEH building (current FBI HQ). Following the guidance of the ITE Trip Generation Handbook, 2nd edition (ITE 2004), three days of turnstile counts (November 12, 2013 [Tuesday], December 4, 2013 [Wednesday], and January 9, 2014 [Thursday]) were obtained. The sample days for normal operations days were selected by the FBI. The survey results produced a peak hour count of 1,344 on November 12, 2013, 1,361 on December 4, 2013, and 1,324 on January 9, 2014, and a peak hour of 7:15 AM to 8:15 AM. To provide a more conservative forecast, the maximum count from the 3-day turnstile counts (1,361) was used, instead of the average. The turnstile counts only represent the inbound flows, but most organizations have two-way flows of workers, even in peak hours. Therefore the ITE Trip Generation Manual Corporate Headquarters land use entering/exiting percentages (AM: 93 percent entering/7 percent exiting) were used to calculate the morning outbound peak hour flow, based on the maximum count from the survey results. The total person trips (entering and exiting) divided by 5,045 (current number of FBI employees working at the JEH building) was used to develop the AM peak hour rate, which resulted in a 0.29 person trip rate (29.0 percent of employees arrive or leave during the AM peak hour).

Afternoon peak hour rates were calculated based on a JEH building exit-only trip generation survey. Following the ITE guidance (ITE 2004), the trip generation survey was conducted for three days (September 16, 17, and 18, 2014) on a non-holiday week resulting in outgoing trip volumes of 1,174, 1,259, and 1,130, respectively. Based on the PM peak hour occurring between 4:30 PM and 5: 30 PM, the PM rate was calculated from the trip generation survey (outbound flow) and the inbound turnstile counts from the inbound survey days.

Based on the turnstile volumes, the highest number of employees entering during the 4: 30 to 5: 30 PM time slot was 114. The average for the time slot was 73, higher than both the other days' values (68 and 36 respectively) for the same 1-hour period. This meant that the 114 value was skewing the values when averaged and was not a good representation of a typical evening inbound flow. Therefore, the next 15-minute slot for an hourly average (4:45 PM to 5:45 PM) was examined. The average of the 4:45 PM to 5:45 PM time slot equals the average of the 3 days for the 4:30 to 5:30 PM time slot, and therefore appears to be more typical of a normal operation. To follow the same process as the inbound flow, the highest value of this time slot was used, for a value of 98. Since the values for the inbound PM flows fluctuated between days and one day seemed to at least double the other two, the percent entering and exiting was adjusted to model the outbound flows in a more conservative manner. The calculated split was 7 percent inbound and 93 percent outbound. Instead the split was rounded down and up to a 5 percent inbound and 95 percent outbound split. The outbound split has the greatest impact to traffic; therefore, a higher outbound split percentage is more conservative (worse case) than a lower outbound split.

This resulted in a 0.269 person PM peak hour trip rate (26.9 percent of employees arrive or leave during the PM peak hour) where 5 percent entered and 95 percent exited the JEH building based on the 5,045 existing employees working at the JEH building. Table 3-8 summarizes the JEH building trip generation rates.

Mission Briefing Center

The Mission Briefing Center is assumed to have 500 seats, according to the FBI. It is assumed that half (50 percent) of the facility capacity would arrive from off-site and that half would be on-site (walk) trips. The ITE Trip Generation Manual does not contain a "Conference Center" land use; therefore, the study followed the trip rates used by the traffic study for the Washington Convention Center published in the Old Post Office Redevelopment Transportation Study. The AM peak inbound trip generation rate reported by the Old Post Office Redevlopment Transportation Study was 0.36; the PM peak outbound trip rate was 0.29, assuming that 100 percent would be inbound in the AM peak and 100 percent outbound in the PM peak (GSA 2013b).

Total Site Forecasted Person Trips

The person trip generation representing the total number of estimated employees at the new site used the trip rates calculated through the JEH building trip generation study. The Mission Briefing Center uses the person trip generation rates provided by the Old Post Office Redevelopment Transportation Study. Table 3-9 contains the forecasted person trip generation assumptions for the various sites.

Build Condition Modal Split

Modal split is calculated by apportioning person trips to the available transportation modes used to commute. The process began by determining the total number of parking spaces for the 11,055 seated workers that would either drive alone or arrive by carpool/vanpool daily to develop a parking ratio. The parking ratio is a critical component for calculating parking spaces for a Federal agency based on NCPC guidance (See Section 3.10.3). The modal split process is outlined in detail in each TIA (Appendices C, D, and E), but it resulted in a ratio of 1:3 for Greenbelt and Springfield and 1:1.5 for Landover. Once the parking ratio was established, the number of parking spaces was calculated. ***It should be noted that this number does not reflect the non-seated workers, visitors, and pool fleet, which would require additional parking spaces and would not be subject to NCPC parking policy.*** The carpool/vanpool vehicles percentage was determined based on project knowledge of carpool/vanpool mode split at other large Federal sites. The total number of available parking spaces was reduced by this value.

The calculation of mode split for SOVs is dependent on the remaining parking spaces. For the remaining modes other than Metrorail/commuter rail covering bicycles, pedestrian, and buses, the mode split was determined based on previous studies, location, and judgment. It was then assumed that the remaining percentage added up to 100 percent would travel to/from the sites via Metrorail.

Table 3-10 summarizes the FBI mode split and provides the resulting trips by mode. The individual TIAs contains summaries of the relevant modal split information sources and percentages referenced in the previous discussion for each site.

Table 3-10: FBI Modal Split Summary Results

Mode	Greenbelt		Landover		Springfield	
	Modal Split	Persons	Modal Split	Persons	Modal Split	Persons
Single-Occupancy Vehicles	29.7%	3,280	63.3%	7,002	30.58%	3,381
Carpool/ Vanpool	11%[a]	405 trips (1,216 persons)	10% a	368 trips (1,105 persons)	11%[b]	304 trips (1,216 persons)
Bicycle	2%	221	1%	111	2%	221
Walk	1%	110	1%	111	3%	332
Commuter Bus [c]	3%	11 trips (332 persons)	3%	11 trips (332 persons)	10%	37 trips (1,105 persons)
Local Bus	6%	663	3%	332	6%	663
Metrorail/ Commuter Rail	47.33%	5,233	18.7%	2,062	37.42%	4,137
Telework/ Compressed Work Schedules	0%	0	0%	0	0%	0
Total	**100%**	**11,055**	**100%**	**11,055**	**100%**	**11,055**

[a] Assumes an average occupancy of three persons per carpool/vanpool.
[b] Assumes an average occupancy of four persons per carpool/vanpool.
[c] Assumes an average of 30 persons per commuter bus.
Source: Greenbelt Site Transportation Agreement, Springfield Site Transportation Agreement, and Landover Site Transportation Agreement (Appendix A)

TRIP DISTRIBUTION ASSUMPTIONS

50 percent of vehicular trips distributed based on current FBI employee zip codes; the remaining of 50% of trips distributed based on the MWCOG travel demand model

Build Condition Trip Distribution

The trip distribution for work trips was determined using two sources: the existing FBI home zip codes and MWCOG travel demand model. Based on the various Site Transportation Agreements, it is assumed that a certain percentage of existing FBI employees would relocate to the new site, and the remaining percent would represent new FBI employees who would choose to locate in proximity to the Landover site.

The FBI estimates that approximately 50 percent of the existing FBI staff would retire, transfer to another FBI site outside the National Capital Region, or resign once the new HQ is operational; therefore, 50 percent of the distribution would be based on the FBI zip code database. The existing FBI home zip codes are used as the home origin and home destination. The other 50 percent of trips are based on distribution patterns in the various site areas from the 2020 MWCOG travel demand model for home-based work trips because the model trip tables represent a more local distribution reflecting new employee interest in residing close to the new FBI HQ. The two distribution patterns (home zip code plus MWCOG trip tables) were averaged to form a blended trip distribution. Because the Mission Briefing Center external vehicle trips would most likely not resemble a localized trip pattern, the study used the same blended trip distribution for these vehicle trips. The detailed trip distribution for each Consolidated FBI HQ site is contained within chapters 4-7.

3.10.4.3 Methodology

The following sections describe how the various transportation calculations were performed by transportation mode. For the most part, this discussion pertains to methodology used for the Consolidated FBI HQ sites only. On occasion, the methodology was the same for the JEH parcel. For the full detailed discussion of methodology used for the JEH parcel, please refer to Section 4.2.9.

Pedestrian Analysis

Analysis of the pedestrian network for the alternative sites includes measurements of sidewalk widths within the 0.5-mile non-traffic study area. Sidewalk measurements and other observations for the alternative sites were recorded in the field in April and May of 2015 and via imagery from Google maps. Measurements were recorded from the edge of the sidewalk to the edge of the curb. The Affected Environments sections also include a description of where sidewalks are present, origin and destination points of pedestrians and/or commonly used sidewalks in the study area, disruptions or obstacles in the pedestrian environment, and general ADA compliance. Refer to specific site chapters for detailed descriptions of anticipated pedestrian improvements within the respective study areas.

ADA Compliance

The ADA compliance analysis within the JEH study area focuses on intersection curb ramps due to the high share of pedestrian trips that would be generated in a downtown urban area. Chapter 4, *J.Edgar Hoover Parcel,* includes more detail on the ADA requirements for curb ramps in Washington, D.C. Generally, however, according to the ADA, there is a minimum requirement of three foot clearances on street curb ramps, as well as minimal slopes and detectable warnings (i.e., dome-shaped bumps) (United States DOJ 2007). Since sidewalk widths in the downtown urban area of the District are inconsistent due to various obstructions, the JEH study area analysis does not focus on sidewalk widths.

For the Consolidated FBI HQ study areas, due to generally consistent sidewalk widths along each block, ADA compliance in the Consolidated FBI HQ study areas focused on sidewalk widths and less on intersection ramp compliance. Federal Highway Administration (FHWA) guidelines state that sidewalks require a minimum width of 5.0 feet if setback from the curb or 6.0 feet if at the curb face (FHWA 2014a). Any width less than 5.0 feet must be 3.0 feet wide with 5.0 feet turn-around locations every 200 feet to meet the minimum requirements for people with disabilities (DOJ 2010).

Bicycle Analysis

Bicycle facilities were inventoried using bicycle plans from each site's jurisdiction and verified using aerial photography and site visits. Bicycle facility assessments also noted if bikesharing facilities were present in the study area. Proposed bicycle facilities were obtained from these same plans. Recommendations for bicycle mitigation were made for any proposed facilities that are directly adjacent to each site or would complete elements of the bicycle network in the site study area that would serve employees of the Proposed Action.

Transit Analysis

Analysis of public transit covered Metrorail, Metrobus, and local bus and focused on weekday service because the Proposed Action would primarily generate weekday trips. It should be noted that commuter rail, commuter bus, carsharing, slugging, and private shuttles are not evaluated for the No-build or Build Conditions because future ridership information or planning documents were not available.

The Metrorail transit analysis includes study of both vertical and horizontal elements, including Metrorail transit passenger load analysis, capacity of platforms, the capacity of escalators and stairs within stations, and faregate aisle and fare vending machine capacity. The transit analysis also includes a review of the frequency of service of different types of transit. Additionally, Metrobus and local bus capacity analysis is included in the No-build, Build, and Build with Mitigation Conditions when ridership data is available from the service provider.

Projected Transit Growth

No-build Condition passenger growth was calculated using the MWCOG Regional Travel Demand Model, which uses socioeconomic inputs to predict future growth across all travel modes in the greater Washington area. Through 2025, a 2.1 percent annual growth rate is predicted for Metrorail, and a 1.9 percent annual growth rate is predicted for local bus. These values were used to determine the background passenger growth in the Metrorail and bus modes for each study area, with a 2022 horizon year for Greenbelt, Landover, and Springfield, and a 2025 horizon year for JEH. Passenger trips associated with planned development projects in each study area were added to this background growth.

Build Condition Projected Trips

Projected transit trips associated with the Build Condition were calculated for the FBI Consolidated HQ sites and then added to the 2022 No-build ridership totals for the bus and Metrorail modes. No-build Condition ridership includes background growth using regional growth rates and passenger trips from planned development projects.

Metrorail Station Capacity

The capacity of Greenbelt, Largo Town Center, Franconia-Springfield, Metro Center, Gallery Place-Chinatown, Archives-Navy Memorial, and Federal Triangle Metrorail stations was measured using 15-minute ridership data (entries and exits) provided by WMATA by Metrorail station entrance.

Vertical Elements (Escalators and Stairs) and Faregate Aisle Arrays

Volume to capacity (v/c) ratios were developed for the escalators, stairs, and faregate aisle arrays at each station. A v/c of 0.7 was considered to be "at capacity." Passenger volumes using each element were calculated using passenger entries and exits at each station entrance during the peak 15-minute exiting period – the period where the most passengers would use each element. Capacities for escalators and stairs were calculated using information in the Transit Capacity and Quality of Service Manual (TCQSM) and previous WMATA studies. Capacities for faregate aisle arrays were calculated using previous WMATA studies.

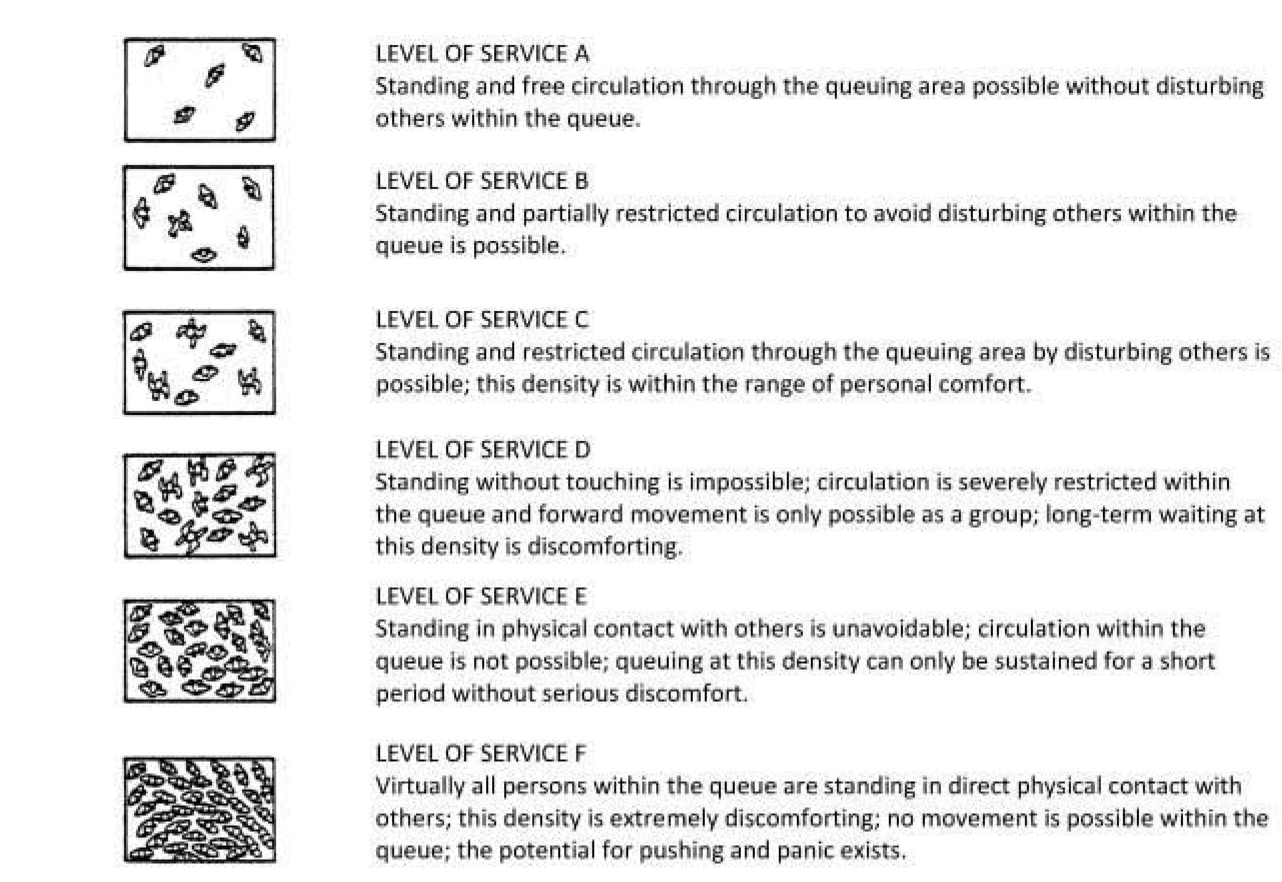
Fare Vending Machines

Volume to capacity (v/c) ratios were developed for the fare vending machines at each station entrance. A v/c of 0.7 was considered to be "at capacity." Passenger volumes using each element were calculated using passenger entries and exits at each station entrance during the peak 15-minute entering period – the period where the most passengers would use the machines. Capacities for the fare vending machines were calculated using previous WMATA studies based on the location of the station and the primary types of passengers using it.

Platform Analysis

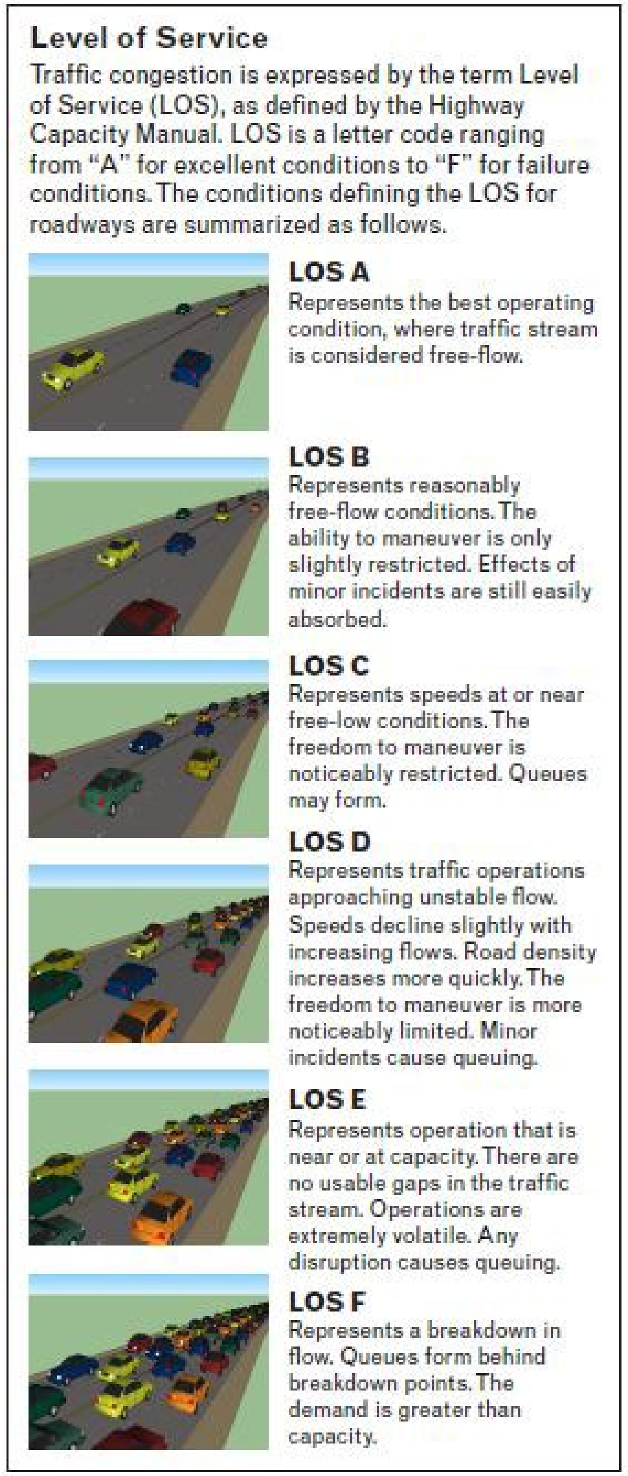
Pedestrian level of service (LOS) and maximum passenger queue (line) lengths were calculated for each Metrorail Station platform using methods in the TCQSM. Pedestrian levels of service provide a means of evaluating the capacity and comfort of a pedestrian space using letters A through F, with A being the best and F being the worst. An illustration and description of each LOS is shown in figure 3-3. The total number of entering and exiting passengers per train during the peak entering period (when the most passengers would be waiting on the platform) was used for this analysis, and half the passengers were concentrated in a 200-foot section of the platform so as to mimic the typical uneven distribution of passengers on platforms.

Figure 3-3: Pedestrian Levels of Service Descriptions



Source: TRB 2013

Figure 3-4: Traffic Level of Service Descriptions



Emergency Evacuation (NFPA 130) Analysis

The emergency evacuation analysis uses the TCQSM methodology to calculate platform evacuation times and station evacuation times during the peak entering period at each station – the period when the highest number of passengers would likely be in each station. National Fire Protection Association (NFPA) 130 standards require that a platform be evacuated in less than four minutes, and an entire station be evacuated in less than 6 minutes. WMATA Metrorail Stations, however, are not required to meet these standards. The details for this analysis are contained in the appropriate TIA and Appendix to the TIA.

Metrorail Passenger Loads

For JEH study area stations, peak Metrorail passenger loads for the busiest segments within the study area were obtained by Metrorail Line directly from WMATA. Greenbelt, Largo Town Center, and Franconia-Springfield stations are all terminal stations, and therefore, maximum passenger loads are equal to whichever is larger: the total number of exiting passengers per train in the outbound direction (trains ending at the station) or the total number of entering passengers per train in the inbound direction (trains beginning at the station). The loads were divided by the number of train cars provided on each line and evaluated against WMATA' standards of being "acceptable" (less than 100 passengers per car), "crowded" (100 to 120 passengers per car), or "extremely crowded" (more than 120 passengers per car). No expansion of WMATA's current fleet was assumed for this analysis to provide the most conservative estimate of potential capacity issues. WMATA's Momentum plan, the agency's vision for the future including near-term goals for 2025, does call for all eight-car trains on all lines during peak periods by 2020; however, this would require significant upgrades to electrical systems and a significant expansion of WMATA's current fleet of railcars (WMATA 2014a).

Bus Analysis

Bus Bay Capacity Analysis

The bus bay capacity analysis compares bus volumes per hour serving the Greenbelt, Largo Town Center, and Franconia-Springfield Metrorail Stations to WMATA's standard capacity per bus bay (six buses per hour) and their maximum capacity per bus bay (12 buses per hour). Any planned shuttle service between these stations and the proposed sites was included in the Build Condition analyses.

Bus Capacity Analysis

The bus capacity analysis used maximum passenger loads observed on each route in each 0.5-mile study area to compare the peak hour maximum passenger volumes to the capacity of bus services, calculating a v/c ratio.

Shuttle Plans

Anticipated shuttle routes and schedules were developed between the Landover site and the Largo Town Center Metrorail Station and between the Springfield site and the Franconia-Springfield Metrorail Station to maximize the Metrorail mode share to these sites. The shuttle frequencies were calculated based on the projected number of site patrons that would use them; this includes all of the Metrorail mode patrons for the Landover site and 90 percent of the Springfield Metrorail mode patrons (due to its proximity to the Franconia-Springfield Metrorail Station. Operating and capital costs for each shuttle were calculated using cost averages from WMATA and the American Public Transit Association. The traffic impacts from adding these additional vehicles to the roadway network were analyzed within the appropriate TIA and Appendix to the TIA.

Parking Analysis

Parking facilities were inventoried using Google Maps and various parking garage websites, then verified using site visits. Structured parking, surface parking in parking lots, and on-street parking was reviewed, identified as public or private use, and mapped. All parking on privately owned land intended only for users of the property was considered private, while all Metro, Park & Ride, or market-based parking (pay-to-park) areas were considered public. For the JEH study area, on-street parking was mapped by the parking restrictions observed in the field.

Traffic Analysis

All study area intersections were analyzed to determine how well they operated and if there would be any queue related issues. The following basic terms are fundamental to discussing the traffic analysis methodology.

LOS is the primary measure of traffic operations for both signalized and unsignalized intersections, as well as freeway facilities. LOS is a performance measure developed by the transportation industry to quantify driver perception for such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles. The LOS provides a scale that is intended to match the perception by motorists of the operation of the transportation facility and to provide a scale to compare different facilities. Detailed LOS descriptions are presented in figure 3-4.

Peak hour(s) is the hour (or hours) of the day during which traffic congestion is at its highest, or peak, and when most people are traveling on the various modes of transportation. There is both an AM peak hour and a PM peak hour.

Queue length is a measure of space in feet between the stop bar at an intersection and last vehicle in the queue provided for each intersection movement (left, though, and right turns). A failing queue length represents a condition where the queue exceeds the available storage capacity.

No-build/No-action Alternative Background Growth

Background growth was added to the Interstate and non-Interstate roadway network to account for vehicle trips traveling through the study area during the AM and PM peak hours. These trips are important to include because they account for vehicle volume growth due to land use changes outside of the study area. Two sources were relied on to develop background growth rates. The MWCOG Travel Demand Model and the annual average daily traffic (AADT) volumes maintained by the state Department of Transportations (DOT). The MWCOG travel demand forecasts, in close collaboration with local jurisdictions, provide consolidated, consistent future vehicle volume projections that support air quality modeling, traffic congestion forecasts, and general planning. The models are updated regularly as conditions change, but there is always some degree of lag. The AADT volumes provide a historic reference. VDOT and DDOT stipulate that 5 to 6 years of historic data is recommended to determine a historical average growth.

Future Condition Traffic Analysis Peak Hour Factor

The PHF is used to convert 60-minute volumes into peak 15-minute volumes because the Highway Capacity Manual (HCM) traffic operations analysis procedures require a 15-minute peak volume. The peak hour factor (PHF) is the ratio of the 60-minute volume divided by 4 times the highest 15-minute volume in the peak hour of the day. All intersection facilities for the three Consolidated FBI HQ sites were evaluated based on a PHF of 0.92. The study uses the lowest accepted value following the VDOT requirement that all future facility traffic evaluation use a PHF between 0.92 and 1.00 to be consistent for all three sites, and to use the most conservative value for the analysis of future facilities (VDOT 2012). Since the HCM 2000 traffic analysis is based on a 15-minute period, a PHF of 0.92 represents an analyzed vehicle volume based on the highest 15-minute vehicle volume. As a comparison, a PHF of 1.0 represents an analyzed vehicle volume based on a uniform 15-minute vehicle volume or the least conservative.

Transportation Analysis Tools

The following sections describe the analytical framework and software that was used to make the transportation analysis calculations.

The study area intersections were analyzed using Synchro™ Traffic Signal Coordination Software Version 8.0 (Build 805, Revision 878) and SimTraffic™ Version 8.0 (Build 805, Revision 878). Two main analyses are performed for traffic, an intersection capacity analysis and an intersection queueing analysis. The intersection capacity analysis uses the Synchro™ software tool and various input values to determine the LOS.

Signalized Intersection Level of Service

The LOS for signalized intersections in Virginia is based on the HCM 2000 method based on the Springfield Site Transportation Agreement and requires several inputs to determine an accurate LOS. Conversely, the LOS for signalized intersections at in Maryland is guided by both the HCM 2000 method and the Critical Lane Volume (CLV) method based on the Greenbelt and Landover Site Transportation Agreements. Custom designed Excel sheets were used to calculate the LOS operation based on the CLV method. Following the DDOT scoping form, the LOS for signalized intersection in Washington, D.C. is based on the Synchro™ Method. The HCM, Synchro™ method and CLV methods are described in the following section.

HCM 2000 Method/Synchro™ Method

The HCM 2000 and Synchro methods require the same several inputs to determine an accurate LOS (TRB 2000). Primary inputs include:

- vehicular volumes;
- pedestrian volumes;
- traffic signal timings;
- roadway geometry;
- speed limits;
- truck percentages; and
- PHF (measure of vehicle 15-minute flow rate).

Average vehicle control delay represents the average extra delay in seconds per vehicle caused by the presence of a traffic control device or traffic signal and includes the time required to decelerate, stop, and accelerate. The average vehicle control delay, measured in seconds per vehicle, is calculated using the primary inputs just mentioned. Synchro was used to calculate the HCM 2000-based average control delay results for all FBI Consolidated HQ sites while Synchro was used to calculate the Synchro-based average control delay results for the JEH parcel.

Table 3-11: JEH, Greenbelt and Landover Signalized Intersection Control Delay and LOS Thresholds – HCM 2000 Method

LOS	Average Control Delay (seconds/ vehicle)	Description
A	Less than or equal to 10	Passing Operation
B	>10-20	
C	>20-35	
D	>35-55	
E	>55-80	Failing Operation
F	More than 80	Above capacity and unstable conditions

Source: TRB (2000)

Table 3-12: Springfield Signalized Intersection Control Delay and LOS Thresholds – HCM 2000 Method

LOS	Average Control Delay (seconds/ vehicle)	Description
A	Less than or equal to 10	Passing operation in the majority of the Springfield study area[a]
B	>10-20	
C	>20-35	
D	>35-55	
E	>55-80	
F	More than 80	Failing Operation

a The following study area signalized intersections do not use the LOS guidelines from table 3-12 because they are outside of the designated Franconia-Springfield District as defined by the Fairfax Comprehensive Plan (see figure 7-31): #10, #11, #19, #20, #21, #22. For these intersections, LOS A through LOS D are considered passing operations, LOS E and LOS F are considered failing operation.
Source: TRB (2000); Fairfax County (2013c)

Table 3-13: Signalized Intersection Critical Lane Volume (CLV) and LOS Thresholds – CLV Method

LOS	Critical Lane Volume	Description
A	Less than or equal to 1,000	Passing operation
B	>1,000 – 1,150	
C	> 1,150 – 1,300	
D	> 1,300 – 1,450	
E	< 1,450 – 1,600	
F	>1600	Failing Operation

Source: M-NCPPC (2012)

Table 3-14: JEH, Greenbelt and Landover Unsignalized Intersection Control Delay and LOS Thresholds – HCM 2000 Method

LOS	Average Control Delay (seconds/ vehicle)	Description
A	Less than or equal to 10	Passing Operation
B	>10-15	
C	>15-25	
D	>25-35	
E	>35-50	Failing Operation
F	More than 50	

Source: TRB (2000)

LOS can be characterized for the entire intersection, each intersection approach, and each lane group. Control delay is used to characterize LOS for the entire intersection or an approach. Control delay and volume-to-capacity ratio are used to characterize LOS for a lane group. Delay quantifies the increase in travel time due to a traffic signal control. It is also a surrogate measure for driver discomfort and fuel consumption (TRB 2010). Signalized intersections or approaches that exceed a delay of 50 seconds have LOS E and 80 seconds have LOS F. Table 3-11 shows the average control delay and corresponding LOS for signalized intersections in the Greenbelt and Landover study areas as well as the JEH parcel study area; using the HCM 2000 method, LOS E and LOS F constitute failing operations. Table 3-12 shows the average control delay and corresponding LOS for signalized intersections in the Springfield study area; using the HCM 2000 method, LOS E and/or LOS F constitute failing operations depending on the intersection location. It is important to note that table 3-12, however, has been modified to reflect the Fairfax Comprehensive Plan guidance that LOS E be considered a passing operation for the designated Franconia-Springfield District of the Comprehensive Plan.

To determine the LOS of an intersection, the input values were entered into the analysis software (Synchro™), and the average vehicle delay (seconds per vehicle) was calculated. Based on the average vehicle delay, the LOS was determined for all movements (left, through, and right), approaches, and the intersection as a whole.

CLV Method

The CLV method also requires several inputs to determine LOS; these inputs include vehicular volumes and roadway geometry. Using these parameters, the CLV method measures the conflicted vehicle movements through an intersection (usually through volumes plus opposing left-turn volumes). The critical volume is determined by adding the highest vehicle conflicting movements along two perpendicular approaches (one east-west volume plus one north-south volume). Volumes are adjusted to reflect the number of lanes serving each vehicle move. Using the CLV method, LOS F constitutes failing operations. Table 3-13 shows the Critical Lane Volume (CLV) method and corresponding LOS for signalized intersections.

As noted previously, passing operation of a signalized intersection following the HCM 2000 method is LOS D and above, while passing operation of signalized intersection following the CLV method is LOS E and above.

Unsignalized Intersection Levels of Service

All sites followed the same method for unsignalzed intersection analysis. The LOS for unsignalized intersections (STOP-Controlled intersections or roundabouts) is based on the HCM 2000 method and requires several inputs to determine an accurate LOS, including:

- vehicular volumes;
- pedestrian volumes;
- roadway geometry;
- speed limits;
- truck percentages; and
- PHF.

The average vehicle control delay, in seconds per vehicle, is calculated using these parameters with the HCM 2000 procedures (TRB 2000). This represents the average delay, caused by the presence of a stop sign or roundabout, and includes the time required to decelerate, stop, and accelerate.

LOS for a two-way STOP-Controlled (TWSC) intersection (i.e., unsignalized intersection) is determined for each minor-street movement (or shared movement) as well as the major-street left turns. LOS F is assigned to the movement if the v/c ratio for the movement exceeds 1.0 or if the movement's control delay exceeds 50 seconds. The LOS for TWSC intersections are different from the criteria used for signalized intersections primarily because user perceptions differ among transportation facility types. The expectation is that a signalized intersection is designed to carry higher traffic volumes and would present greater delay than an unsignalized intersection.

Unsignalized intersections are also associated with more uncertainty for users because delays are less predictable than at signals, which can reduce user's delay tolerance. LOS is not defined for the TWSC intersection as a whole or for major-street approaches for three primary reasons: (a) major-street through-vehicles are assumed to experience zero delay; (b) the disproportionate number of major-street through-vehicles at a typical TWSC intersection skews the weighted average of all movements, resulting in a very low overall average delay for all vehicles; and (c) the resulting low delay can mask important LOS deficiencies for minor movements (TRB 2010).

The capacity of the controlled intersection legs is based primarily on three factors : the conflicting volume; the critical gap time, defined as the number of seconds between vehicles passing the same point along the major street approach; and the follow up time, defined as the number of seconds between the departure of the first and second vehicle in queue along the minor street approach. The HCM-based capacity analysis procedure assumes consistency for driver's critical gap time. Critical gap times are based on many factors including delay experienced by drivers on the approaches controlled by STOP signs. As delay increases, drivers become less patient and would accept shorter gaps, which results in higher capacities for unsignalized intersections that are operating at LOS D or worse. The unsignalized intersection procedure uses fixed critical gap times. Unless the critical gap times are adjusted, the procedure would have a tendency to overestimate the delay at unsignalized intersections that are operating at LOS D or worse. Also, poor operations at an unsignalized intersection would encourage some drivers to turn right and make a U-turn on the mainline or accept shorter critical gaps (safety issue) rather than attempt a turn left (TRB 2010).

Table 3-14 shows the average control delay and corresponding LOS for unsignalized intersections in Maryland. It should be noted that the worst LOS at one-way and TWSC intersections represents the delay for the minor approach only. Using the HCM 2000 method, LOS E and LOS F constitute failing operations.

Similar to the signalized intersection LOS table for Springfield, table 3-15 has been modified to reflect the Fairfax Comprehensive Plan guidance that LOS E be considered a passing operation for the designated Franconia-Springfield District of the Comprehensive Plan.

Intersection Queuing

In addition to analyzing the vehicle delay, the vehicle queue lengths were calculated for each approach. The intersection queuing analysis uses both the Synchro™ and SimTraffic™ tools to determine different levels of queuing. SimTraffic was used in addition to the standard Synchro tool to analyze queueing because it provides a more robust analysis of queuing than Synchro and it was the tool agreed to with state transportation agencies in the various Site Transportation Agreements mentioned in Section 3.9.3.4.

A failing queue length is determined by a queue length exceeding the intersection approach storage capacity. As the available storage for each intersection approach differs, these values reflect whether the existing storage provides enough space for vehicles waiting to pass through the intersection without blocking another lane or another intersection. Because failing queues might occur along the same approach as a failing LOS, these values are calculated independently and might result in one approach receiving a failing LOS score, while another approach has a failing queue length. A measurement of adequate space is determined by the process of a signal being RED and observing whether or not the lane can feasibly store all the vehicles (turning lane or travel lane) before blocking another lane (turning lane) or another intersection (travel lane).

Entry Control Facility

The Entry Control Facility (ECF) is a security check point for all vehicles to pass through to access the internal roadway serving the parking garages, loading docks, and other components of the proposed Consolidated FBI HQ site. Each vehicle would be expected to stop at the facility while FBI security personnel screen the vehicle and occupants before allowing it to proceed. Similar to a tollgate along a highway, the ECF might cause a queue; therefore, the analysis must determine if a queue might spill beyond the planned driveway onto the street network. The Consolidated FBI HQ site TIAs contain the ECF process in greater detail.

Development of Build Condition

Once the primary transportation assumptions were applied to forecast the future vehicle network, the assignment of vehicle trips occurred next. Because multiple routes could be accessed between the nearest Interstate and the FBI Consolidated HQ sites, TransModeler™ Traffic Simulation Software (TransModeler™) performed the selection of which route to assign vehicle trips between the study area boundary and each I Consolidated FBI HQ site. This process is called Dynamic Trip Assignment (DTA). Dozens of simulations were run to determine what vehicle trip assignment scenario would lead to the lowest overall travel time for all vehicles. The resulting vehicle volumes were used to evaluate the intersection operation and queue length analysis. This process was followed for the Build Condition for all three Consolidated FBI HQ sites. Because the mitigation required for the Landover and Springfield sites would impact vehicle travel patterns, a second DTA was run for these sites for the Build with Mitigation Condition.

Freeway Analysis

The Highway Capacity Software (HCS) Version 6.65 was used to determine the Interstate operations for these key on- and off-ramps. The HCS modules follow the HCM uninterrupted flow procedures called freeways. The Interstate system is a network of signed roadways that crisscross the country from coast to coast (east-west) and border to border (north-south) and operate as freeways or uninterrupted vehicle flow. Interrupted vehicle flow refers to the roadways with traffic signals, stop signs, and roundabouts.

Table 3-15: Springfield Unsignalized Intersection Control Delay and LOS Thresholds–HCM 2000 Method

LOS	Average Control Delay (seconds/ vehicle)	Description
A	Less than or equal to 10	Passing operation[a]
B	>10-15	
C	>15-25	
D	>25-35	
E	>35-50	
F	More than 50	Failing Operation

a This study area unsignalized intersection does not use the LOS guidelines from table 3-15 because it is outside of the designated Franconia-Springfield district as defined by the Fairfax Comprehensive Plan: Intersection #9. For this intersection, LOS A through LOS D are considered stable operations, LOS E is considered unstable conditions, and LOS F is above capacity and unstable conditions.
Source: TRB (2000); Fairfax County (2013b)

According to the Greenbelt, Landover, and Springfield site transportation agreements, the Interstate analysis is only conducted for the Build with Mitigation Condition. This was agreed to streamline and focus the analysis in determining if the consolidation of the FBI HQ would impact Interstate facilities. Therefore only the inbound AM peak hour and outbound PM peak hour is analyzed to reflect the highest volumes added to the interstate network from the consolidation of the FBI HQ. If a freeway facility received a failing LOS under the Build with Mitigation Condition, the vehicle density was compared to the No-build condition. If the difference in vehicle density between the No-build Condition and Build Condition was greater than 5 percent, a major adverse impact was assessed.

Recommended Traffic Mitigation Measures

Each intersection that had LOS degradation from a passing LOS to a failing LOS by lane group (right turns, through movements, or left turns) when compared to the No-build Condition was mitigated by one of the following methods:

- Optimize the existing traffic signal (change the amount of seconds of green to each approach)
- Coordinate a corridor of traffic signals
- Revise the existing lane geometry (number of right versus through versus left-turning lanes)
- Add new turning lanes
- Add through lanes

A list of mitigation measures was developed through an iterative process of testing the different improvement strategies, starting with optimizing the traffic signals and progressing to adding lanes if warranted. The recommended roadway improvements include external roadway mitigation measures necessary to support the Greenbelt, Landover, or Springfield conceptual site plans. If implemented, the external roadway mitigations would improve the traffic operations at all study area intersections to a passing LOS (both HCM-based and CLV-based [Maryland sites only]) or if failing would be equal to or better than the No-build Condition operations. The recommended mitigations would also result in no vehicle queues beyond the available storage capacity, or if beyond the storage capacity, would be no greater than 150 feet longer than the queues measured for the No-build Condition. The 150 feet is referenced in the District Department of Transportation Comprehensive Transportation Review Requirements guidance and provides a reasonable increase (approximately six vehicles or less).

The mitigation measures were developed to ensure the intersections would operate in a safe manner for all modes. This included assigning adequate pedestrian crossing times for any signalized intersection that required a change in the number of approach lanes and recommending non-motorized bridges to ensure bicycle and pedestrians can safely cross when an at grade crossing would not be safely accommodated. It is assumed that all planned roadway improvements and mitigation would follow the American Association of State Highway Transportation Officials, VDOT/ Maryland SHA, and M-NCPPC/FCDOT requirements to ensure all vehicle, bicycle, and pedestrian movements are designed to the latest safety

Table 3-16: Traffic and Transit Impact Thresholds

Impact Thresholds	Traffic	Transit
Not Measurable	Delays are not perceptible to most users and the number of users is within capaci-ty. Improvements to traffic operations (travel time, throughput, or delays) are also not perceptible to most users.	Condition would not degrade or improve transit capacity or change the overall transit LOS provided to users.
Major Adverse	Delays impact corridors of the study area creating more of a regional impact dealing with several intersections that are key to the operation of the roadway. A corridor can be defined as several adjacent intersections along the same roadway providing a vital connection between roadways or important passage through a highly congested area.	An increase in transit ridership that creates modest passenger delays, measured as increasing volumes above WMATA thresholds for capacity at any combination of two of the following: individual Metrorail facility elements (vertical elements, faregate aisles, or platform capacity) or bus routes (includinxg substantial delays from road-way operations).
Adverse	Delays are localized, such as at independent or isolated intersections.	An increase in transit ridership that creates minimal passenger delays, measured as increasing volumes above WMATA thresholds for capacity at any one of the following: individual Metro-rail facility elements (farecard vending machines) or bus routes (including substantial delays from roadway operations).
Beneficial	Improvements to traffic operations (travel time, throughput, or delays)	An increase in transit service or capacity for Metrorail facility elements (fare-card vending machines) and/or bus routes (including reduced delays from roadway operational improvements).

Transportation Demand Management

Transportation Demand Management (TDM) is a set of strategies, programs, services, and physical elements that influence travel behavior by mode, frequency, time, route, or trip length in order to help achieve highly efficient and sustainable use of transportation facilities (DDOT 2010). TDM measures for the chosen Consolidated FBI HQ site would be developed as part of the Final EIS and are included in this analysis as part of the Build Condition, as they would be an element required by NCPC and jurisdiction agencies. The TDM measures would encourage the reduction of SOV trips by "focusing the demand for transportation services on alternative modes and providing the public with the incentives as well as information to use these alternatives."

The introduction of TDM measures would serve to ensure the transportation mode splits planned in this study were achieved as well as serve to mitigate travel mode, frequency, time, route, and/or trip length associated with future trips of the consolidated FBI HQ.

3.10.5 Evaluating Impacts

Transportation impacts associated with the alternatives are analyzed in the No-build, Build, and Build with Mitigation Condition (Consolidated FBI HQ sites) or No-action Alternative and Action Alternative (JEH parcel) sections. As noted at the beginning of this chapter, potential impacts are described in terms of type, category, duration, and intensity. Type and intensity can be more specifically defined for the transportation impacts assessment and are described in this section.

The thresholds for determining the intensity of effects on local pedestrian, bicycle, transit, parking, traffic networks, and truck access are guided by the following definitions:

No Measurable Impact: a localized impact that is not perceptible to most users.

Adverse: Adverse impacts would increase congestion or barriers and/or degrade travel patterns, safety, or travel time.

Major Adverse: a broad area impact that is highly noticeable and would substantially affect a large numbers of network users.

Beneficial: Beneficial impacts would reduce congestion or barriers and/or improve travel patterns, safety, or travel time.

Because both traffic and transit entail extensive analysis, more detailed impact thresholds have been established for these transportation modes. See table 3-16 for these specific impact thresholds. Any impact thresholds included in table 3-16 are used to identify the No-action Alternative (JEH parcel) or No-build Condition (other three sites) and to compare the Action Alternative (JEH parcel) or Build Condition (other three sites) to the No-action Alternative/No-build Condition. Mitigation measures area recommended to reduce the impact level caused by the Proposed Action and also address the traffic operational standards established through the transportation agreements. Note that pedestrian, bicycle, parking, and truck access impacts do not have detailed impact thresholds, but instead use the intensity levels noted in the previous paragraph.

3.11 Greenhouse Gas Emissions and Air Quality

This EIS evaluates the impacts of the FBI HQ consolidation and the exchange of the JEH parcel to greenhouse gas emissions and air quality as described in the following sections.

3.11.1 Greenhouse Gas Emissions

Gases that trap heat in the atmosphere are called greenhouse gases (GHG) and include water vapor, CO_2, methane (CH_4), nitrous oxide(N_2O), O_3, and several hydrocarbons and chlorofluorocarbon (USEPA 2015l). GHG emissions originate from both natural and human-caused sources. Carbon dioxide constitutes the majority of GHG emissions that enter the atmosphere through human activities such as burning fossil fuels, wood and solid waste. Carbon dioxide is removed from the atmosphere when it is absorbed by plants as part of the biological carbon cycle (USEPA 2015l). The effects of GHGs on climate change depends on their concentration in the atmosphere, the length of time they remain in the atmosphere and how strongly they impact global temperatures. A gas's global warming potential measures the amount of heat it traps in the atmosphere, expressed as a comparison to an equivalent mass of CO_2 (CO_2e). CO_2, as the standard to which all other GHGs are measured, has a global warming potential of 1. Table 3-17 summarizes the global warming potential of different GHGs.

Water vapor is a naturally occurring GHG and accounts for the largest percentage of the greenhouse effect. Next to water vapor, CO_2 is the second-most abundant GHG. Uncontrolled CO_2 emissions from power plants, heating sources, and mobile sources are a function of the power rating of each source, the feedstock (fuel) consumed, and the source's net efficiency at converting the energy in the feedstock into other useful forms of energy (e.g., electricity, heat, and kinetic). Because CO_2 and the other GHGs are relatively stable in the atmosphere and essentially uniformly mixed throughout the troposphere and stratosphere, the climatic impact of these emissions does not depend on the source location on the earth (i.e., regional climatic impacts/changes would be a function of global emissions).

Table 3-17: Global Warming Potential Values (100-year)

Greenhouse Gas	Global Warming Potential Range
Carbon dioxide (CO_2)	1
Methane (CH_4)	28-36
Nitrous Oxide (N_2O)	265-298
Chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), hydrochlorofluorocarbons (HCFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)	thousands or tens of thousands

Source: http: //www.epa.gov/climatechange/ghgemissions/gwps.html

STATIONARY SOURCE

Sources emitting air pollution that are fixed in location, including buildings and facilities, power plants, and factories or other industrial sources.

MOBILE SOURCE

Sources emitting air pollution that are not fixed in location, including automobiles, trucks, buses, locomotives, ships, and aircraft.

The Clean Air Act (CAA) is a U.S. Federal law designed to control air pollution on a national level. It requires USEPA to develop and enfore regulations to protect the public from airborne contaminants known to be hazardous to human health.

The National Ambient Air Quality Standards (NAAQS) are mandated by the CAA for pollutants considered harmful to public health and environment.

USEPA defines ambient air in 40 CFR 50.1(e) as “that portion of the atmosphere, external to buildings, to which the general public has access.”

There is broad scientific consensus that humans are changing the chemical composition of earth’s atmosphere through the release of GHGs. Activities, such as fossil fuel combustion, deforestation, and other changes in land use, are resulting in the accumulation of trace GHGs, such as CO_2, in the atmosphere. An increase in GHG emissions results in an increase in the earth’s average surface temperature, which is commonly referred to as global warming. Global warming is expected, in turn, to affect weather patterns, average sea level, ocean acidification, chemical reaction rates, and precipitation rates, all of which is commonly referred to as climate change. The Intergovernmental Panel on Climate Change’s best estimates are that the average global temperature rises between 2000 and 2100 could range from 0.6 degree Celsius (1.08 degrees Fahrenheit) (with no increase in GHG emissions above year 2000 levels) to 4.0 degrees Celsius (6.66 degrees Fahrenheit) (with substantial increase in GHG emissions) (IPCC 2007). Even small increases in global temperatures could have considerable detrimental impacts on natural and human environments.

In 2014, CEQ issued Revised Draft Guidance for Greenhouse Gas Emissions and Climate Change Impacts (CEQ 2014). The draft guidance recommends NEPA documents consider both the impact of the changing climate on the project (such as changes in environmental resource conditions, increased flooding risk, more extreme temperatures, to the extent such information is available for the project area), and the impact of the project on GHG emissions. The draft guidance suggests 25,000 metric tons of CO_2e per year as the level above which quantification of GHG emissions may be warranted. The draft guidance recommends considering mitigation measures to lower GHG emissions. A quantitative GHG analysis was prepared for this project that addresses the following types of emissions:

- Building-related GHG emissions, including electricity, steam, and natural gas for building power, heating and cooling.
- Mobile-source GHG emissions focused on employee commutes and addressing how the location of each site would affect the use of transit.

3.11.1.1 Stationary and Building-Related Greenhouse Gas Sources

For the existing JEH building, information on GHG emissions from backup generators, purchased electricity, and purchased steam was obtained from FBI’s fiscal year (FY) 2013 GHG emissions inventory. These same data were used to estimate electricity consumption and emissions for the site alternatives, assuming the same electricity consumption per GSF and the same emission factor of CO_2 per kilowatt-hour. The methodology for developing the natural gas boiler emissions estimate for the site alternatives is addressed in the stationary source air quality methodology section. It is important to note that building energy efficiency measures and renewable energy generation were not incorporated in the quantification of GHG emissions related to building operations; consequently, the results are considered higher than the actual emissions would be after accounting for conservation measures that would be determined during the subsequent design process.

For the Greenbelt site No-action Alternative, energy consumption of the potential mixed-use development was quantified based on land use-specific electricity and natural gas consumption per square foot from the 2013 District Department of Energy and Environment Private Building Energy Benchmarking database for buildings constructed in 2000 or later. Buildings that used steam or fuels other than natural gas were excluded, as were buildings reporting no natural gas use. Detailed information regarding the emission factors used to convert the Greenbelt No-action Alternative energy consumption estimates to GHG emissions is provided in Appendix F.

3.11.1.2 Mobile Greenhouse Gas Sources

FBI utilized a database of employee home address zip codes to determine the distance traveled to the JEH building and each of the site alternatives based on the MWCOG travel model roadway network and zone to zone travel time data. The outcome of this analysis was an average distance traveled (assuming driving) per employee for each of the site alternatives. This distance was used in conjunction with data on the modal split (percent driving alone, percent carpool) to estimate the total vehicle miles traveled (VMT) for each alternative.

The annual total VMT for each alternative was converted to CO_2 based on the USEPA emissions model MOVES2014. To ensure a conservative emission factor, the MOVES emissions modeling was conducted for a January morning hour (7:00 AM) because emissions are generally higher at lower temperatures. The analysis was based on passenger vehicles traveling at an average speed of 35 miles per hour (mph) on urban unrestricted access type roadways (e.g., arterials with stop and go traffic). The MOVES modeling was conducted for a 2025 analysis year to match an analysis year for which regional MOVES input data was available from MWCOG (recognizing that the site alternative opening year is actually 2022). Data provided by MWCOG included county-specific meteorology and vehicle age distribution. A regional average emission factor was obtained by averaging the resulting emission factors for Washington, D.C., Prince George’s County, and Fairfax County. Appendix F provides a detailed overview of the MOVES input assumptions.

A critical assumption with the mobile source GHG analysis is that the model is based on existing employee home zip codes. Over time, mobile source GHG emissions would be expected to decrease under the action alternatives because of turn over and new employees considering the HQ location in deciding where to live would reduce the “average travel distance” compared to the average travel distance used in the analysis. Some portion of existing employees may also decide to relocate depending on how the new HQ location affects their commutes.

3.11.2 Air Quality

The Clean Air Act (CAA) and its amendments led to the creation of National Ambient Air Quality Standards (NAAQS) by USEPA for six criteria air pollutants: carbon monoxide (CO), sulfur dioxide (SO_2), ozone (O_3), particulate matter (PM), nitrogen dioxide (NO_2), and lead. The NAAQS were enacted for the protection of the public health and welfare, allowing for an adequate margin of safety.

There are two types of NAAQS: primary standards and secondary standards. Primary standards set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. Table 3-18 summarizes the primary and secondary NAAQS for the criteria pollutants. The following section includes a brief discussion of the six criteria pollutants and the relevance of each pollutant to the emissions sources involved with the Proposed Project.

Carbon monoxide: CO is a colorless, odorless gas emitted from combustion processes, including engine exhaust. Elevated CO concentrations can cause adverse health impacts by reducing oxygen delivery to vital organs. Very high concentrations can cause death. For this Project, CO is primarily a consideration in the vicinity of congested intersections and the proposed parking garages.

Lead: Lead is a toxic heavy metal that can have numerous adverse health impacts, including neurological damage to children and cardiovascular effects in adults. Lead emissions can contribute to exposure through the air directly or indirectly by causing soil/water contamination. Prior to the phase out of leaded gasoline, automobiles were a source of lead emissions. According to USEPA, the major sources of lead emissions to the air today are ore and metals processing and piston-engine aircraft operating on leaded aviation gasoline. The Proposed Project does not involve lead emissions; therefore, lead is not discussed further in the air quality analysis.

Nitrogen dioxide. NO_2 is one of a group of reactive gases called nitrogen oxides or NO_x. NO_2 forms small particles that penetrate deep in the lungs, and can cause or worsen existing respiratory system problems such as asthma, emphysema, or bronchitis. NO_2 emission sources associated with the Proposed Project include autos and trucks, construction equipment, and natural gas boilers, among others. NO_x are also a precursor that can lead to the chemical reactions forming ground-level O_3.

Ozone: Ground-level O_3 is an important component of smog and is formed through reactions of NO_x and volatile organic compounds (VOCs) in the presence of sunlight. Sources of NO_x and VOC emissions include both mobile and stationary sources. Health effects of O_3 exposure include respiratory irritation, reduced lung function, and worsening of diseases such as asthma. People with lung disease, children, older adults, and people who are active outdoors may be particularly sensitive to O_3. Elevated O_3 can also impact sensitive vegetation. O_3 formation is a regional air quality concern; therefore the potential impacts in terms of O_3 formation are addressed by quantifying the contribution of the Project to precursor emissions rather than predicting project-specific O_3 concentrations.

Particulate matter: PM is a broad class of air pollutants that exist as liquid droplets or solids, with a wide range of size and chemical composition. Smaller particulates that are smaller than or equal to 10 and 2.5 microns in size (PM_{10} and $PM_{2.5}$) are of particular health concern because they can get deep into the lungs and affect respiratory and heart function. Particulates can also impact visibility; damage soil, plants, and water quality; and stain stone materials. PM emissions are primarily a concern for heavy-duty trucks and other equipment with diesel engines, although PM emissions also occur from gasoline and natural gas combustion.

Table 3-18: National Ambient Air Quality Standards

Pollutant	Primary / Secondary		Averaging Time	Level	Form
Carbon Monoxide	Primary		8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead	Primary and Secondary		Rolling 3-month average	0.15 μg/m^3	Not to be exceeded
Nitrogen Dioxide	Primary		1-hour	100 ppb	98th percentile, averaged over 3 years
	Primary and Secondary		Annual	53 ppb	Annual mean
Ozone	Primary and Secondary		8-hour	0.075 ppm	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particulate matter	$PM_{2.5}$	Primary	Annual	12 μg/m^3	Annual mean, averaged over 3 years
		Secondary	Annual	15 μg/m^3	Annual mean, averaged over 3 years
		Primary and secondary	24-hour	35 μg/m^3	98th percentile, averaged over 3 years
	PM_{10}	Primary and secondary	24-hour	150 μg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur dioxide	Primary		1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Secondary		3-hour	0.5 ppm	Not to be exceeded more than once per year

Table 3-19: Summary of Applicable General Conformity De minimis Thresholds (tons/year)

VOC (O_3 precursor)	NO_x (O_3 and $PM_{2.5}$ precursor)	$PM_{2.5}$ direct emissions	SO_2 ($PM_{2.5}$ precursor)	CO*
50	100	100	100	100

CO threshold does not apply to Springfield site

Table 3-20: Air Quality Index

Air Quality Index Levels of Health Concern	Numerical Value	Meaning
Good	0 to 50	Air quality is considered satisfactory, and air pollution poses little or no risk.
Moderate	51 to 100	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
Unhealthy	151 to 200	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	201 to 300	Health warnings of emergency conditions. The entire population is more likely to be affected.
Hazardous	301 to 500	Health alert: everyone may experience more serious health effects.

Source: Cap (n.d.)

Sulfur dioxide: SO_2 is part of a group of reactive gases called oxides of sulfur. Health effects of SO_2 exposure include adverse respiratory effects, such as increased asthma symptoms. The largest sources of SO_2 emissions nationally are from fossil fuel combustion at power plants/industrial facilities, electrical utilities, and residential/commercial boilers. Mobile sources are not a significant source of SO_2 emissions.

Areas that do not meet the NAAQS are classified as nonattainment areas for that pollutant. Areas that have never been designated nonattainment for a pollutant and NAAQS are considered attainment areas. State Implementation Plans (SIPs) are designed to bring nonattainment areas into compliance with the NAAQS, including the establishment of emissions “budgets” or the maximum emissions allowed for different source categories to ensure the air quality standards would be met. Former nonattainment areas currently meeting the NAAQS are designated maintenance areas and must have maintenance plans for 20 years. Section 176(c) of the CAA (42 U.S.C. §7506(c)) requires Federal agencies that license, permit or approve any activity to demonstrate that the action conforms to the applicable SIP before the action is approved. In this context, “conformity” requires that Federal actions be consistent with the objective of SIPs to eliminate or reduce the severity and number of violations of the NAAQS, and achieve expeditious attainment of those standards.

Two different regulations implement the conformity requirement of the CAA: the transportation conformity regulations and the general conformity regulations. Transportation conformity applies to highway/transit projects and transportation plans developed, funded, or approved under title 23 U.S.C. or the Federal Transit Act (49 U.S.C. 1601 et seq.), while general conformity applies to all other Federal actions, including the FBI HQ Consolidation. General conformity regulations apply to a Federal action in a nonattainment or maintenance area if the total of direct and indirect emissions of the relevant criteria pollutants and precursor pollutants caused by the Federal action equal or exceed certain de minimis rates. If the action would cause emissions above the de minimis rates and the action is not otherwise exempt, “presumed to conform,” or included in the existing emissions budget of the SIP, the agency must conduct a conformity determination before it takes the action.

The JEH parcel and all three site alternatives are located in the National Capital Interstate Air Quality Control Region (AQCR 47) a nonattainment area for the 8-hour O_3 NAAQS, triggering consideration of the General Conformity de minimis thresholds for the O_3 precursor emissions VOC and NO_x. Similarly, all the sites are located in a maintenance area for $PM_{2.5}$, triggering consideration of the de minimis thresholds for $PM_{2.5}$ emissions, and the $PM_{2.5}$ precursors NO_x and SO_2. Finally, all of the sites except for Springfield are located in a maintenance area for CO, triggering applicability of the CO de minimis threshold. Table 3-19 summarizes the applicable de minimis thresholds. Both peak construction annual emissions and annual operational emissions are considered in comparison to the de minimis thresholds. If emissions can be shown to be less than the de minimis thresholds, no further analysis is required to demonstrate compliance with the general conformity regulations.

3.11.2.1 Regional Air Quality Index Summary

USEPA calculates the Air Quality Index (AQI) for five major air pollutants regulated by the CAA: ground-level O_3, PM, CO, SO_2, and NO_2. MWCOG collects data daily to determine air quality for the region and releases it in the form of the AQI. The AQI ranges from zero (no air pollution) to 500, with 300 representing severely unhealthy air pollution levels. An AQI value between 101 and 150 indicates that air quality is unhealthy for sensitive groups, who may be subject to negative health effects. Sensitive group s may include those with lung or heart disease who would be negatively affected by lower levels of ground level O_3 and PM than the rest of the general public. An AQI value between 151 and 200 is considered unhealthy, and may result in negative health effects for the general public, with more severe effects possible for those in sensitive groups. AQI values above 200 are considered very unhealthy. An AQI above 300 represents hazardous air quality (USEPA 2015c). AQI values are provided for each site in sections 4.1.10.2, 5.1.10.2, 6.1.10.2, and 7.1.10.2 to provide a context for understanding the affected environment in which impacts to air quality are occurring. Table 3-20 displays the AQI rating system.

3.11.2.2 Meteorology/Climate

Temperature and humidity are among the meteorological parameters that affect emissions. For example, gasoline vehicle start emissions are higher at low temperatures because of incomplete combustion of the fuel-rich mixture necessary for combustion to occur at low temperatures and longer cranking times (USEPA nd). Climate in the Washington, D.C., metropolitan area is humid and continental with a normal high temperature of 88 degrees Fahrenheit in July and an normal low temperature of 29 degrees Fahrenheit in January (based on 1981-2010 data from National Airport). Summers are warm with periods of high humidity and winters are cold, with periods of snow cover (National Weather Service 2015).

3.11.2.3 Stationary Source Methodology and Assumptions

The primary stationary source associated with the consolidation of FBI HQ at the Greenbelt, Springfield and Landover sites is assumed to be natural gas boilers used for heating and hot water. It is important to note that the specific technology to be used has not been predefined. For the JEH building, heating is provided by purchased steam; therefore, no large stationary sources require analysis at the existing JEH building. Each of the site alternatives would also require backup power generators, which would likely be diesel or natural gas powered. The JEH building currently has diesel backup generators. The analysis of the quantity of stationary source emissions (e.g., tons per year of each pollutant) is the same for each of the three site alternatives because the same basic program of space is proposed for each site. In addition to quantifying the annual emissions associated with the proposed FBI HQ, the impact to air quality at a local level in the communities surrounding each site was examined through dispersion modeling.

Boiler emissions of criteria pollutants and GHGs were estimated using the estimated annual fuel consumption and the small boilers emission factors from Section 1.4 of USEPA's AP-42 Compilation of Air Pollutant Emission Factors (USEPA 1998). It was assumed the project would incorporate pollution control equipment, such as low-NO_x burners that would reduce NO_2 and N_2O emissions. Given that a specific design and detailed building energy requirements have not been determined at the current stage of project development, it was assumed that natural gas consumption per square foot of building area for the new FBI HQ campus woubld be the same as the FBI's Criminal Justice Information Services Division (CJIS) building in West Virginia. The CJIS building is 500,000 GSF and was completed in 1995 (FBI n.d.). This is a very conservative assumption (over predicting vs. under predicting emissions) since the Proposed Action would incorporate building energy efficiency and renewable energy components that would reduce energy intensity relative to typical buildings from the 1990s.

The AERMOD dispersion model (version 14134) was used to estimate the incremental project impact to localized $PM_{2.5}$ and NO_2 concentrations at specific air quality-sensitive areas (such as residences and community facilities) surrounding each of the three sites. AERMOD is a state-of-the-art dispersion model that takes into account how meteorology (e.g., wind speed, direction, temperature), emission source characteristics (e.g., stack height, stack emission rate, diameter, temperature etc.), terrain, and other factors combine to determine the ambient concentration of air pollutants at discrete receptor locations. The modeled project increment is combined with "background concentrations" obtained from air quality monitoring data to develop a total concentration (project plus background) comparable to the NAAQS. The modeling conducted for this Draft EIS is considered preliminary and for screening-level impact analysis only because of the uncertainties in the specific design of the campus. Detailed information on the modeling assumptions is provided in Appendix F.

3.11.2.4 Mobile Source Methodology and Assumptions

Automobiles, trucks and buses are referred to collectively as mobile sources of emissions. The two primary pollutants of concern related to mobile sources are CO and fine particulates ($PM_{2.5}$). A detailed analysis of how mobile sources would affect air quality in a localized area (such as adjacent to a congested intersection) through emissions (how much pollution is emitted) and dispersion (how would the pollution affect ambient concentrations) modeling is called hot-spot analysis. A $PM_{2.5}$ hot-spot analysis is not necessary for any of the alternatives based on the lack of substantial heavy duty diesel vehicle traffic generation. The majority of project-generated traffic would be gasoline powered automobiles. As a result, CO required further consideration and screening.

Mobile Source $PM_{2.5}$

Although not subject to transportation conformity requirements, the transportation conformity regulations were used for NEPA purposes to determine if a $PM_{2.5}$ hot-spot analysis was necessary. The transportation conformity regulations are relevant to use for this purpose because they are intended to prevent violations of the NAAQS or worsening of existing violations. The transportation conformity criteria triggering $PM_{2.5}$ hot-spot analysis include significant increases in diesel vehicle volumes or effects on congested intersections with significant number of diesel vehicles (refer to Appendix F for a complete listing of the criteria).

The Proposed Action would involve daily heavy truck trips for deliveries. Therefore, the project would not cause a significant increase in diesel truck traffic. The traffic mitigation measures include intersection channelization/traffic signal timing changes that would be expected to improve traffic flow and reduce idling.

The traffic analysis data was reviewed to identify the number and percentage of heavy vehicle volumes (see Appendix F for table). For the intersections with the highest number of heavy vehicles, the heavy vehicle percentage in the peak hours was 4 percent or less, and the highest peak hour heavy vehicle volume was approximately 300. Based on this information, a determination was made that none of the site alternatives would adversely affect intersections with significant heavy vehicle volumes, nor result in adverse $PM_{2.5}$ concentrations within the vicinity of congested intersections.

Mobile Source Carbon Monoxide

The potential for elevated CO concentrations in the vicinity of signalized intersections were measured through two levels of analyses. The first iteration reviewed the LOS for each study intersection, identifying the intersections with LOS E or LOS F conditions, which are indicative of the slowest speeds/greatest amount of idling, which in turn generates the highest CO emissions. For these congested intersections, additional screening was conducted using FHWA's Carbon Monoxide Categorical Hot-Spot Finding Tool for signalized intersections (FHWA 2014b). FHWA's Categorical Finding involved modeling of CO concentrations a hypothetical worst-case urban intersection, with the basic concept being that projects that fall within the range of assumptions used for the hypothetical worst-case intersection (e.g., number of traffic lanes, traffic volumes, LOS) do not require project-specific analysis. Instead, it can be concluded automatically that they would not result in CO impacts. The qualitative evaluation of the potential for CO impacts for this project includes consideration of the traffic volumes on each intersection approach, approach LOS, intersection geometry, and monitored background CO concentrations representative for each site.

3.11.2.5 Temporary Construction Impacts Methodology and Assumptions

Construction activities would result in emissions of criteria pollutants through vehicle exhaust and fugitive dust over the approximately 4-year construction period. Given that detailed construction methods and staging plans are not currently available, it is not possible to conduct a detailed, accurate construction emissions analysis for the project. Instead, the overall order of magnitude of probable construction emissions may be understood based on a review of the emissions analyses conducted for other projects of a similar scale and scope. One comparison project is the U.S. Department of State's Foreign Affairs Security Training Center (FASTC) at Nottoway County, Virginia. The facility included 2.5 million GSF of building space, an employee population of 1,070 staff, and 8,000-10,000 annual trainees (U.S. Department of State), which is similar to this project. The FASTC EIS construction emissions methodologies include the NONROAD2008 model, MOVES2010, and AP-42 (U.S. Department of State 2015). A detailed list of assumptions is provided in the FASTC air quality technical report.

The FASTC project was analyzed based on a 7-year construction schedule (2014 through 2020). The total emissions from the 7 years of construction assumed for the FASTC project were summed and divided by the 4 years of construction (2018 through 2022) proposed for consolidation of FBI HQ to determine average annual emissions from construction equipment.

With respect to fugitive dust emissions, the FASTC project was not considered comparable since the project disturbed more than 1,100 acres, compared to fewer than 100 acres for any of the FBI HQ site alternatives. Dust emissions are proportional to the surface area of soil exposed; therefore, using the FASTC emissions of dust would result in an unrealistically high level of impact. To remedy this situation, a separate construction dust emissions analysis was completed for each of the sites based on USEPA's AP-42 and assumptions regarding the total area of soil disturbance associated with each site. Refer to Appendix F for the details of fugitive dust analysis assumptions.

The total annual construction emissions were compared to the General Conformity de minimis thresholds as an indicator of a potentially significant impact for NEPA purposes (even though the sites are not located in nonattainment/maintenance areas for every pollutant).

Mitigation Measures

The Proposed Action would incorporate the following measures to minimize the potential for air quality impacts during construction:

Utilization of Newer Equipment: All heavy duty diesel construction equipment on-site shall meet USEPA Tier 2 or better emission standards. At least 50 percent of construction equipment over 100 horsepower shall meet USEPA Tier 3 or better emission standards or incorporate USEPA-approved diesel retrofit technology. Tier 3 NOx emissions range from 40 to 60 percent lower than Tier 1 emissions and considerably lower than uncontrolled engines.

Dust Control: Fugitive dust control plans would be required as part of contract specifications. For example, stabilized truck exit areas would be established for washing off the wheels of all trucks that exit the construction site. Tracking pads would be established at construction exits to prevent dirt from being tracked onto roadways. Any truck routes within the sites would be either watered as needed or, in cases where such routes would remain in the same place for an extended duration, the routes would be stabilized, covered with gravel, or temporarily paved to avoid the re-suspension of dust. During dry weather, exposed soil areas (unpaved access roads, soil piles, staging areas) would be watered once per day to control fugitive dust. All trucks hauling loose material would have their loads securely covered prior to leaving the construction sites. To minimize fugitive dust emissions, vehicles on-site would be limited to a speed of 10 mph.

Idling Limits: Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 3 minutes.[5] Clear signage indicating idling limits shall be provided for construction workers at all access points.

[5] The regulatory idling limit in Maryland is 5 minutes and 3 minutes in Fairfax County, Virginia. See http://www.epa.gov/reg3artd/diesel/anti_idling_regs.htm for more information.

3.11.3 Greenhouse Gas Emissions and Air Quality Intensity Thresholds

Air quality intensity thresholds are based on the NAAQS and General Conformity de minimis criteria. With respect to GHG emissions, no formal intensity definitions are used, however emissions are discussed generally in relation to the 25,000 tons/year CO_2e reference point from the Draft CEQ guidance.

No Measurable Impact: Concentrations of criteria pollutants and sensitive receptors surrounding the site and annual criteria pollutant emissions would not increase relative to the No Build condition for the site.

Adverse: Concentrations of criteria pollutants and sensitive receptors surrounding the site and annual criteria pollutant emissions would increase by greater than 5 percent, but would not exceed the NAAQS or General Conformity de minimis thresholds.

Major Adverse: Concentrations of criteria pollutants surrounding the site would be exceed the NAAQS and/or the General Conformity de minimis thresholds.

Beneficial: Concentrations of criteria pollutants at sensitive receptors surround the site would be reduced relative to the No Build condition. Total emissions of the site would be reduced compared to the No Build condition.

Table 3-21: Common Noise Sources and Sound Levels

Source	Sound Level (dBA)
Near large jet at takeoff	140
Air-raid siren	130
Threshold of pain	120
Thunder or sonic boom	110
Garbage or trailer truck at roadside	100
Power lawn mower at 5 feet	90
Alarm clock or vacuum cleaner	80
Freeway traffic at 50 feet	70
Conversational speech	60
Average residence	50
Bedroom	40
Soft whisper at 15 feet	30
Rustle of leaves	20
Breathing	10
Threshold of hearing	0

Source: U.S. National Bureau of Standards (1976)

Table 3-22: Noise Abatement Thresholds

Change in dBA	Perception
0	Reference
3	Barely Perceptible Change
5	Readily Perceptible Change
10	Twice or Half as Loud
20	Four Times or ¼ as Loud
40	Eight Times or 1/8 as Loud

Source: FHWA (1995)

3.12 Noise

The extent to which individuals are affected by noise is controlled by several factors, including:

- duration and frequency of the noise/sound;
- distance between the noise source and the receptor;
- intervening natural or engineered barriers or structures; and
- ambient environment.

Noise is monitored and measured using the A-weighted decibel (dBA), which is used to express the relative loudness of sounds in the air as perceived by the human ear. The dBA scale de-emphasizes the very low and the very high frequencies and emphasizes the middle frequencies, thereby closely approximating the frequency response of the human ear. Common noise sources and their sound levels are shown in table 3-21.

Human ability to perceive change in noise levels varies widely from person to person, as do responses to perceived changes. Generally, a 3-dBA change in noise level would be barely perceptible to most listeners, whereas a 10-dBA change is normally perceived as doubling (or halving) of noise levels and is considered a substantial change. These thresholds permit direct estimation of an individual's probable perception of changes in noise levels as shown in table 3-22. Table 3-23 shows the general noise level produced by construction equipment with and without noise control measures.

Noise-sensitive receptors are generally considered to be human activities or land uses that may be subject to the stress of significant interference from noise. Land uses associated with sensitive receptors include residential dwellings, parks, hotels, hospitals, nursing homes, education facilities, churches, and libraries. Sensitive receptors may also include threatened or endangered noise-sensitive biological species. Commercial and industrial land uses are not considered noise sensitive by most definitions.

3.12.1 Data Sources

Sensitive noise receptors were identified using Google maps and verified during site reconnaissance during the preparation of the Draft EIS.

3.12.2 Study Area

The ROI for noise depends on the intensity of noise generation. For most common noise sources, such as vehicular traffic, the ROI is limited to areas within 500 feet of the noise source. High-intensity noise sources, such as ordnance detonations, may have an ROI extending several miles from the noise source; these types of noise sources are not anticipated as a result of this project. Therefore, the study area for noise includes all land within 500 feet of the site boundaries for each of the site alternatives.

3.12.3 Methodology and Assumptions

An analysis of the potential effects associated with noise typically evaluates potential changes to the existing acoustical environment that would result from implementation of a Proposed Action. An increase or change in stationary sources or traffic could result in an increase in noise in a community or a given location.

The main issues concerning noise effects on humans are physiological impacts (e.g., hearing loss and non-auditory impacts), behavioral impacts (e.g., speech or sleep interference and performance impacts), and subjective impacts such as annoyance. This noise analysis considers potential impacts to nearby noise-sensitive receptors, including residential, schools, churches, and hospitals. The major sources of noise, their contribution to the overall noise environment, and maximum sound level were estimated for comparison to local noise control standards. The analysis considers construction and operation of the proposed facilities.

The following thresholds were used to determine the degree of impacts to noise in the study areas:

No Measurable Impact: There would be no measurable difference between existing and future noise levels.

Adverse: Site levels would predominate noise levels of adjacent land uses; however, they would be consistent with noise level regulations and adjacent land uses.

Major Adverse: Created noise would persistently dominate and be inconsistent with the existing soundscape exceeding noise level regulations with extensive mitigation measures being needed to offset any adverse effects with success not being guaranteed.

Beneficial: Future noise levels would be decreased relative to existing levels, and a reduction in the number of sensitive receptors exposed to unacceptable noise levels and reduction in ambient sound levels would occur.

Table 3-23: Typical Construction Equipment Noise Levels (dBA at 50 feet)

Equipment Type	Without Noise Control	With Feasible Noise Control[a]
Earthmoving:		
Front Loaders	79	75
Backhoes	85	75
Dozers	80	75
Tractors	80	75
Scrapers	88	75
Graders	85	75
Truck Pavers	91	75
	89	80
Material Handling:		
Concrete Mixers	85	75
Concrete Pumps	82	75
Cranes	83	75
Derricks	88	75
Stationary:		
Pumps	76	75
Generators	78	75
Compressors	81	75
Impact:		
Pile Drivers	101	95
Jackhammers	88	75
Pneumatic Tools	86	80
Other:		
Saws	78	75
Vibrators	76	75

[a] Estimated levels obtainable by selecting quieter procedures or machines and implementing noise control features requiring no major redesign or extreme cost.

Source: USEPA (1971)

3.13 Infrastructure and Utilities

This EIS evaluates the impacts of the FBI HQ consolidation and the exchange of the JEH parcel to infrastructure and utilities as described in the following sections.

3.13.1 Data Sources

Hardcopy maps and digital data showing the locations of existing utility infrastructure were obtained from the following utility purveyors: Washington Suburban Sanitary Commission (WSSC), Washington, D.C. Water and Sewer Authority (DC WASA), Fairfax Water, Potomac Electric Power Company (PEPCO), Dominion Virginia Power, and Washington Gas. Due to information security requirements of the utility purveyors, these maps are not published in this EIS. During the preparation of the Draft EIS, meetings were held with each utility purveyor to verify the locations of existing infrastructure, confirm tie in locations, and discuss any capacity issues or anticipate improvements required to accommodate a consolidated FBI HQ at each site.

3.13.2 Study Area

The study area for impacts to infrastructure and utilities includes all land within the boundaries of the site alternatives and the JEH parcel, as well as those areas that would be affected by construction and right of way acquisition to extend adequate service to each site.

3.13.3 Methodology

Impacts for this resource area were analyzed qualitatively, using available information for the study area including meetings with utility providers. Alternative impacts have been determined based on available capacity of existing utilities, impact of the proposed development on existing utilities, and upgrades required to support the proposed development. Note that capacity of lines is based on the available excess, or available capacity as reported by the utility purveyor, and GSA makes no assertion as to the accuracy of this information. Definition of the impact categories is as follows:

No Measurable Impact: Utilities of sufficient capacity are available on the proposed site.

Adverse: The impact to the utility lines and the serviced community would be noticeable. Utilities of sufficient capacity exist but could require relocation or extension of service lines and/or upgrades to existing service lines within the area of the site. There would be increased loads on the utility, and there would likely be disruption to the serviced community during construction. Following the construction phase, service to the community would be restored to its former state.

Major Adverse: The impact to the utility lines and the serviced community would be substantial, resulting in lengthy extensions and/or upgrades to main trunk/distribution lines, treatment plants, and distribution centers. Substantial disruptions to the serviced community would occur during construction.

Beneficial: The impact to the utility lines and the serviced community would result in improvements to capacity and LOS.

3.13.4 Mitigations

Temporary short-term impacts associated with provision of utility service to a consolidated FBI HQ campus, such as noise, dust, soil erosion, and traffic disruptions may occur due to construction activities associated with connection to off-site utilities and would be minimized by ensuring that construction periods are kept to the shortest extent possible and effective traffic safety, dust control, and soil erosion and sediment control practices are implemented. Any improvements to the existing capacities of the utility services should also consider the effects of the development on local area utility customers.

Impacts to wetlands and surface water bodies associated with the installation of utilities could be mitigated through the use of directional drilling or other trenchless technologies. By confining utility extensions to the alignments of existing roadways and rights-of-way, adverse environmental impacts could be avoided. The design and construction of utility system improvements would follow applicable local and state regulations and permitting procedures. Because no adverse impacts to the provision of utility services are expected from the FBI HQ consolidation, no other mitigation measures beyond coordination and approvals from the appropriate state and local regulatory agencies would be warranted.