PENNSYLVANIA AVE-MINNESOTA AVE, S.E., INTERSECTION IMPROVEMENT PROJECT

ENVIRONMENTAL ASSESSMENT

OCTOBER 2013

ENVIRONMENTAL ASSESSMENT

FOR THE

PENNSYLVANIA AVE-MINNESOTA AVE, S.E. INTERSECTION IMPROVEMENT WASHINGTON, DC

Prepared pursuant to 42 U.S.C. 4332(2)(c) by:
U.S. Department of Transportation
Federal Highway Administration
District Department of Transportation

in cooperation with
National Park Service
National Capital Planning Commission

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for Terry Bellamy
Director
District Department of Transportation

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Joseph C. Lawson
Division Administrator
Federal Highway Administration
DC Division Office

EXECUTIVE SUMMARY

ES.1. Preface

The Federal Highway Administration (FHWA) in conjunction with the District Department of Transportation (DDOT) is proposing improvements to the Pennsylvania Avenue, SE and Minnesota Avenue, SE intersection. This action would also include the transfer of land from the National Park Service (NPS) to DDOT. The land transfer would facilitate the proposed reconfiguration of this intersection, also known as the "Twining Square" area in Southeast Washington, DC. This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) and implementing regulations, the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations (CFR) 1500-1508), the FHWA's *Environmental Impact and Related Procedures* (23 CFR 771), FHWA *Technical Advisory Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (T6640.8A), NPS *Director's Order #12: Conservation Planning, Environmental Impact Analysis, and Decision-making (DO-12)* and DDOT's *Environmental Policy and Process Manual*.

The Proposed Action includes modifications to the intersection to improve safety, mobility, and connectivity for pedestrians and motorists. A land transfer from NPS to DDOT would be necessary, pending National Capital Planning Commission (NCPC) approval, to carry out the proposed intersection improvements.

ES.2. Purpose and Need

The purpose of the Proposed Action is to provide transportation improvements to the Pennsylvania and Minnesota Avenues, SE intersection in keeping with the District of Columbia's Great Streets Initiative as set forth in the 2007 *Great Streets Framework Plan* and the 2007 *Revitalization of Pennsylvania Avenue, SE for the Great Streets Initiative Concepts Design Final Report (Great Streets Design Final Report)*. The project needs consist of the following:

- Improve pedestrian and vehicular safety;
- Create a consolidated, usable park space;
- Improve multimodal connectivity and access; and
- Support land use and community needs.

For additional information on the Great Streets Initiative principles, program goals, and applicability to the Study Area, see Section 1.3, Project Overview and *Appendix A.*

ES.3. Project Background

The Study Area is located at the western end of the Pennsylvania Avenue, SE Great Streets corridor at the intersection of Pennsylvania Avenue with Minnesota Avenue, SE, in the immediate vicinity of Twining Square, also referred to as L'Enfant Square in the *Great Streets Framework Plan*.

The Pennsylvania and Minnesota Avenues, SE intersection includes NPS property, U.S. Reservation 487 (Twining Square), which includes four small park parcels fragmented by intersecting roadways and the adjacent roadway medians, totaling approximately 1.4 acres. The roadways split the reservations into areas that effectively function as traffic islands for pedestrians while crossing the street; the pieces of parkland are too small to function as true open space or green space as currently configured. Twining Square lacks aesthetic appeal and is underutilized urban space.

As shown on Figure 1-2 in *Section 1, Purpose and Need*, the current intersection configuration is dominated by busy lanes of traffic, rendering pedestrian circulation both difficult and dangerous. The project intersection is located on a major commuter route, Pennsylvania Avenue, SE, in an urban environment, at its crossing with the local travel route of Minnesota Avenue, SE. The project intersection carries traffic to and from the bridges that cross the Anacostia River, as well as Minnesota Avenue, SE.

Proposed solutions to improve the intersection were developed as part of the *Great Streets Design Final Report*, which was developed as part of the District's Great Streets Initiative. The Great Streets Initiative was kicked off in 2005 as a multi-agency program that strategically uses public investments to improve local quality of life and attract private investments to communities. Several corridors were chosen to be a part of the Great Streets Initiative, including Pennsylvania Avenue, SE.

The program goals of the Great Streets Initiative are as follows:

1. Improve the quality of life in neighborhoods along the corridors, including public safety, physical appearance and personal opportunity;
2. Support local demand for goods and services through economic development;
3. Expand mobility choices and improve safety and efficiency of all modes of travel; and
4. Attract private investment through the demonstration of a public commitment to Great Street communities.

Three viable options, developed as part of a four-day design charrette held in July 2006 were developed to a concept level: (1) Modified Traffic Square Alternative, (2) Ellipse Alternative, and (3) Conventional Intersection Alternative. Traffic analysis was performed, and urban design concepts were developed and applied. The Modified Traffic Square Alternative was selected as the preferred alternative in the *Great Streets Framework Plan* because of its conformance with the Great Street Initiative goals.

ES.4. Alternatives

Multiple alternatives for the Pennsylvania and Minnesota Avenues, SE intersection were developed in accordance with the project objectives established to meet the project purpose and need. Three alternatives, including the No Build Alternative, are analyzed in detail in this EA.

i. No Build Alternative

Under the No Build Alternative, there would be no improvements to the project intersection and no land jurisdiction transfer from NPS to DDOT would occur. The intersection would continue to function as it does today. Existing traffic patterns, crosswalks, signalization, and sidewalks would remain unimproved.

While the No Build Alternative does not meet the purpose and need of the Proposed Action, it provides a basis for comparing the environmental consequences of the Build Alternatives.

ii. Proposed Action

The Proposed Action is to provide improvements to the Pennsylvania and Minnesota Avenues, SE intersection that includes a potential land transfer from NPS to DDOT. The land transfer would facilitate reconfiguration of the intersection to improve safety, mobility, and connectivity for pedestrians and motorists at the intersection in keeping with the District of Columbia's Great Streets Initiative. No private right-of-way would be impacted or acquired by the Proposed Action.

Build Alternative 1 – Revised Square Alternative

Under Build Alternative 1, the intersection would be improved to create a "traffic square" concept, which would require all vehicles, with the exception of through-movements on Pennsylvania Avenue, SE, to go around the expanded central park area. Build Alternative 1 would require a jurisdictional land transfer from NPS to DDOT of approximately 1.4 acres to enable the proposed modifications to the intersection and consolidate the green space. Build Alternative 1 would provide more contiguous park area for residents and visitors to the area to use and enjoy. The northern park area would total approximately one acre and the southern park area would total approximately 0.5 acres of contiguous park area.

Build Alternative 1 improves the roadway alignment and configuration to promote traffic-calming thereby improving safety for pedestrians and vehicles at the intersection. Under this alternative, the traffic signal configuration is simplified and the left-turning conflicts are removed. Pennsylvania Avenue, SE would bisect the center of the square, and turning movements would be directed around the perimeter of the "square." This perimeter route acts to calm the traffic, similar to how a traffic circle works by allowing vehicles to enter and exit the square at locations identified by the intersecting streets. It would also reduce vehicular speeds by providing short, straight distances between tight radius turns, at the presumed four corners of the square.

Build Alternative 1 would reduce the interaction between pedestrians and vehicles, and would also improve the functionality of existing and new crosswalk facilities. The crosswalk alignments and refuge areas for pedestrians would be significantly enhanced; sidewalks and green space would be improved and green space frontage would be provided for local residences and businesses.

Build Alternative 1 would meet the purpose and need for the Proposed Action in promoting the principles set forth in the District's Great Streets Initiative. Build Alternative 1 would improve pedestrian and vehicular safety, create a usable park space, improve multimodal connectivity and access, and support land use and community needs.

Build Alternative 2 – Conventional Intersection Alternative

Under Build Alternative 2, the intersection would be redesigned into a typical at-grade intersection with all vehicle turning movements permitted for all approaches, with the exception of 25th Street, which would remain a one-way street going southbound. Build Alternative 2 would require a jurisdictional land transfer from NPS to DDOT of approximately 1.4 acres to enable the proposed modifications to the intersection and consolidate the green space. Build Alternative 2 would consolidate the two park parcels to the north of Pennsylvania Avenue and the two park parcels to the south of Pennsylvania in order to provide more contiguous park area for residents and visitors to use as green space. The northern park area would total approximately one acre and the southern park area would total approximately 0.4 acres of contiguous park area.

The Build Alternative 2 design would improve the existing split roadway system that currently contains two complex intersections by reducing multiple traffic movements into one signalized intersection. This alternative would provide for left-turn movements in all directions and increase the left-turn bay storage length for vehicles.

Build Alternative 2 has two options for the movement of one-way traffic to the north and west of the "square" on L'Enfant Square, SE. Either one-way movement would work operationally as follows:

> Option 1) Traffic flows one-way to the west and south on L'Enfant Square SE. Commuter traffic could continue to cut-through the "square" to avoid the Pennsylvania/Minnesota Avenues, SE intersection and the right-turning vehicle/pedestrian conflict to the west of the square would remain; or
>
> Option 2) Traffic flows one-way to the north and east on this roadway. Cut-through traffic would be minimized and the vehicle/pedestrian conflict would be reduced.

Build Alternative 2 would improve vehicle operations and reduce confusion at the complex intersection compared to the No Build Alternative. Because this alternative maintains the intersection as a typical intersection, the focus remains on moving vehicles through the intersection to their destinations. After careful consideration, the lead agencies decided to carry Build Alternative 2 forward in this EA.

ES.5. Construction and Staging

Construction staging areas would be selected to protect environmental resources, to meet the needs of the contractor based on the construction phasing plans, and to minimize disruptions and safety hazards for pedestrians, bicyclists and motorists who utilize the intersection. Appropriate advance notification of construction and construction phasing to ensure the safest and most logical detours around the road and sidewalk segments under construction would occur. Scheduling of construction would be conducted with adherence to Title 20 of the District of Columbia Code of Municipal Regulations (DCMR). It is estimated that construction would take approximately 18 to 24 months.

Adequate construction techniques, including use of BMPs and LID strategies, would be adhered to so as to minimize the potential for impacts to the surrounding environment. Construction impacts are discussed within the appropriate environmental categories in *Section 4, Environmental Consequences.*

ES.6. Cumulative Impacts

Cumulative effects would result from the Build Alternative impacts to Road Network and Traffic and Archaeological Resources.

From a regional context, the incremental impact on the roadway network and traffic due to the Build Alternatives would be negligible given the inevitable increase in traffic volume and congestion in the Study Area due to natural factors such as population growth and migration into the District and nearby suburbs. Additionally, with plans to implement Phase 3 of the D.C. Streetcar project through the Study Area (likely by 2030), the increased availability of public transit options may help lessen future traffic congestion in the Study Area. As a result, the Build Alternatives, when added to other past, present and foreseeable actions would have a negligible cumulative effect on the road network and traffic.

The incremental impact to archaeological resources is small given that the area where the potential to recover historic or prehistoric archaeological resources exists is limited to the southern reservation (approximately 0.06 acres) of the Study Area. Phase IB/II testing of this small area is recommended prior to final design decisions and construction of either of the Build Alternatives. Due to the small area recommended for further testing and provided that the conditions stated in the *Section 106 Review Form* for archaeology are followed (see *Appendix E)*, the cumulative effect on archaeological resources due to past, present or future projects, is expected to be negligible.

The impacts of the Build Alternatives, when added to other past, present and future projects outlined in this EA, would result in a net benefit to vegetation, future land use, zoning, economics and development, aesthetic and visual quality, health and safety, parks and recreation areas, and the bicycle and transportation network.

The Build Alternatives would have no long-term cumulative impacts to geology, soils and topography, farmland, ground water, surface water, floodplains, water quality, wetlands, navigable waters, wild and scenic rivers, coastal zone, aquatic or terrestrial organisms, wildlife, historic structures, cultural landscapes, paleontology, zoning, demographics, environmental justice, joint development, emergency services, schools, utilities and infrastructure, Indian Trust resources, Sacred Sites and ethnographic resources, transit, air quality, noise, hazardous waste and materials, and energy conservation.

ES.7. Summary of Impacts

A comparison of impacts associated with the alternatives evaluated in this EA is summarized in **Table ES.1**.

Table ES.1
Summary of Impacts

Resource	No Build Alternative	Build Alternative 1	Build Alternative 2
Natural Resources			
Geology and Topography	No impact.	No impact; minor grading on already disturbed topography	
Soils	No impact.	Minor short-term adverse impacts from soil erosion during construction. Negligible long-term impacts.	
Farmland	No impact; no prime farmland soils within Study Area.	No impact; no prime farmland soils within Study Area.	
Ground Water	No impact to groundwater volume or quality.	Negligible short-term and long-term impacts; minimal net increase of pervious surface.	Negligible short-term and long-term impacts; minimal net decrease of pervious surface.
Surface Water	No impact.	No impact; no surface waters within Study Area.	
Floodplains	No impact; Study Area is not located within a floodplain.	No impact; Study Area is not located within a floodplain.	
Water Quality	No impact.	Minor short-term adverse impacts during construction due to potential release of sediments into stormwater runoff from soil disturbance. Negligible long-term impacts due to minimal net change in impervious surface area and distance to Anacostia River.	
Wetlands	No impact; no wetlands identified within project study area.	No impact; no wetlands identified within Study Area.	
Navigable Waters	No impact; no navigable waters present in project study area.	No impact; no navigable waters within Study Area (indirect impacts addressed under Water Quality).	
Wild and Scenic Rivers	No impact; no Wild and Scenic Rivers within project study area.	No impact; no Wild and Scenic Rivers within Study Area.	
Coastal Zone	No impact. The District does not have a designated Coastal Zone.	No impact; the District does not have a designated Coastal Zone.	
Aquatic Organisms	No impact.	No impact; no aquatic habitat within Study Area (indirect impacts addressed under Water Quality).	
Wildlife	No impact.	Negligible short-term impacts; impacts would be of short duration and well within natural fluctuations. Negligible long-term impacts due to the location of the site being entirely within previously disturbed and maintained landscapes.	
Rare, Threatened and Endangered Species	No impact.	No impact; no threatened or endangered species in Study Area.	
Vegetation	No impact.	Minor short-term adverse impacts during construction due to earth disturbance and potential impacts to several trees to accommodate design changes. Minor long-term benefit due to enhanced landscape and additional grass and tree cover.	
Cultural Resources			
Historic Structures	No impact.	Conditional No Adverse Effect.	Conditional No Adverse Effect.

Table ES.1
Summary of Impacts

Resource	No Build Alternative	Build Alternative 1	Build Alternative 2
Cultural Landscapes	No impact.	Any indirect effects, such as visual impacts to the landscape due to construction would be short-term and negligible with the use of BMPs. Long-term indirect effects would be negligible.	
Archaeology	No impact.	Conditional No Adverse Effect. Phase IB/II archaeological testing of an area in the southern reservation of intersection needed prior to final design and construction where an intact historic surface was identified during geoarchaeological survey.	
Paleontology	No impact.	No impact; no known paleontological resources exist in Study Area.	
Socioeconomic Resources			
Land Use	No impact.	Negligible short-term impacts may result from road closures during construction. Minor indirect long-term benefits to future land use.	Negligible short-term impacts may result from road closures during construction. Negligible long-term impacts.
Zoning	No impact.	No short-term impacts to zoning. Minor indirect long-term benefits to future zoning.	No short-term impacts to zoning. Negligible long-term impacts to future zoning.
Demographics	No impact.	Minor short-term adverse impacts due to road closures during construction. Minor long-term beneficial impacts due to enhanced safety for residents in the Study Area.	Minor short-term adverse impacts due to road closures during construction. Negligible long-term impacts.
Environmental Justice	No impact.	Negligible short-term and long-term impacts.	
Economics and Development	Minor negative indirect impact in long-term due to missed revitalization opportunity.	Minor short-term adverse impacts to residents and businesses due to temporary road closures. Indirect minor long-term beneficial impacts.	Minor short-term adverse impacts to residents and businesses due to temporary road closures. Negligible long-term impacts.
Joint Development	No impact.	No impact.	
Aesthetics and Visual Quality	No impact.	Minor short-term adverse visual impacts during construction. Long-term minor benefit to visual quality with more contiguous park area/ green space and new roadway infrastructure.	
Healthy and Safety	No direct impact. Long-term indirect impact due to existing safety issues remaining unresolved.	Negligible short-term impact while becoming familiar with new traffic patterns. Minor long-term benefits to vehicle and pedestrian safety at the intersection.	Negligible short-term impact while becoming familiar with new traffic patterns. Negligible long-term impact due to unresolved pedestrian safety issues.

Table ES.1
Summary of Impacts

Resource	No Build Alternative	Build Alternative 1	Build Alternative 2
Community Resources	No impact.	Minor short-term adverse impacts due to maintenance of traffic, temporary lane closures during construction. Indirect long-term benefit to students, school faculty, or those attending places of worship who may utilize the intersection due to improved safety for vehicles and pedestrians.	
Emergency Services	No impact.	Minor short-term adverse impacts due to maintenance of traffic, temporary lane closures during construction. Negligible impact in the long term.	
Parks and Recreation Areas	No direct impact. Minor long-term indirect impact as park area would remain fragmented and unusable as park or recreation area.	Minor short-term adverse impacts during construction. Long-term minor benefit due to providing more contiguous parkland to be used for passive recreational activity.	
Utilities and Infrastructure	No impact.	Minor short-term adverse impacts to utilities if it is determined that they must be relocated due to construction. Consultation with utility companies and more detailed survey needed as design development advances. Negligible impact in the long term after project implementation.	
Indian Trust Resources	No impact.	No impact; no known Indian Trust Resources exist in Study Area.	
Sacred Sites and Ethnographic Resources	No impact.	No impact; no known Sacred Sites and Ethnographic Resources exist in Study Area.	
Transportation			
Bicycle and Pedestrian Network	No impact.	Minor short-term adverse impacts due to temporary detours during construction. Moderate long-term beneficial impacts to local users and commuters through the area.	Minor short-term adverse impacts due to temporary detours during construction. Minor long-term beneficial impacts to local users and commuters through the area.
Roadway Network and Traffic	No short-term impact. Minor long-term adverse impacts; conditions expected to worsen due to anticipated increase in traffic volume by 2040.	Minor short-term adverse impacts due to temporary closures during construction; detours and maintenance of traffic will be provided. Minor adverse impacts in the long term due to increased queue lengths and travel time in 2040.	
Transit	No impact.	Minor short-term adverse impacts to WMATA bus service during construction and familiarization with new routes and bus stops. Long-term impacts would be negligible.	
Air Quality	No impact.	Short-term adverse impacts to air quality due to construction would be temporary and localized; BMPs will be used. Build Alternatives would not contribute to any violation of the NAAQS and meets the project level CO conformity requirements of 40 CFR 94.	

Table ES.1
Summary of Impacts

Resource	No Build Alternative	Build Alternative 1	Build Alternative 2
Noise	No short-term impacts. In the long term, due to the projected increase in traffic volume at this intersection, noise levels will increase by 2040 under the No Build Alternative.	Minor short-term adverse impacts during construction. 2040 design year build PM peak hour traffic would raise noise levels 0.2 to 3.1 dB. The same residences, park and daycare that would be exposed to noise levels that approach or exceed the NAC with the No Build, would also approach or exceed the NAC with either build alternative. It has been determined that noise mitigation is not feasible for this project.	
Hazardous Waste and Materials	No impact.	No impact.	
Energy Conservation	No impact.	No impact. Energy conserved through use of LID principles at project site.	
Cost	--	**$10,971,254**	**$9,009,853**

Source: HNTB Corporation, 2013.

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ACRONYMS AND ABBREVIATIONS

ACHP	American Council on Historic Preservation
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
ADT	Average Daily Traffic
ANC	Advisory Neighborhood Commission
APE	Area of Potential Effect
AWI	Anacostia Waterfront Initiative
BMP	Best Management Practices
CAA	Clean Air Act of 1970
CAAA	1990 Clean Air Act Amendments
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFA	Commission of Fine Arts
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CT	U.S. Census Bureau Census Tract
dBA	A-Weighted Sound Level-Decibels
DCMR	District of Columbia Code of Municipal Regulations
DC OP	DC Office of Planning
DC SHPO	DC State Historic Preservation Office
DDOE	District Department of the Environment
DDOT	District Department of Transportation
The District	District of Columbia
DMPED	Office of the Deputy Mayor of Economic Development
DO	Director's Order
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act of 1973

FEMA	Flood Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
FONSI	Finding of No Significant Impact
FWS	U.S. Fish and Wildlife Service
IPaC	Information, Planning, and Conservation System
LID	Low-Impact-Design
LOS	Level of Service
LRP	Long-Range Plan
LWCF	Land and Water Conservation Fund
MAC Study	*Middle Anacostia River Crossings Transportation Study (2005)*
MPO	Metropolitan Planning Organization
msl	Mean sea level
MWCOG	Metropolitan Washington Council of Governments
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NCPC	National Capital Planning Commission
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
PEPCO	Potomac Electric Power Company
PM_{10}	particulate matter less than or equal to 10 microns
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns
PMP	District of Columbia Pedestrian Master Plan
RCRA	Resource Conservation and Recovery Act
SE	Southeast

SIP	State Implementation Plan
TIP	Transportation Improvement Program
TMDL	Total Maximum Daily Loads
TNM	Traffic Noise Model®
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USGS	U.S. Geological Survey
WIP	Watershed Implementation Plan
WMATA	Washington Metropolitan Area Transit Authority

1.0 PURPOSE AND NEED

The Federal Highway Administration (FHWA) in conjunction with the District Department of Transportation (DDOT) are proposing improvements to the Pennsylvania Avenue and Minnesota Avenue Southeast (SE) intersection that would include the transfer of land jurisdiction from National Park Service (NPS) to DDOT. The land transfer would facilitate the proposed reconfiguration of this intersection, also known as the "Twining Square" area in Southeast Washington, DC. This Environmental Assessment (EA) is being prepared by DDOT and the FHWA, in cooperation with the NPS, to fulfill the requirements of the National Environmental Policy Act of 1969 (NEPA). Specifically, this EA covers the proposed improvements to the intersection as initially identified by the District of Columbia's Great Streets Initiative for improvements to Pennsylvania Avenue, SE as set forth in the 2007 *Great Streets Framework Plan* and the 2007 *Revitalization of Pennsylvania Avenue, SE for the Great Streets Initiative Concepts Design Final Report (Great Streets Design Final Report)*. This EA examines the potential impacts of the Proposed Action to this intersection and the surrounding environs.

This EA has been prepared in accordance with NEPA and implementing regulations, the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508), the FHWA's *Environmental Impact and Related Procedures* (23 CFR 771), FHWA *Technical Advisory Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (T6640.8A), NPS *Director's Order #12: Conservation Planning, Environmental Impact Analysis, and Decision-making (DO-12)* and the *DO-12 Handbook* , and DDOT's *Environmental Policy and Process Manual*. If it is determined that there are no significant impacts to resources within the Study Area and an Environmental Impact Statement (EIS) would not be required, decision documents would be prepared by both the FHWA and the NPS that summarize the findings of the EA and provides a concise rationale on how each agency made their final decision.

As shown in **Figure 1-1**, the proposed project is located at the western end of the Pennsylvania Avenue, SE Great Streets corridor at the intersection of Pennsylvania Avenue, SE and Minnesota Avenue, SE, in the immediate vicinity of Twining Square, also referred to as L'Enfant Square in DDOT's *Great Streets Framework Plan and Great Streets Design Final Report* (2007) for Pennsylvania Avenue, SE. As illustrated in **Figure 1-2,** the Study Area is a complex and congested intersection and actually consists of two separate signalized intersections that are separated by approximately 250 feet. The project intersection carries traffic to and from the bridges that cross the Anacostia River, as well as Minnesota Avenue, SE. The Proposed Action includes modifications to the intersection to improve safety, mobility, and connectivity for pedestrians and motorists. A land exchange between NPS and DDOT would be necessary, pending National Capital Planning Commission (NCPC) approval, to carry out the proposed intersection improvements. Proposed improvements would not impact any private right-of-way.

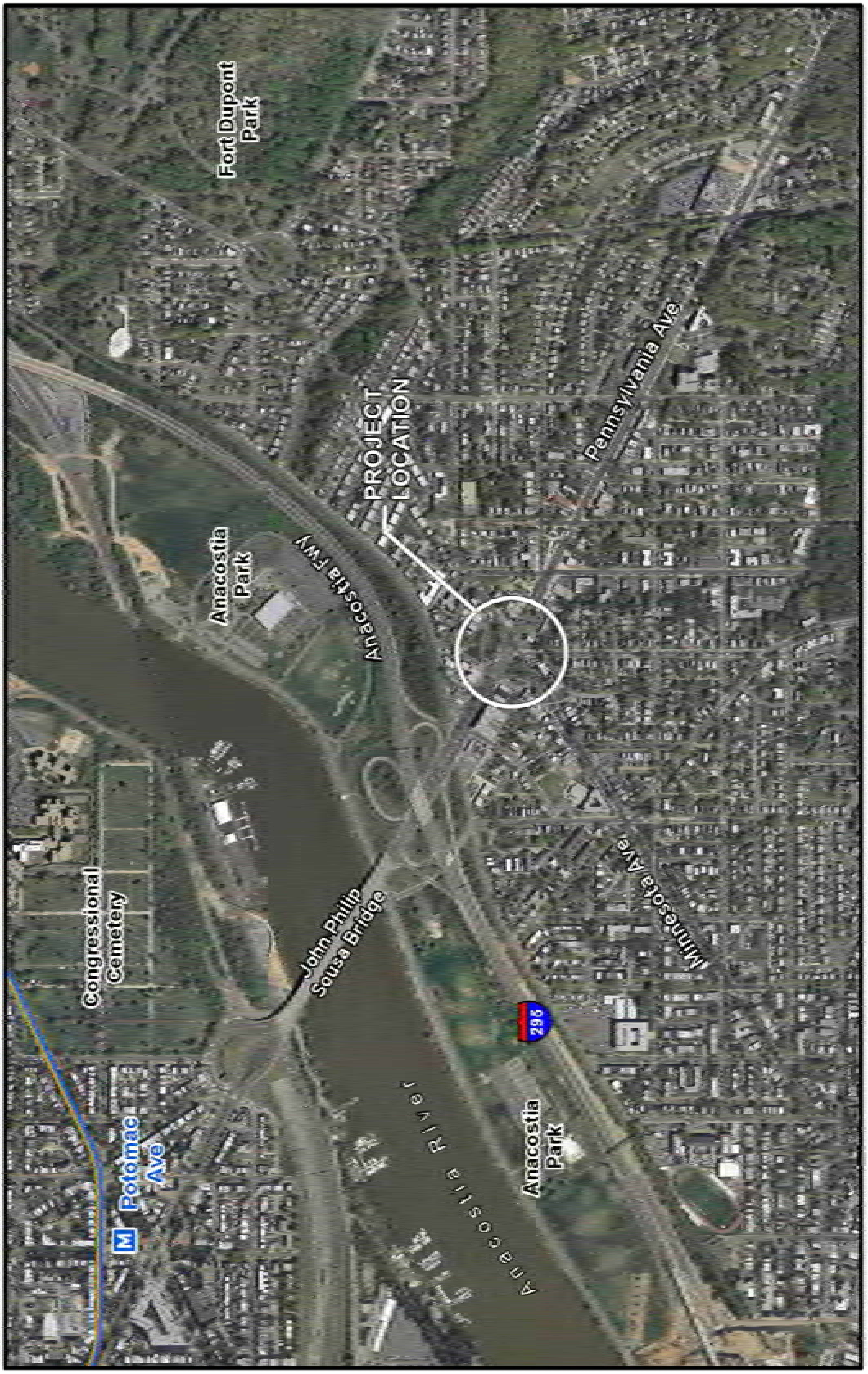


Figure 1-1
Project Location
Environmental Assessment

Prepared by: HNTB Corporation, 2013

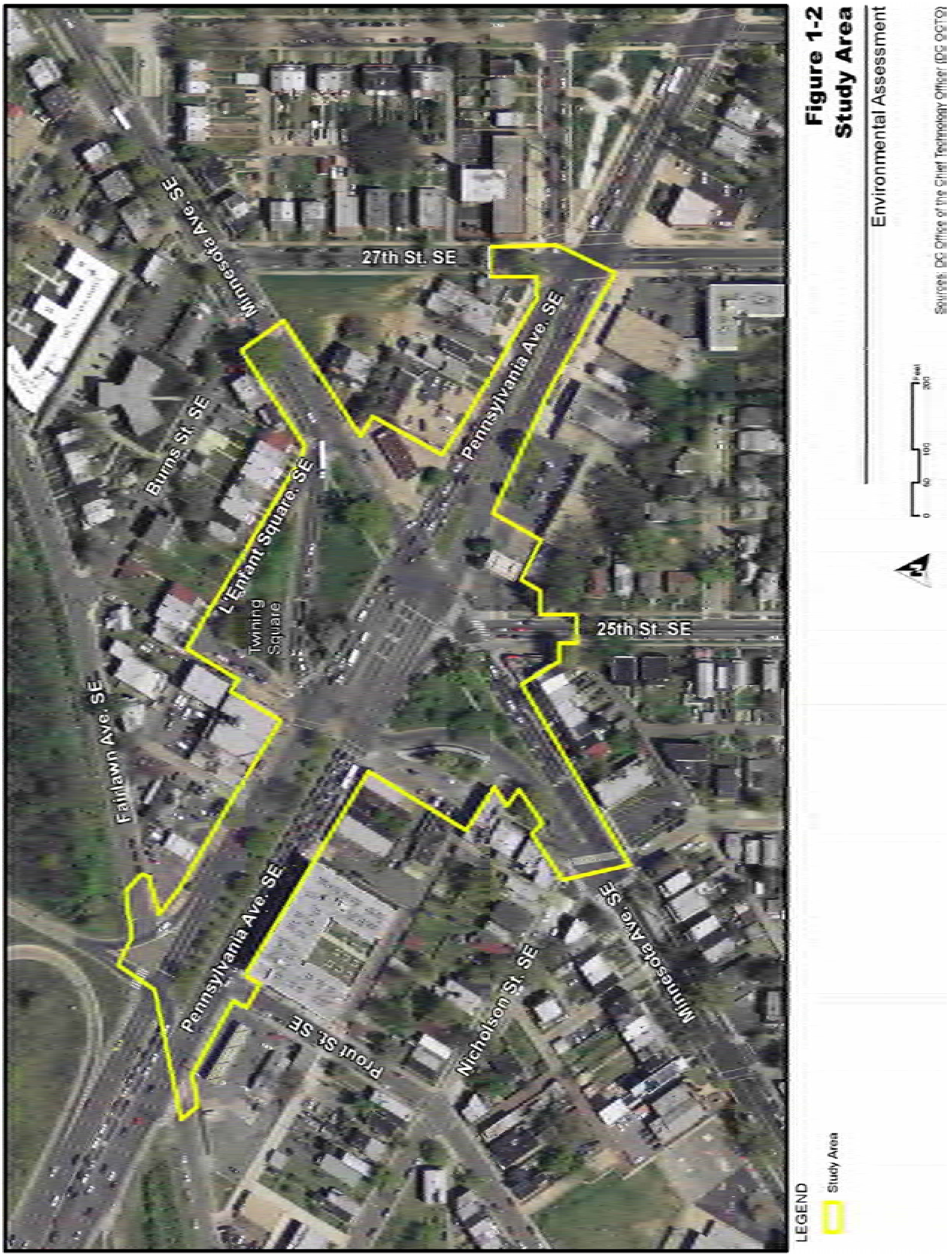


Figure 1-2
Study Area
Environmental Assessment

1.1 Purpose of the Proposed Action

The purpose of the Proposed Action is to provide transportation improvements to the Pennsylvania and Minnesota Avenues, SE intersection in keeping with the District of Columbia's Great Streets Initiative as set forth in the 2007 *Great Streets Framework Plan* and the 2007 *Revitalization of Pennsylvania Avenue, SE for the Great Streets Initiative Concepts Design Final Report (Great Streets Design Final Report).*

For additional information on the Great Streets Initiative principles, program goals, and applicability to the Study Area, see *Section 1.3, Project Overview* and ***Appendix A, Great Streets Design Final Report***.

1.2 Needs for the Proposed Action

The need for the Proposed Action consists of the following:

- Improve pedestrian and vehicular safety;
- Create a consolidated, usable park space;
- Improve multimodal connectivity and access; and
- Support land use and community needs.

1.2.1 Improve Pedestrian and Vehicular Safety

The primary need for the Proposed Action is to improve safety for pedestrians and motorists using this intersection. The Pennsylvania and Minnesota Avenues/25th Street, SE intersection is a complex and congested intersection, which makes it difficult and dangerous to navigate for vehicles and pedestrians. The Study Area intersection consists of two separate signalized intersections that are separated by approximately 250 feet. The western intersection is Pennsylvania Avenue, SE and southbound Minnesota Avenue, SE and the eastern intersection is Pennsylvania Avenue, SE and northbound Minnesota Avenue/25th Street, SE. The intersections have a large number of pedestrian and vehicle "conflict points" under the existing configuration and there is not adequate vehicle storage space to accommodate the eastbound left turns. Compounding the safety issues at this intersection is the fact that motorists cut through the neighborhood streets in the communities surrounding this intersection in order to bypass the traffic congestion.

Vehicular Safety

The Pennsylvania and Minnesota Avenues, SE intersection has a high volume of accidents and injuries, as shown in **Table 1.1**, with a total of 123 reported crashes and 60 reported injuries during the most recent 3-year reporting period (2009-2011). As shown in **Table 1.2**, the majority of accidents (36%) occurred in the evening and overnight hours, between 6:30 PM and 7:30 AM, followed by the morning rush hour between 7:30 AM and 9:30 AM, which made up 18% of accidents. Seventy-six percent (76%) of accidents involved passenger cars while 11% involved trucks and 8% involved buses.[1]

Table 1.1

Accidents and Injuries -
Pennsylvania Ave. and Minnesota Ave, SE.

	2009	2010	2011
Accidents	38	39	46
Injuries	18	15	27

Source: DDOT Accident Summary Report, 2009-2011.

Table 1.2

Accidents Time of Day -
Pennsylvania Ave. and Minnesota Ave, SE.

Time of Day	Accident	Percent
07:30 – 09:30	22	17.9%
09:30 – 11:30	10	8.1%
11:30 – 13:30	12	9.8%
13:30 – 16:00	19	15.4%
16:00 – 18:30	16	13.0%
18:30 – 07:30	44	35.8%

Source: DDOT Accident Summary Report, 2009-2011.

Along Pennsylvania Avenue, SE, crash data collected between 2009 and 2011 indicate that side swipes (31%), right-angle (20%), and rear-end collisions (18%) are the prevalent accident types.[2] As indicated from the accident summaries, the number of accidents can largely be attributed to the congestion of the roadway in the weekday-evening hours. In addition, the rear-end accidents are also a result of stop-and-go conditions. The side-swipe accidents can be attributed to vehicles changing lanes and aggressive driving, while the right-angle accidents largely occur due to congestion and frustration resulting in motorists taking chances to clear the intersection.[3]

Existing intersection geometries and signal phasing are factors contributing to crash occurrences at the intersection. Congested conditions during peak periods and excessively high vehicle speeds during off-peak periods are also contributing factors.[4] Additionally, problems at the intersection are exacerbated by the lack of an interchange movement for motorists traveling from the Anacostia Freeway (I-295) southbound to Pennsylvania Avenue, SE westbound. This causes motorists to make frequent illegal traffic movements at this intersection. In order to reach Pennsylvania Avenue, SE westbound, motorists make illegal U-turns, or make a left turn on Minnesota Avenue, SE northbound followed by a left turn onto Minnesota Avenue southbound.[5]

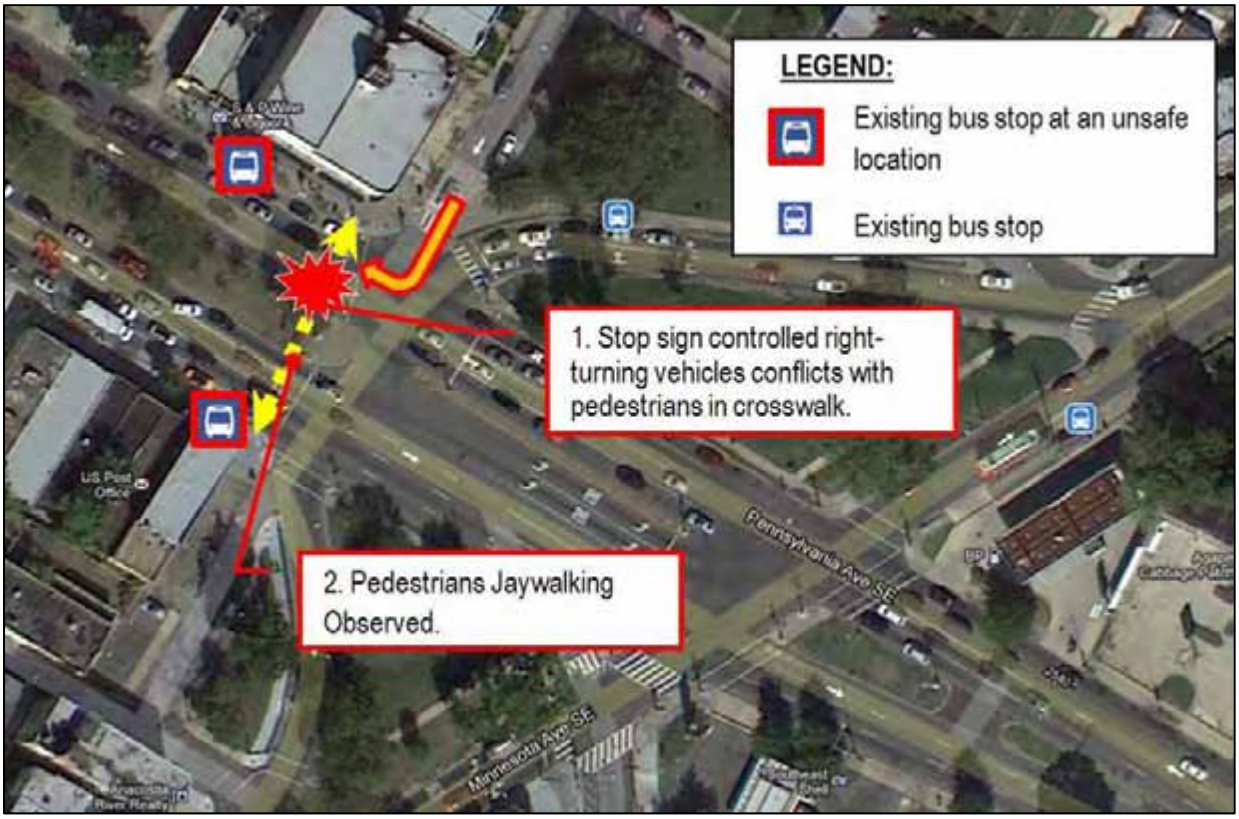
Pedestrian Safety

The intersection is heavily used by pedestrians commuting to and from work or using the bus stops at the intersection. During mid-week field observations January 8th through 10th, 2013, over 150 pedestrians were observed crossing Pennsylvania Avenue, SE. Pedestrians were observed using the west side crosswalk alone to access two heavily used bus stops on Pennsylvania Avenue, SE just west of Twining

Square during both the AM and PM peak hours. Many of the existing crosswalks at the intersection are inconvenient to use due to their locations and long crossing lengths. This discourages pedestrian use, and instead of using the signalized crosswalks provided, pedestrians crossing to and from bus stops and commercial properties choose an unmarked, but more direct route across the medians and lanes of traffic.

Additionally, although an Exclusive Pedestrian Walk Phase is provided in the signal timing to stop all vehicles and only allow pedestrians to cross Pennsylvania Avenue, SE, the vehicles from the unsignalized local driveway still attempt to make abrupt right turns between gaps of pedestrians. Pedestrians frequently jaywalk at this intersection and cross Pennsylvania Avenue, SE without waiting for a Walk indication in order to get to bus stops across the street. A review of the police crash records indicated that five pedestrians were injured at this intersection in the past three years (2010 to 2012); however during field observations during a one-hour AM peak period in March of 2013, three minor pedestrian/vehicle incidents were observed and dismissed without being reporting to the police. See **Figure 1-3** for two of the major safety concerns involving pedestrians at the intersection.

Figure 1-3
Existing Safety Concerns for Pedestrians



Source: Google Maps (background aerial), 2013 and HNTB, 2013.

The District has seen an increasing trend in pedestrian-related crashes in recent years. On average, more than 670 pedestrian injuries occurred annually between 2000 and 2006 in the District. The existing intersection does not conform to the *District of Columbia Pedestrian Master Plan (PMP)* vision and goals for Washington, DC, which states, "Washington, DC will be a city where any trip can be taken on foot safely and comfortably, and where roadways equally serve pedestrians, bicyclists, transit users and

motorists." The primary goals for the PMP include (1) reducing the number of pedestrians killed and injured in crashes with motor vehicles; and (2) to increase pedestrian activity by making walking a comfortable and accessible mode of travel throughout all parts of the District.[6]

The highest pedestrian accident locations along Pennsylvania Avenue, SE were evaluated for the *Great Streets Framework Plan* in 2007. 2002-2004 data showed that the highest number of pedestrian accidents (42 per year) occurred at the Pennsylvania and Minnesota Avenues, SE intersection, whereas other intersections averaged less than 16 pedestrian accidents per year.[7] The same study determined that the highest concentration of people walking to the bus (over 1,500 per day) were in the blocks immediately adjacent to Minnesota Avenue, SE. Additionally, westbound bus pull-offs at Twining Square create considerable blockage of the travel lanes that lead to dangerous motorist and pedestrian movements.[8] Between 2010 and 2012, the subject intersection ranked #45 out of 1,453 intersections with reported pedestrian/bicycle accidents in the District. (See **Table 1.3**).

Table 1.3
Pennsylvania and Minnesota Avenues, SE Intersection Statistics, 2010-2012

	Number
Total # of Intersections with Accidents Reported	1,453
Pennsylvania/Minnesota Ave, SE Intersection Ranking	**#45**
Number of Pedestrian/Cyclist Accidents	4
Number of Pedestrians Injured	5
Number of Cyclists Injured	--

Source: DDOT Correspondence, 2013.

This improvement coincides with Guiding Principle #3 of the Great Streets Program, to "Move – Create a sustainable transportation network, with many travel options." The goal further defines the challenge to "Change the existing 'corridors' function from major vehicular arterials into streets that sustain healthy pedestrian and transit based activities..."[9]

1.2.2 Create a Consolidated, Usable Open Space

Currently, Twining Square (also referred to as L'Enfant Square in the *Great Streets Framework Plan*) is under the jurisdiction of the NPS. The park is fragmented by turn lanes and overburdened bus stops, rendering pedestrian circulation and use both difficult and dangerous. Roadways split the park space into traffic islands or pedestrian refuge areas, and available "green space" is disconnected between busy lanes of traffic. **Figure 1-4** provides an illustration of the project intersection with associated acreages of each of the NPS reservations in Twining Square that would be transferred to DDOT under the Proposed Action. The reservations consist of (clock-wise from top left): 0.27 acres, 0.49 acres, 0.34 acre and 0.06 acres of grassed area, totaling approximately 1.2 acres of park. Additionally, the roadway medians to the east and west of the intersection (Lot Numbers 0809, 0810 and 0816) total approximately 0.2 acres. These medians would also transfer to DDOT to accommodate the proposed design improvements.

Figure 1-4
Approximate Park Area Acreage
Environmental Assessment

Given the availability of these fragments of green space at the intersection, the opportunity to consolidate the green space in the vicinity of the intersection is needed in order to make this land usable to the community. According to the *Great Streets Concept Design Report*, improvements that would consolidate the parkland in this intersection present great potential to create a "village green."[10]

In order to meet Great Streets Program goals along Pennsylvania Avenues, SE, proposed improvements at this intersection would integrate the park resources that exist today and would create *valuable* open space for the community that does not exist there today. This coincides with Guiding Principle #2 of the Great Streets Program, to "Refresh – Integrate and conserve natural resources, and create valuable open spaces."

1.2.3 Improve Multimodal Connectivity and Access

The street geometry and topography in this area make multimodal connectivity to and through Pennsylvania Avenue, SE difficult. The intersection is heavily used by buses. There are five bus stops that utilize this intersection, and there are twelve bus routes (32, 34, 36, 39, A11, B2, J13, K11, M6, V7, V8 and V9) using Pennsylvania Avenue, SE, five routes (B2, U2, V7, V8 and V9) on Minnesota Avenue, SE, and two (32 and 34) on 25th Street, SE. The nearest Metro train station, Potomac Avenue Station, is located one mile away to the west of the Study Area.

Access to bus stops at the subject intersection is difficult and dangerous for many pedestrians and bicyclists. The amount of transfers at the intersection leads to pedestrians and bicyclists traversing the intersection by the quickest route possible, often without attention to crosswalks or adherence to walk signals. Currently, the U2 route provides north-south service through the intersection. This service, however, operates at a low frequency. Transit users can effectively make the same trips as the U2 by transferring to and from the B2 route and the V7, V8 andV9 routes. Service is more frequent on these routes than the U2 so transit riders are more attracted to transferring than using the U2. It was noted in field observations that frequent transfers occur between the B2 route and V7, V8, V9 route. Bus stops for these routes are located on opposite sides of Pennsylvania Avenue, SE. Improvements are needed at the intersection to accommodate transit users' needs and to increase their ability to reach their destinations safely and easily.

Although sidewalks and crosswalks are present on both sides of Pennsylvania Avenue, SE near Minnesota Avenue, SE, bicyclists prefer to ride on the sidewalks rather than the roadway due to heavy vehicular traffic. The *District of Columbia Bicycle Master Plan* determined the roadways at the Study Area intersection to have a Bicycle Level of Service (LOS) E along Pennsylvania Avenue, SE and LOS D on Minnesota Avenue, SE and 25th Street, SE within the Study Area. The Plan also recommended Multi-Use Trail or Multi-Use Trail Connection and a Signed Bicycle Route on Pennsylvania Avenue at this intersection.[11] Shared-use pathways (multi-use trails) provide a high quality walking and bicycling experience in an environment that provides separation from traffic. The Plan also identifies Twining Square (referred to as L'Enfant Square in the Study/Pennsylvania and Minnesota Avenues, SE) as one of five key intersections in the District with complicated traffic patterns that need improved bicycle access.[12] The Study Area does not have any bicycle lanes and is not a signed bicycle route. The Pennsylvania and Minnesota Avenues, SE intersection is along the proposed route planned for Phase 3 of the D.C. Streetcar. The Study Area is along the Streetcar Line proposed to run along Minnesota Avenue from around Bolling Air Force Base (AFB) to the Benning Road area.[13] D.C. Streetcar in this area would connect

neighborhoods to Minnesota Avenue/Benning Road, Twining Square, and Historic Anacostia commercial nodes. It would also connect to the Anacostia Waterfront Initiative (AWI) redevelopment areas and connect economically distressed neighborhoods not well served by Metro to the Minnesota Avenue Metro Station. Long range planning is ongoing for D.C. Streetcar with a broad, 30-year vision for the completion of the entire system. Needed improvements proposed in this EA to increase and improve connectivity and access for transit users and commuters would work in tandem with the D.C. Streetcar to further promote mobility for all modes of transportation and particularly for transit users and commuters. When combined with the D.C. Streetcar, improvements at this intersection would offer connections to and through the Study Area for a large number of transit users and commuters.

In order to meet Great Streets Program goals along Pennsylvania Avenue, SE, proposed improvements at this intersection would create opportunities to enhance connectivity along Pennsylvania Avenue, SE to other parts of the District and Maryland, along with greater access for pedestrians and transit users. This improvement also coincides with Guiding Principle #3 of the Great Streets Program, to "Move – Create a sustainable transportation network, with many travel options."

1.2.4 Support Land Use and Community Needs

Land use at the Pennsylvania-Minnesota Avenue, SE intersection is dominated by commercial land use and zoning with areas of low- and medium-density residential. The commercial establishments are automobile-oriented in nature with large building setbacks and no continuous building line. There are underutilized and vacant properties that contribute to the lack of aesthetic appeal and visual quality. Two gas stations dominate the northeast and southeast corners of the intersection; other commercial establishments provide a limited amount of retail goods and services. The primary function of the intersection as it exists today is to serve the significant volumes of traffic traveling through the corridor to and from employment cores to the northwest.

This intersection was identified in the *Great Streets Framework Plan* as one of the intersections having the greatest interaction between households and employment.[14] Given this balance and the existing assets at the intersection, there is great potential to redevelop the area with higher-quality, neighborhood-serving retail, mixed with local-serving office space, and medium and high-density residential development. The reconfiguration of the intersection with significant attention to pedestrian comfort and safety would aid in improved pedestrian mobility along the corridor, allowing residents to walk to retail nodes with services that residents desire, such as coffee, drycleaners and boutique shops. The *Pennsylvania Avenue, SE Corridor Land Development Plan* suggests that developing two parks at Twining Square north and south of Pennsylvania Avenue (instead of the fragmented pieces of park land that exist currently) would act as green pockets intended to function as gathering spaces for surrounding communities. Enhancements would be targeted to increase pedestrian and bicycle use, and would be a driving factor in discouraging automobile-oriented retail pockets which are prolific in areas east of the Anacostia River. The availability of park land at this intersection provides an opportunity to create a significant Public Plaza (in the L'Enfant tradition), an attractant for retail and housing development.[15]

The area around Twining Square has great potential for redevelopment. Both the DC Office of Planning and the Office of the Deputy Mayor for Planning and Economic Development (DMPED) have identified this intersection for revitalization and growth. In order to facilitate redevelopment along the 2300 block of Pennsylvania Avenue, SE, DMPED has already acquired 2337 Pennsylvania Avenue, SE, which

borders the intersection to the west. Redevelopment in this area is intended to eliminate blight and provide quality neighborhood-serving retail for residents. DMPED intends to continue negotiations with private land owners to develop targeted properties. One of the outcomes of this DMPED investment is the potential to create jobs in the area and to increase retail options for the under-served corridor. [16]

In order to meet Great Streets Program goals along Pennsylvania Avenue, proposed improvements at this intersection would create opportunities to change the public and market perceptions of the area through streetscape, aesthetics and transportation improvements. The action is needed in order to create an environment capable of supporting and attracting community needs and creating an environment where residents and visitors want to live, work and play. This improvement corresponds with several of the Great Streets' guiding principles, including: Guiding Principle #1 of the Great Streets Program, "Energize – Strengthen businesses and other local institutions and services;" Guiding Principle #4, "Distinguish – Create streets with vibrant places that reflect local character;" and Guiding Principle #5, "Care – Increase community ownership and stewardship."[17]

1.3 Project Overview

1.3.1 Background

The need to improve the Pennsylvania and Minnesota Avenues, SE intersection has been reiterated through multiple studies, beginning with DDOT's 2003 *Pennsylvania Avenue, SE Transportation Study*. The original proposed plan called for bridging one road over the other and the construction of on and off ramps, most likely with the creation of a single point urban interchange (SPUI). While this modification would have increased the capacity of the intersection and enhanced circulation, there would have been visual impact due to the elevated road, which would have also divided the community. This plan was ultimately determined to be cost prohibitive.[18]

Following the *Pennsylvania Avenue, SE Transportation Study*, discussion of improvement to the intersection continued with the District's Great Streets Initiative. The Great Streets Initiative was kicked off in 2005 as a multi-agency program that strategically uses public investments to improve local quality of life and attract private investments to communities. Several corridors were chosen to be a part of the Great Streets Initiative, including Pennsylvania Avenue, SE. Proposed solutions to improve the Pennsylvania and Minnesota Avenues intersection (L'Enfant Square / Twining Square) were developed as part of the *Great Streets Framework Plan: Pennsylvania Avenue SE* (2007) and the *Great Streets Design Final Report* (2007) (see *Appendix A*).

The program goals of the Great Streets Initiative are as follows:

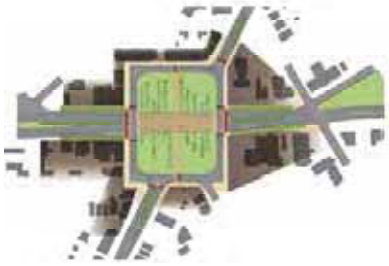
1. Improve the quality of life in neighborhoods along the corridors, including public safety, physical appearance and personal opportunity;
2. Support local demand for goods and services through economic development;
3. Expand mobility choices and improve safety and efficiency of all modes of travel; and
4. Attract private investment through the demonstration of a public commitment to Great Street communities.

The principles of the Great Streets Initiative include the following:

1. Energize – Strengthen businesses and other local services;
2. Refresh – Integrate nature and create valuable open spaces;
3. Move – Choices in how to travel;
4. Distinguish – Safe, vibrant places that reflect local character; and
5. Care – Increase community ownership and participation.

Pennsylvania and Minnesota Aves SE Improvement Preliminary Concepts

1) Modified Traffic Square



2) Ellipse Design

3) Conventional Intersection

Source: DDOT, 2006.

The entire Great Streets revitalization effort along Pennsylvania Avenue, SE covers two miles of construction, from 200 feet west of 27th Street (near the foot of the Sousa Bridge) to Southern Avenue, SE on the Maryland border and is focused on improvements to the public right of way and infrastructure. Located to the east of the Anacostia River, this section of Pennsylvania Avenue provides a gateway to the City's core. Its heavy use as a throughway for vehicle traffic has hindered the Avenue's ability to function as a node of activity or as a ceremonial gateway. Neighborhoods in the vicinity of this part of Pennsylvania Avenue include Hillcrest, Randle Heights, Anacostia, and Fort DuPont Park. Retail pockets are auto-oriented in character, and offer limited services. The corridor has several major parks (Fort Davis, Fort DuPont and Fort Stanton) and smaller pocket parks; however pedestrian access to the parks is hindered or restricted due to the heavily traveled, automobile-oriented Pennsylvania Avenue.

The concept design developed in the *Great Streets Concept Design Report* took into account previous studies, plans, and the efforts of the local community in developing the proposed concept designs. A four-day design charrette held in July 2006 resulted in the development of several alternatives, which were then evaluated and subsequently condensed down to three viable options for the Pennsylvania and Minnesota Avenues, SE intersection (concepts shown adjacent): (1) Modified Traffic Square, (2) Ellipse Design, and (3) Conventional Intersection. The three options were evaluated based on the detailed evaluation criteria set forth in the *Great Streets Framework Plan* and on input derived from the design charrette. The three options were then developed to a concept level, traffic analysis was performed, and urban design concepts were developed. Of the three alternatives considered in the report, the Modified Traffic Square Alternative was selected as the preferred option in the *Great Streets Framework Plan* because of its conformance with the Great Streets Initiative goals.

The Modified Traffic Square selected by the *Great Streets Framework Plan* would have impacted private right-of-way (three buildings) in the project vicinity and potentially required extensive environmental remediation due to the uses of the private properties (gas stations). Therefore, the Revised Square design was developed in order to avoid impacting private property, while maintaining the general concept of the Modified Traffic Square configuration, and carried forward as an alternative in this EA (see Section 2.2). The Conventional Intersection design developed as part of the *Great Streets Framework Plan* is also being carried forward as an alternative in this EA.

Agency Relationships

The proposed project concept was a result of iterations of plans and studies conducted by the District and DDOT, along with other partnering agencies of the Great Streets Initiative. FHWA is the lead federal agency because FHWA funds will be contributed to this project. NPS and NCPC are cooperating agencies due to the Proposed Action, which necessitates an exchange of land jurisdiction between DDOT and NPS.

1.3.2 Description of Study Area

The Study Area is located at the western end of the Pennsylvania Avenue, SE Great Streets corridor at the intersection of Pennsylvania Avenue with Minnesota Avenue, SE, in the immediate vicinity of Twining Square, also referred to as L'Enfant Square in the *Great Streets Framework Plan*. Refer to Figure 1-2 for an illustration of the Study Area.

Roadway

The Pennsylvania and Minnesota Avenues, SE intersection is dominated by busy lanes of traffic, rendering pedestrian circulation both difficult and dangerous. The Study Area is located on a major commuter route, Pennsylvania Avenue, SE, in an urban environment, at its crossing with the local travel route of Minnesota Avenue, SE. The Proposed Action intersection carries traffic to and from the bridges that cross the Anacostia River, as well as Minnesota Avenue, SE.

The streets in the Proposed Action intersection are described below:

- Pennsylvania Avenue, SE is a median-separated Principle Arterial according to the DDOT Roadway Functional Classification and presently carries approximately 42,500 vehicles per day. It is one of the few major gateways used by motorists to reach downtown Washington, DC from the southeast region of DC east of the Anacostia River and Maryland.
- Minnesota Avenue, SE is as a Minor Arterial with average annual daily traffic (AADT) of 10,200 vehicles per day.
- 25th Street is a Minor Arterial with AADT of 5,800 vehicles per day. It is a one-way street going southbound within the Study Area.

The Study Area consists of two intersections:

- L'Enfant Square, SE at Pennsylvania Avenue, SE
    - Operates at a level of service (LOS) D during the AM and PM peak hours.

- Pennsylvania and Minnesota Avenues, SE
    - Operates at LOS B during the AM peak hour and LOS C in the PM peak hour.

Although the overall intersections currently operate with an acceptable level of service (A through D), approaches to the intersections range from LOS A to F. Currently the traffic signal configuration is confusing and there are left-turn traffic conflicts. See *Section 3.4,Transportation* for more detailed information about existing traffic conditions.

NPS Property

The Study Area includes NPS property, U.S. Reservation 487 (Twining Square), which includes four small park reservations fragmented by roadway. North of Pennsylvania Avenue, a cut-through roadway connects Minnesota Avenue southbound to Pennsylvania Avenue westbound, which bisects the northern part of the reservation. South of Pennsylvania Avenue, the southern reservation is also bisected by roadway that connects Pennsylvania Avenue eastbound to Minnesota Avenue southbound. Due to the intersection configuration, the four reservation parcels effectively function as traffic islands for pedestrians while crossing the street; the pieces of parkland are too small to function as true open space or green space as currently configured. Twining Square lacks aesthetic appeal and is underutilized urban space.

The grassed medians that bisect the Pennsylvania Avenue roadway in the Study Area to the east and west of the intersection are also NPS property. The medians are functional, as they separate opposing traffic along Pennsylvania Avenue and serve as refuge areas for pedestrians crossing the street. Figure 1-4 provides an illustration of the NPS park reservations, the roadway medians and the approximate acreages of the individual parcels in the Study Area.

Purpose and Significance of the Park

Twining Square at the Proposed Action intersection is one of the Capitol Hill Parks, a collection of 59 triangles and squares owned by the NPS. As noted previously, Twining Square at this intersection is U.S. Reservation 487. (U.S. Reservation 336A is also known as "Twining Square" by some and lies a few blocks east of the Proposed Action intersection on Pennsylvania Avenue between 27th and 28th Streets, SE). Many of the avenues and streets east of the Anacostia River, including Pennsylvania Avenue east of the river, did not exist as of the 1901 City of Washington Southeast Quadrant map. The confusion as to what the official name of the park is occurred because during the 1920s and early 1930s, Twining Square was known as L'Enfant Square. In 1929, the Office of Public Buildings and Public Parks of the National Capital assumed jurisdiction over Reservations 487 A, B, C and D (Twining Square and the adjacent medians) at the intersection of Pennsylvania and Minnesota Avenues, SE via the March 29, 1929 request of the Commissioners of the District. In 1933, in accordance with the recommendation of the National Capital Park and Planning Commissions, U.S. Reservation 487 officially became "Twining Square" instead of "L'Enfant Square." The name Twining Square was selected to honor the first military member of the District Commissioners, Major William Johnson Twining who served from 1878-1882.

The street along the northeast side of Twining Square is still known as L'Enfant Square, SE even though the park's name was officially changed to Twining Square in 1933. The neighborhood to the north of Pennsylvania Avenue at the intersection is referred to as "Twining."

Adjacent Land Uses

The land use adjacent to the intersection is a combination of medium-density residential (rowhouses) with a limited amount of retail services, occupying one- and two-story buildings, and park land (Twining Square). The predominant use of the intersection is small- to medium-size commercial, and includes two gas stations that occupy the high-profile corner locations at the northeast and southeast corners of the intersection. Many properties in the Study Area are underutilized or vacant. The intersection primarily functions to serve the significant volumes of traffic traveling through the corridor to and from employment cores to the northwest.

1.4 Project Objectives

To help develop the design concepts presented in this EA, the project team utilized the Great Streets Program principles while also taking into consideration agency and public comments, and the Study Area constraints. These objectives guided the project team throughout the planning and preliminary design to identify the most viable alternatives that best satisfy the Proposed Action's purpose and need. The objectives for the Proposed Action are in line with the Great Streets Initiative Program Goals, as previously stated:

- Improve the quality of life in neighborhoods along the corridors, including public safety, physical appearance, and personal opportunity;
- Support local demand for goods and services through economic development;
- Expand mobility choices and improve safety, and efficiency of all modes of travel; and
- Attract private investment through the demonstration of a public commitment to Great Streets communities.

1.5 Design Considerations

Based on data collection and study, the project team considered a number of factors while refining the alternatives and options for the Pennsylvania and Minnesota Avenues, SE Intersection Improvements EA. A *Design Criteria Report* detailed such considerations leading to the formation of concepts that were either incorporated into the alternatives and options carried forward for detailed study or dismissed (See ***Appendix B, Design Criteria Report***). The primary guidelines and standards used in preparing the alternative design concepts include the *DDOT Design and Engineering Manual* (2009), *AASHTO – A Policy on Geometric Design of Highways and Street* (2004 and 2011) and the *AASHTO Roadside Design Guide* (2011).

1.6 Relationship to Other Plans and Studies

The Proposed Action is consistent with the District's planning documents and projects, including the following:

1.6.1 Comprehensive Plan for the National Capital

The *Comprehensive Plan of the National Capital*, which was first adopted in 1984 and 1985 and is updated periodically, is a general policy document that provides overall guidance for future planning and

development of the District. The plan is comprised of two parts, the District Elements and the Federal Elements, which are adopted by the DC Council and the NCPC, respectively.

The *Comprehensive Plan of the National Capital: District Elements* contains 11 citywide elements that provide goals, objectives and policies for land use issues that impact the whole city, e.g. transportation, environment, parks and open space, arts and culture. The Parks, Recreation and Open Space Element in the *District Comprehensive Plan* addresses the importance of open space for recreation, aesthetics, neighborhood character, and environmental quality and includes language on the creation of trails to better connect the city's open spaces and neighborhood. These include:

- Coordination between the District and the Federal government on park and open space planning and management;
- Providing additional recreational land and facilities in areas of the city that are currently underserved and in newly developing areas; and
- Maintaining, upgrading, and improving existing parks and recreation facilities as key features of successful neighborhoods in the District.

The NCPC adopted the *Comprehensive Plan for the National Capital: Federal Elements* on August 5, 2004. The Federal Parks and Open Space Element establishes policies to protect, enhance, and expand the region's parks and open space system, including trails.

1.6.2 Pennsylvania Avenue, SE Transportation Study

The *Pennsylvania Avenue, SE Transportation Study* was undertaken by DDOT with the intent to evaluate existing conditions on the major roadways in Southeast Washington, DC. These roadways include Pennsylvania Avenue, SE, Anacostia Freeway (I-295), Minnesota Avenue, Branch Avenue, Alabama Avenue, and Southern Avenue. The study evaluated the existing conditions of transportation in the Study Area and provided short-term and long-term recommendations, including options to improve the subject intersection.[19]

1.6.3 Middle Anacostia River Crossing Transportation Study

The *Middle Anacostia River Crossings Transportation Study* (MAC Study) was completed in 2005 by DDOT and the Anacostia Waterfront Initiative (AWI) to assess current and future needs regarding vehicular, transit, pedestrian, and bicycle mobility and safety. The study was developed from the Anacostia Waterfront Framework Plan (2003), and covered the area southeast of M Street and South Capitol Street, between Historic Anacostia and Pennsylvania Avenue and along Minnesota Avenue. The MAC Study recommends both near-term and mid-term improvements at the subject intersection due to the failing level of service and high accident rate.[20]

1.6.4 Great Streets Framework Plan: Pennsylvania Avenue, SE

The *Great Streets Framework Plan: Pennsylvania Avenue SE* was developed by the District and DDOT in 2005. The Great Streets multi-agency program identified corridors that are vital to local neighborhoods and are key to enhancing the District's diversity and prosperity. Pennsylvania Avenue, SE was one of the identified corridors, and Twining Square (called L'Enfant Square in the Study) is named as one of three

significant activity nodes along the corridor. The Plan recommends Minnesota Avenue be restored as a two-way street, consequently creating two softscape parks on either side of Pennsylvania Avenue, edged by retail and mixed use facilities. The Plan envisions that the parks would become major gathering spaces for the community, and that the Square would be furnished with benches and street lighting. Public art, dense tree cover, and landscape elements would reinforce the "green" boulevard feel visualized by the Plan.

1.6.5 District of Columbia Bicycle Master Plan

The *District of Columbia Bicycle Master Plan* was developed as a guide to establish high-quality bicycle facilities and programs in the District over the next 10 years. With anticipated population growth and little room to accommodate future growth in automobile lanes, the District's transportation system must respond via other transportation modes, namely bicycling. In 2005, the District had 17 miles of bike lanes, 50 miles of bike paths, and 64 miles of bicycle routes. The Plan provides goals and recommendations based on an inventory of the District's bicycle facilities.

The *Bicycle Master Plan* conducted a comprehensive roadway inventory to determine a Bicycle Level of Service (LOS) on many of DC's streets. These results were used to help plan the bicycle route network. Routes with a LOS D or above, or with potential to be improved to this level, were selected. The Bicycle LOS model and associated roadway inventory were used to prioritize street improvements and identify potential for striping bike lanes and making other bicycle improvements. The Bicycle LOS in the Study Area is E (80 miles) along Pennsylvania Avenue, SE and D (188 miles) along Minnesota Avenue, SE and 25th Street, SE. Routes with a Level of Service D or above, or with the potential to be improved to this level, were selected. The Study Area does not have any bicycle lanes and is not a signed bicycle route.

Pennsylvania Avenue, SE in the Study Area is recommended for Proposed Multi-Use Trail or Multi-Use Trail Connection and as a Signed Bicycle Route.[21] Shared-use pathways (multi-use trails) provide a high quality walking and bicycling experience in an environment that provides separation from traffic. The Plan identifies Twining Square (referred to as L'Enfant Square in the Study/Pennsylvania and Minnesota Avenues, SE) as one of five key intersections with complicated traffic patterns that need improved bicycle access.[22]

1.6.6 Revitalization of Pennsylvania Avenue, SE for the Great Street Initiative Concept Design

The *Revitalization of Pennsylvania Avenue, SE for the Great Street Initiative Concept Design* was developed as part of the District's Great Streets Initiative to remake Pennsylvania Avenue, SE into a "Signature Boulevard." This report took into account all of the studies and planning that had been performed on Pennsylvania Avenue, SE prior, and presented specific design concepts for improvements to the Avenue, including to the intersection of Pennsylvania and Minnesota Avenues, SE at Twining Square. This Concept Design developed a comprehensive plan based on community input and sound engineering study to satisfy the principles of the Great Streets Initiative. The *Revitalization of Pennsylvania Avenue, SE for the Great Street Initiative Concept Design* also involved numerous community meetings and charrettes, which ultimately resulted in the three alternatives for Twining Square that laid the groundwork for the alternatives being considered in this EA.

1.6.7 Pennsylvania Avenue, SE Corridor Land Development Plan

The *Pennsylvania Avenue SE Corridor Land Development Plan* was developed in 2008 by the District of Columbia Office of Planning (DCOP) to provide a framework and foundation to guide redevelopment of key sites along the corridor. The 2300 and 2500-2600 blocks of Pennsylvania Avenue, SE (referred to as "L'Enfant Square" in the Plan, but known here as Twining Square) were identified in the Plan as having unmet retail potential. Twining Square was identified as a sub-area, ripe for redevelopment by the 2008 Plan.

1.6.8 District of Columbia Pedestrian Master Plan

The District of Columbia Pedestrian Master Plan was developed in 2009 by DDOT to address pedestrian needs and issues in regards to pedestrian safety throughout the District. The vision of the Pedestrian Master Plan is to create "a city where any trip can be taken on foot safely and comfortably, and where roadways equally serve pedestrians, bicyclists, transit users and motorists."[23] An objective includes ensuring that all transportation development projects provide safe and convenient pedestrian facilities, including: new sidewalks, and improved access and safety at crossings, intersections and bus stops.

1.6.9 Pennsylvania and Potomac Avenues, SE Intersection Improvements

As part of the District's Anacostia Waterfront Initiative (AWI) Program, DDOT is conducting an EA for proposed improvements at the Pennsylvania and Potomac Avenues, SE intersection to enhance safety at these street intersections for neighborhood pedestrians and transit users of the Potomac Avenue Metrorail Station and the numerous area bus stops. This project was originally proposed in the 2005 Middle Anacostia Crossings (MAC) Transportation Study as a mid-term improvement for enhancing the transportation network in the Middle Anacostia River region. The Pennsylvania and Potomac Avenues intersection is located approximately one mile west of the Study Area.

1.6.10 Barney Circle and Southeast Boulevard Transportation Study

Also part of the AWI Program, DDOT is conducting an EA for proposed improvements at Barney Circle-Southeast Boulevard to evaluate updated concept alternatives that were previously developed in the 2005 MAC Transportation Study and is including new alternatives for the project to ensure that pedestrian safety and multi-modal transportation needs are included, as well as new or planned residential and economic development within the surrounding AWI Program area. Barney Circle is located less than a mile west of the Study Area.

1.7 Impact Topics Dismissed from Further Analysis

1.7.1 Geology and Topography

Geology

The Study Area is located entirely within the Coastal Plain physiographic province. The Coastal Plain is characterized by unconsolidated interleaved deposits of gravel, sand, silt, and clay, with the surface soils of the specific Study Area vicinity formed in reworked river terrace deposits from the Pliocene and Pleistocene. [24] It is not expected that geology would be disrupted because of the minor grading involved under the Build Alternatives. Therefore, this impact topic was dismissed from further analysis.

Geologic Hazards

There are no known geologic hazards in the Study Area; therefore, this topic was dismissed from further analysis.

Topography

The Study Area is located directly southeast of the Anacostia River on land characterized by a folding landscape of ridges and valleys. Topography in the Study Area is generally gradually sloped. Elevations in the Study Area range from a few feet above water level at the end of the Sousa Bridge to approximately 44 feet above mean sea level (msl) along Pennsylvania Avenue, SE, 200 feet west of its intersection with 27th Street, SE. The topography of the project site is gradually sloped, with elevations between approximately 28 to 38 feet above msl. The land adjacent to the south edge of the site slopes upward more rapidly to 80 feet above msl, forming the base of a ridge characteristic of the surrounding landscape. The land within the immediate Study Area where construction would occur is generally flat.

It is not expected that topography would be disrupted because of the minor grading involved under the Build Alternatives. Therefore, this impact topic was dismissed from further analysis.

Agricultural Lands, Prime, and Unique Farmland Soils

Federal agencies, as required by CEQ Guidance, must assess the effects of proposed actions on soils which are classified as prime or unique farmlands by the Natural Resources Conservation Service (NRCS). The soils mapped within the Study Area are not prime or unique farmland as defined by the U.S. Department of Agriculture and are not regulated by the Farmland Protection Policy Act. Similar to the Study Area, the majority of the soils surrounding the Study Area are mapped as Urban Land soils, which are not classified as prime farmland soil. In addition, the soils in the Study Area have been subjected to prior disturbances. Therefore, these topics were dismissed from further analysis.

1.7.2 Surface Water

The District is within the larger Middle Potomac-Anacostia-Occoquan Watershed.[25] Within this watershed, the Study Area drains to the Anacostia River (Waterbody ID DCANA00E_01 and DCANA00E_02). According to the EPA Watershed Assessment, the Anacostia River watershed is an impaired tidal freshwater estuary which drains an approximately 0.8 square mile area. The drainage area consists of national and city park land, urban areas of residential and commercial, RFK Stadium and marinas.

While there are no surface waters within the Study Area, stormwater runoff from the Study Area ultimately enters tributaries which flow into the nearby Anacostia River. There would no noticeable impacts on surface waters as a result of the Alternatives; therefore, this impact topic was dismissed from further analysis. Impacts to surface waters as a result of construction and hazard of erosion are addressed under Water Quality.

1.7.3 Navigable Waters

There are no Waters of the U.S. in the Study Area. However, the Anacostia River is a Water of the U.S. within the vicinity of the Study Area. During storm events, runoff from the Study Area is transported into storm sewers, and ultimately into the tributaries and sewers which empty into the Anacostia River. There would no noticeable impacts on Navigable Waters as a result of the Alternatives; therefore, this impact topic was dismissed from further analysis. Impacts to the Anacostia River as a result of construction and hazard of erosion are addressed under Water Quality.

1.7.4 Coastal Zone

The District is not within a designated Coastal Zone and they have not developed a Coastal Zone Management Plan under the Coastal Zone Management Act. However, the District participates in the EPA's Chesapeake Bay Program, as well as operates its own District Bay Program. The District Bay Program focuses on the Anacostia and Potomac Rivers and Rock Creek, as they all drain into the Chesapeake Bay. The District implements a Watershed Implementation Plan (WIP), which outlines how the District will meet the requirements of the EPA issued Total Maximum Daily Loads (TMDLs).

Because the District, and thus the Study Area, is not within a Coastal Zone, this impact topic was dismissed from further analysis. Additionally, the Alternatives would not disrupt the progress of the Bay Program in cleaning up the District's waterways.

1.7.5 Floodplains

Executive Order No. 11988, "Floodplain Management" was issued in order to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practical alternative. The order was issued in furtherance of NEPA, the National Flood Insurance Act of 1968, and the Flood Disaster Protection Act of 1973.

The Study Area is not located within either a 100- or 500-year floodplain, as indicted by the Flood Insurance Rate Maps (FIRM), Community Panel Number 1100010030B(FEMA, 1985). The Study Area is located in Zone C, which indicates "Areas of minimal flooding."[26] Because the Study Area is not located within a floodplain, this topic was dismissed from further analysis.

1.7.6 Wetlands

In accordance with the 1987 U.S. Army Corps of Engineers (USACE) Wetlands Delineation Manual, wetlands are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Wetlands generally include swamps, marshes, bogs, and similar areas.

A review of the District Department of the Environment (DDOE) map showing known wetlands within the District indicates that there are no wetlands within the Study Area;[27] therefore, this topic was dismissed from further analysis.

1.7.7 Wild and Scenic Rivers

In 1968, Congress created the National Wild and Scenic Rivers System to preserve rivers with outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, or other values in a free flowing condition.[28] Based on the National Wild and Scenic River Inventory, there are no surface waters within the vicinity of the Study Area that are designated as scenic rivers. Therefore, this topic was dismissed from further analysis.

1.7.8 Aquatic Organisms

The Study Area does not include waterways, and therefore does not include habitat which supports aquatic organisms. However, the Study Area is located approximately 0.3 miles to the east of the Anacostia River. Storm water runoff from the site flows into the Anacostia River, and thus the project site could indirectly impact aquatic organisms in the river and nearby streams/tributaries. Indirect impacts to aquatic organisms as a result of construction and hazard of erosion are addressed under Water Quality. Because the Study Area does not include habitat which supports aquatic organism, this impact topic was dismissed from further analysis.

1.7.9 Threatened and Endangered Species

In August 2012, a formal request was submitted to FWS via their Information, Planning, and Conservation System (IPaC) planning tool to request a list of threatened and endangered species in the project vicinity. Correspondence with FWS was received and there are no endangered or threatened species found within the vicinity of the Study Area. Additionally, FWS and DDOE were invited to an Interagency Meeting for this project and submitted no formal comments or concerns. Therefore, this topic was dismissed from further analysis. See ***Appendix C, Agency Coordination and Public Involvement*** for agency correspondence.

1.7.10 Paleontological Resources

The Study Area is located within the Coastal Plain physiographic province, although the Fall Line marking the transition into the Piedmont province is located in the western portion of the District. The Coastal Plain is characterized by unconsolidated interleaved deposits of gravel, sand, silt, and clay, with the surface soils of the specific Study Area vicinity formed in reworked river terrace deposits from the Pliocene and Pleistocene. [29]

Soils within the area of potential effect (APE) have been recorded primarily as Urban land-Galestown complex, which is found in the western, central, and part of the northern sections of the APE. [30] The northern and eastern edges of the APE are reported as Keyport-Urban land complex. Small segments of Sassafras-Urban land complex and Christiana-Urban land complex are found along the southern edge of the APE. The overlying gravel stratum of the Coastal Plain which dates to the Cretaceous period could potentially contain fossils such as dinosaur bones and petrified trees; however no known paleontological resources exist within the Study Area. Therefore, this topic was dismissed from further analysis. However, if such resources were uncovered during construction, work would be halted and a study conducted.

1.7.11 Indian Trust Resources

Secretarial Order 3175, *Departmental Responsibilities for Indian Trust Resources* (established by the U.S. Department of the Interior) requires consultation with the recognized tribal government, with jurisdiction over the trust property, to which a proposed action may potentially impact. The federal Indian Trust responsibility is a legal obligation by the United States to protect tribal lands, assets, resources and treaty rights. It also represents a duty to carry out the mandates of federal law with respect to American Indian and Alaskan Native tribes. There are no known Indian Trust Resources within the vicinity of the Study Area, nor are there lands held in trust by the Secretary of the Interior for the benefit of American Indians or Alaskan Tribes. Therefore, this topic was dismissed from further analysis.

1.7.12 Sacred Sites

Secretarial Order 3206, *American Indian Tribal Rights, Federal-Tribal Trust Responsibilities and the Endangered Species Act*, was issued by the Secretaries of the Interior and Commerce pursuant to the Endangered Species Act of 1973 (ESA), the Federal-tribal trust relationship and other Federal laws. This Order clarifies the responsibilities of agencies when actions taken under authority of the ESA, and associated implementing regulations, affect, or may affect, Indian lands, tribal trust resources, or the exercise of American Indian tribal rights. This Order further recognizes the trust responsibility and treaty obligations of the United States toward Indian tribes and tribal members and its government-to-government relationship in dealing with tribes. No American Indian sacred sites are known to exist within the Study Area. Therefore, this topic was dismissed from further analysis.

1.7.13 Ethnographic Resources

An ethnographic resource, as defined by the NPS, is any "site, structure, object, landscape or natural resource feature assigned traditional legendary, religious, subsistence or other significance in the cultural system of a group traditionally associated with it."[31] No known ethnographic resources exist within the Study Area. Therefore, this topic was dismissed from further analysis.

1.7.14 Hazardous Waste/Materials

Hazardous wastes and materials are regulated by the Resource Conservation and Recovery Act (RCRA) and by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), commonly known as Superfund. Based on an EPA review of District superfund sites, there are no superfund sites within the Study Area or the vicinity of the Study Area.

Based on a review of the EPA EnviroMapper for Envirofacts Data Warehouse, properties within or adjacent to the Study Area which are listed as having waste discharge include: Highland Cleaners, Earl Scheib, Inc., Williams Garage, Otis Auto Repair, and Sunoco Service Station (adjacent to west end of the Study Area at the intersection of Pennsylvania and Prout Streets, SE). There are two gas stations, a BP and a Shell, located across the street from each other at the east side of the intersection of Pennsylvania and Minnesota Avenues, SE. All gas stations within and adjacent to the Study Area are listed as having underground storage tanks.

The proposed land transfer and reconfiguration of the intersection would not result in disturbance to any of the known existing waste discharge facilities or underground storage tanks. Therefore there are no anticipated impacts to hazardous waste or materials and this topic was dismissed from further analysis. In the event that suspected hazardous materials or potentially contaminated materials are encountered during construction activities, contractors would be directed to stop work until further assessment occurs.

1.7.15 Energy Conservation

The energy currently consumed at the intersection is generally electric power and gas from the residential and commercial uses in the area, as well as energy to power street lights and traffic lights. The proposed development would incorporate Low-Impact-Design (LID) Principles wherever possible to create a more sustainable and integrated environment. Energy can be conserved at the project intersection by attempting to reduce the heat island effect associated with urban areas. This would be accomplished by maximizing plantings in the open space areas and roadway medians and by using light colored paving surfaces where possible. Light colored concrete or asphalt can be used in areas such as pedestrian walkways through intersections and bikeways. Therefore, there are no anticipated impacts to energy consumption and this topic was dismissed from further analysis.

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2.0 PROPOSED ACTION AND ALTERNATIVES

NEPA requires that federal agencies explore a range of reasonable alternatives. The range of alternatives considered reflects the type of Proposed Action and the potential for environmental impact. Since the Proposed Action would remain within DDOT and NPS right-of-way and there are no unresolved conflicts concerning available resources, only two Build Alternatives are being carried forward in addition to the No Build Alternative. 40 CFR Part 1502.14 requires that a No Build Alternative be considered as part of the environmental review process.

Section 2.3 provides a discussion of the alternatives considered, but ultimately dismissed from detailed analysis. FHWA and DDOT, in cooperation with NPS, explored and evaluated the following alternatives in detail:

- No Build Alternative
- Build Alternative 1 – Revised Square Alternative
- Build Alternative 2 – Conventional Intersection Alternative

2.1 No Build Alternative

Consideration of the No Build Alternative is required by NEPA per CEQ Regulations. This alternative serves as a basis of comparison with other alternatives considered for detailed analysis. Under the No Build Alternative, no land jurisdiction exchange between NPS and DDOT would occur. The intersection would continue to function as it does today. Existing traffic patterns, crosswalks, signalization, and sidewalks would remain unimproved. Approximately 1.5 acres of park area exists in the Study Area. Approximately 1.4 acres of this area is owned and maintained by the NPS and would remain under NPS jurisdiction under the No Build Alternative; the remaining acreage (approximately 0.1 acres) is DDOT right-of-way (grassed sidewalk buffer areas) and would remain under DDOT jurisdiction. See **Figure 2-1** for an illustration of the existing condition of the intersection, which is the same as the No Build Alternative.

While the No Build Alternative does not meet the purpose and need of the Proposed Action, it provides a basis for comparing the environmental consequences of the Proposed Action Alternatives.

2.2 Proposed Action

The Proposed Action is to provide improvements to the Pennsylvania and Minnesota Avenues, SE intersection to improve safety, mobility, and connectivity for pedestrians and motorists at the intersection in keeping with the District's Great Streets Initiative. The Proposed Action would include a transfer of land jurisdiction from NPS to DDOT, as may be agreed upon by covenant with stipulations between the agencies following meetings and coordination. The land exchange is necessary to facilitate reconfiguration of the intersection. No private right-of-way would be impacted or acquired by the Proposed Action.

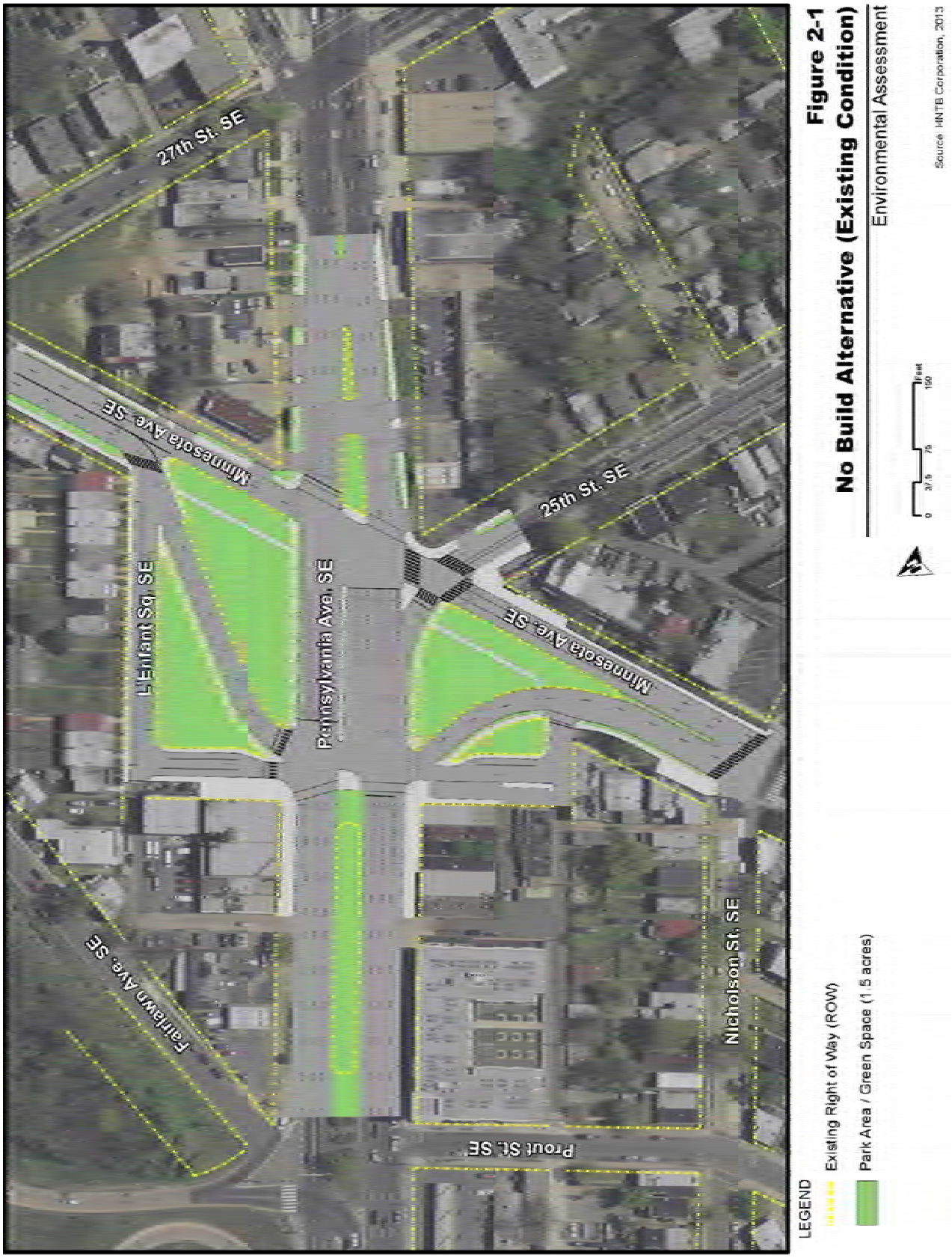


Figure 2-1
No Build Alternative (Existing Condition)
Environmental Assessment

2.2.1 Build Alternative 1 - Revised Square Alternative

Under Build Alternative 1, the intersection would be improved to create a "traffic square" concept, which would require all vehicles, with the exception of through-movements on Pennsylvania Avenue, SE, to go around the expanded central park area. Build Alternative 1 would require a jurisdictional land transfer from NPS to DDOT of approximately 1.4 acres to enable the proposed modifications to the intersection. Build Alternative 1 would consolidate the two park parcels to the north of Pennsylvania Avenue and the two park parcels to the south of Pennsylvania Avenue in order to provide more contiguous park area for residents and visitors to use as green space. The northern park area would total approximately one acre of contiguous park area and the southern park area would total approximately 0.5 acres of contiguous park area. The traffic medians to the east and west of the intersection currently owned by NPS would also transfer to DDOT in order to accommodate proposed improvements (approximately 0.24 acres). See **Figure 2-2** for an illustration of Build Alternative 1 – Revised Square Alternative.

Build Alternative 1 would improve the roadway alignment and configuration to promote traffic-calming thereby improving safety for pedestrians and vehicles at the intersection. Under this alternative, the traffic signal configuration is simplified and the left-turning conflicts are removed. Pennsylvania Avenue, SE would bisect the center of the square, and turning movements would be directed around the perimeter of the "square." This perimeter route acts to calm the traffic, similar to how a traffic circle works, by allowing vehicles to enter and exit the square at locations identified by the intersecting streets. It would also reduce vehicular speeds by providing short, straight distances between tight radius turns, at the presumed four corners of the square.

Build Alternative 1 would maintain most of the intersecting street connections near their current locations; the exception is that 25th Street, SE would no longer connect to the Pennsylvania/Minnesota Avenues, SE intersection. This eliminates a connection that is proximate to other connections. With this change, to turn onto 25th Street, traffic would enter the "square" at L'Enfant Square, SE and follow the square around until exiting onto 25th Street, SE. This new movement would have a minimal impact on the residential neighborhood.

In this alternative, L'Enfant Square, SE to the north of the square would be widened to three lanes from the existing one lane to accommodate the traffic traveling around the square. As a result, on-street parking would only be maintained on the north side of the street, adjacent to residences. A grassed median between the sidewalk and the on-street parking to the north of the square (along L'Enfant Square, SE) is proposed to provide additional buffer for residences from the roadway.

Build Alternative 1 would reduce the interaction between pedestrians and vehicles, and would also improve the functionality of existing and new crosswalk facilities. The crosswalk alignments and refuge areas for pedestrians would be significantly enhanced; sidewalks and green space would be improved and green space frontage would be provided for local residences and businesses.

Build Alternative 1 includes the following key traffic improvements:

- Prohibit left turning movements on Pennsylvania, SE in the center of the square and require all turning vehicles to circulate around the square;

- Prohibit left turns from both directions of Minnesota Avenue, SE on to Pennsylvania Avenue, SE, directing all traffic to circulate around the square, and reduce vehicular conflicts with pedestrians on the crosswalks;
- Expand L'Enfant Square, SE to three lanes on the north side of the square and combine with southbound Minnesota Avenue, SE, providing parking spaces for residents and retail patrons along the north side of the street along the residences only;
- Expand L'Enfant Square, SE to two lanes on the south side of the square and realign the roadway to add the connection to northbound Minnesota Avenue and 25th Street, SE;
- Add wider sidewalks and additional crosswalks to provide safe and convenient access for pedestrians; and
- Add traffic signal control at the new south intersection (south of Minnesota Avenue, SE and 25th Street, SE) to improve traffic flow.

Build Alternative 1 would meet the purpose and need for the Proposed Action in promoting the principles set forth in the District's Great Streets Initiative. Build Alternative 1 would improve pedestrian and vehicular safety, create a usable park space, improve multimodal connectivity and access, and support land use and community needs.

2.2.2 Build Alternative 2 - Conventional Intersection Alternative

Under Build Alternative 2, the intersection would be redesigned into a typical at-grade intersection with all vehicle turning movements permitted for all approaches, with the exception of 25th Street, which would remain a one-way street going southbound. Build Alternative 2 would require a jurisdictional land transfer from NPS to DDOT of approximately 1.4 acres to enable the proposed modifications to the intersection and consolidate the green space. Build Alternative 2 would consolidate the two park parcels to the north of Pennsylvania Avenue and the two park parcels to the south of Pennsylvania in order to provide more contiguous park area for residents and visitors to use as green space. The northern park area would total approximately one acre and the southern park area would total approximately 0.4 acres of contiguous park area. The traffic medians to the east and west of the intersection currently owned by NPS would also transfer to DDOT in order to accommodate proposed improvements (approximately 0.24 acres). See **Figure 2-3** for an illustration of Build Alternative 2 – Conventional Intersection Alternative.

The Build Alternative 2 design would improve the existing split roadway system that currently contains two complex intersections by reducing multiple traffic movements into one signalized intersection. This alternative would provide for left-turn movements in all directions and increase the left-turn bay storage length for vehicles. Under Build Alternative 2, the roadway that bisects the northern section of Twining Square (southbound Minnesota Avenue, SE) would be shifted to realign the roadway. The existing western intersection (L'Enfant Square, SE/SB Minnesota Avenue at Pennsylvania Avenue, SE) in the square would be eliminated and the central, grassed median along Pennsylvania Avenue would be extended; a crosswalk with a pedestrian-activated traffic signal would also be provided at this location to allow safe crossing for pedestrians.

Build Alternative 2 maintains the available street parking along L'Enfant Square, SE to the north of the "square" and has the potential to reduce the traffic volume adjacent to those residences, depending on

which way traffic flows along this roadway stretch. Build Alternative 2 has two options for the movement of one-way traffic to the north and west of the "square" on L'Enfant Square, SE. Either one-way movement would work operationally as follows:

> Option 1) Traffic flows one-way to the west and south on L'Enfant Square, SE. Commuter traffic could continue to cut-through the "square" to avoid the Pennsylvania/Minnesota Avenues, SE intersection and the right-turning vehicle/pedestrian conflict to the west of the square would remain; or
>
> Option 2) Traffic flows one-way to the north and east on this roadway. Cut-through traffic would be minimized and the vehicle/pedestrian conflict would be reduced.

With the jurisdictional land exchange between NPS and DDOT to enable the proposed modifications to the intersection and consolidate the green space, Build Alternative 2 would provide more contiguous park area than exists today for residents and visitors to the area. Given the typical intersection design, traffic speeds would not be reduced and the intersection would continue to favor motorists in vehicles over pedestrians.

Build Alternative 2 includes the following key traffic improvements:

- Turn Minnesota Avenue, SE into a five-lane roadway through the intersection;
- Provide a new left turn bay on westbound Pennsylvania Avenue, SE for quick access to southbound Minnesota Avenue and 25th Street, SE; and
- Add bulb-outs at multiple intersection corners to shorten pedestrian crossing distance, protect parked vehicles, and reduce traffic impact caused by bus pullovers.

This alternative would improve vehicle operations and reduce confusion at the complex intersection compared to the No Build Alternative. The improvements would create more consolidated park space for visitors and residents to the area and the intersection would be less confusing to navigate for motorists and pedestrians. Because this alternative maintains the intersection as a typical intersection, the focus remains on moving vehicles through the intersection to their destinations. After careful consideration, the FHWA and NPS decided to carry Build Alternative 2 forward in this EA.

A cost estimate summary is presented in **Table 2.1**. Detailed cost estimates for the Build Alternatives are presented in ***Appendix D, Construction Cost Estimate and Schedule***.

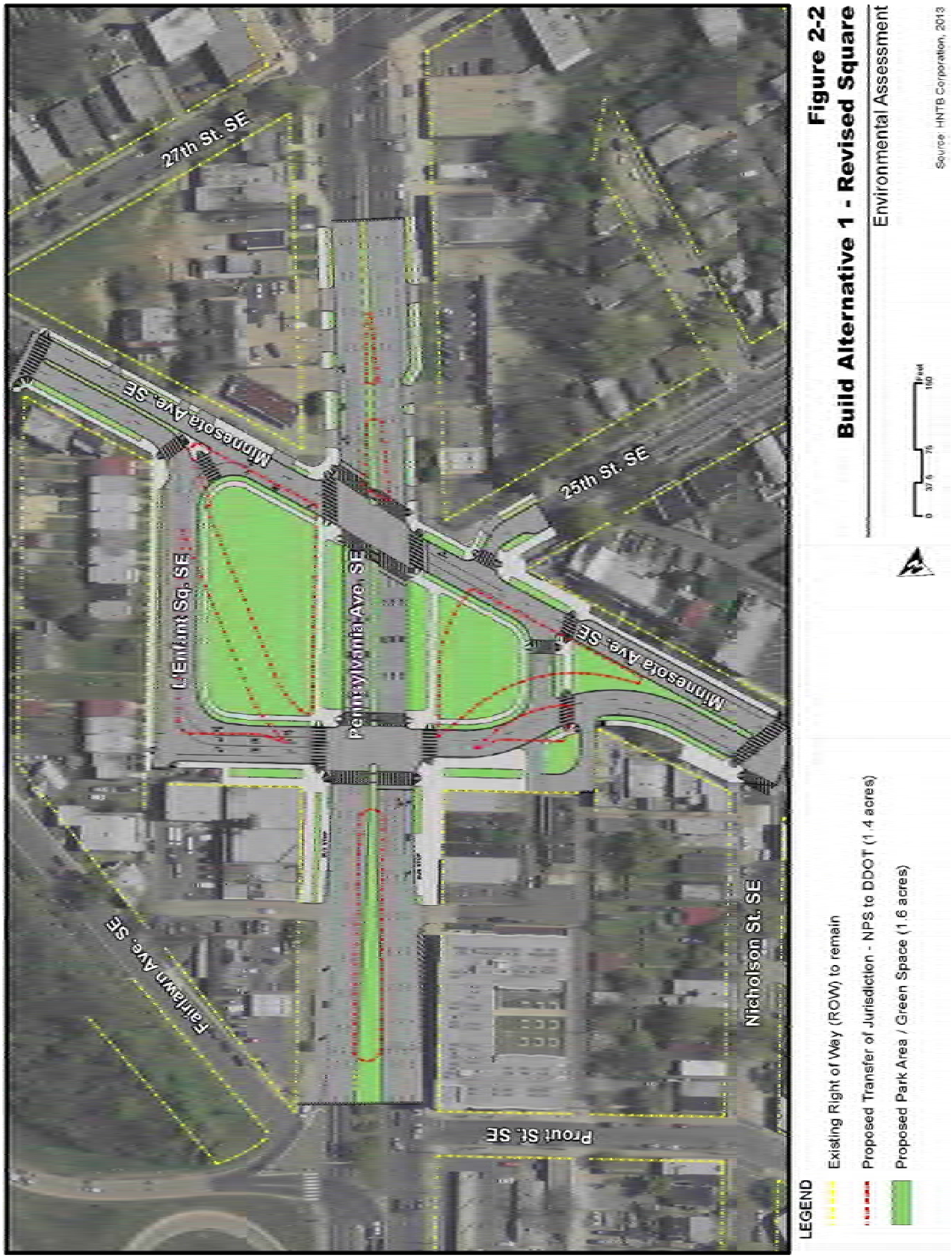


Figure 2-2
Build Alternative 1 - Revised Square
Environmental Assessment

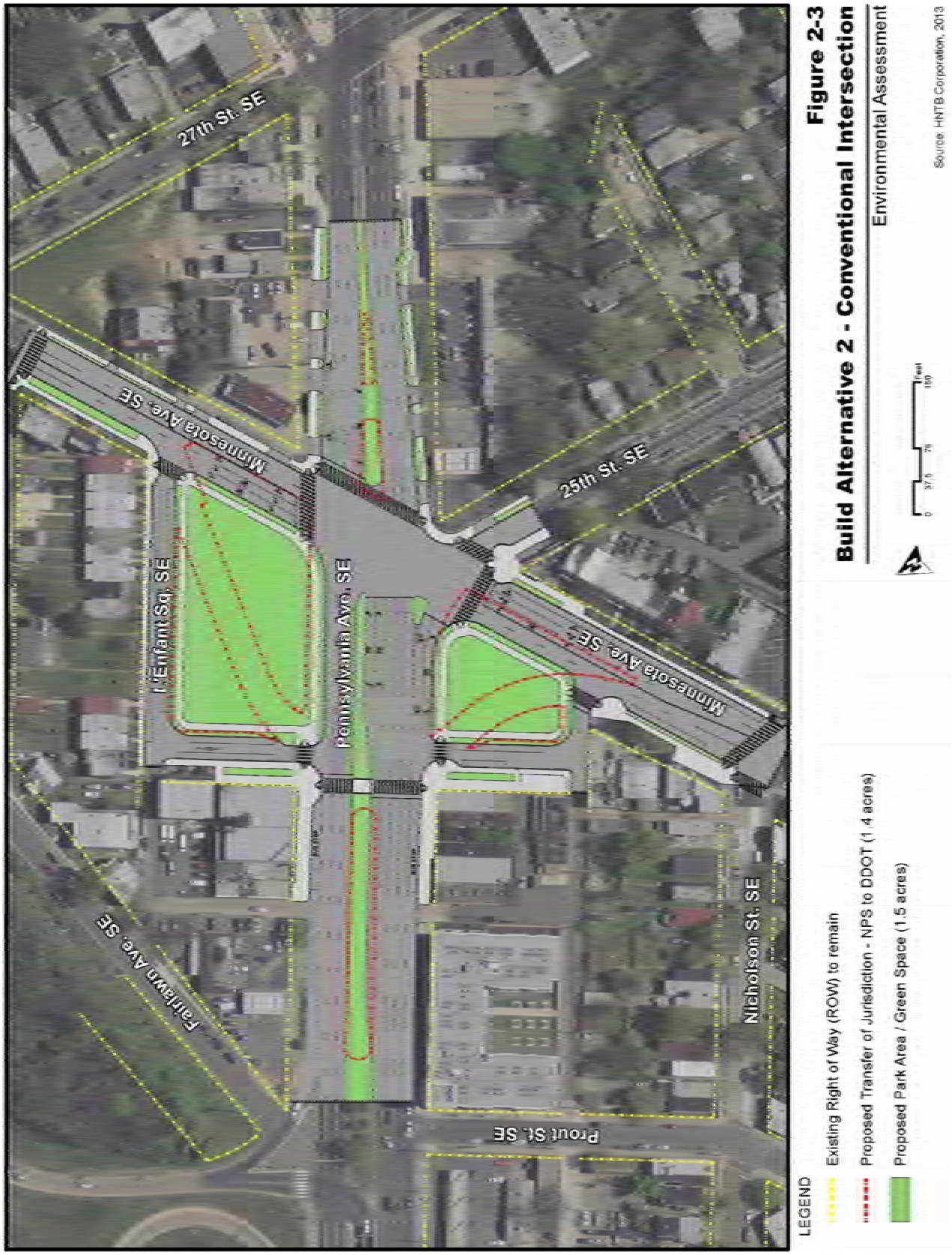

27th St. SE
Minnesota Ave. SE
L'Enfant Sq. SE
Pennsylvania Ave. SE
25th St. SE
Minnesota Ave. SE
Fairlawn Ave. SE
Nicholson St. SE
Prout St. SE
LEGEND
Existing Right of Way (ROW) to remain
Proposed Transfer of Jurisdiction - NPS to DDOT (1.4 acres)
Proposed Park Area / Green Space (1.5 acres)
0
37.5
75
150
Feet
Figure 2-3
Build Alternative 2 - Conventional Intersection
Environmental Assessment
Source: HNTB Corporation, 2013

Table 2.1

Build Alternatives Cost Summary

COST ESTIMATE ITEMS		Alternative 1 - Revised Square				Alternative 2 - Conventional Intersection		
	UNITS	QUANTITY	UNIT COST	AMOUNT	QUANTITY	UNIT COST	AMOUNT
1 Demolition	SF	73,950	$ 4.00	$ 149,050	56,000	$ 4.00	$ 95,200
2 Roadway	SF	164,440	$ 37.50	$ 851,720	176,810	$ 37.50	$ 815,180
3 Miscellaneous Items (Sidewalk, Driveway, Landscape, etc.)	SF	127,749	$ 1,138.00	$ 986,790	121,124	$ 1,138.00	$ 880,450
4 Traffic Signals	Each	3	$ 200,000.00	$ 600,000	2	$ 375,000	$ 375,000
5 Miscellaneous Costs[1]				$ 6,857,034			$ 5,631,158
Maintenance of Traffic				$ 1,714,259			$ 1,407,790
Mobilization				$ 685,703			$ 563,116
			Subtotal	$ 9,256,996		**Subtotal**	$ 7,602,063
Concept Level Contingency 25.0%				$ 1,714,259			$ 1,407,790
			TOTAL AMOUNT	**$10,971,254**		**TOTAL AMOUNT**	**$ 9,009,853**

Source: HNTB Corporation, 2013.

[1] Includes drainage and stormwater management, erosion and sediment control, utilities, street lighting, signing and pavement, grading, landscaping/tree removal.

Note: The costs shown in this estimate represent an estimate of probable costs prepared in good faith and with reasonable care. HNTB has no control over the costs of construction labor, materials, or equipment, nor over competitive bidding or negotiating methods and does not make any commitment or assume any duty to assure that bids or negotiated prices will not vary from this estimate.

2.3 Alternatives Eliminated from Consideration

Throughout the concept development process and agency and public input, several intersection alternatives were considered and dismissed because they were not practical and/or feasible or were not consistent with the project objectives or purpose and need. The following is a discussion of concepts that are not recommended for detailed engineering or analysis, but were considered in the planning process.

2.3.1 Modified Square Alternative

The Modified Square Alternative concept was developed as part of the District's Great Streets Initiative in 2006-2007 and is the basis for the Revised Square Alternative being carried forward. This alternative would create a "traffic square" concept, requiring all vehicles to go around the perimeter of the square with the exception of the Pennsylvania Avenue through-movements. The Modified Square Alternative maintains most of the intersecting street connections near their current locations; the exception is that 25th Street SE would no longer connect to the Pennsylvania/Minnesota Avenues intersection. With this change, 25th Street, SE would be converted into a two-way street. As with the Revised Square Alternative, the Modified Square would also reduce the interaction between pedestrians and vehicles and improve safety at the intersection. This alternative would also require a jurisdictional land exchange between NPS and DDOT and would result in more contiguous park area/green space.

The Modified Square design has a greater central area (larger contiguous park area to the north and south of Pennsylvania Avenue, SE) which would require the taking of private right-of-way (ROW) from the existing gas stations and other businesses located at this intersection. Impacted businesses would include the Shell/Food Mart property at the southeast corner of the intersection (Pennsylvania and 25th Street, SE), the BP gas station at the northeast corner of the intersection (Pennsylvania and Minnesota Avenues, SE) and the two commercial walk-up eateries (Mario's Pizza House and AC Take-Out Chicken) in the southwest quadrant of the Minnesota Avenue, SE and 25th Street SE intersection.

The ROW acquisition of the lands belonging to the existing businesses would result in the closure of at least one of the gas stations, and could potentially necessitate the taking of the whole properties. As part of the ROW acquisition of the two gas stations, environmental site assessments would be needed to investigate the underground storage tanks or other possible contaminants associated with the gas station activities. Should there be any leakage from these tanks, there could be significant remediation measures that would be required prior to proceeding with the project. The cost of ROW and relocation alone for this alternative was estimated to be $4.3 million (2006 dollars). Additionally, should any remediation efforts be required, significant additional costs and delays would be likely.

Given the potential economic impacts associated with displacing existing businesses and impacting private ROW, the potential environmental impacts due to gas station contaminants and the high costs associated with this alternative, the Modified Square Alternative is not considered feasible and was dismissed from detailed study.

2.3.2 Ellipse Alternative

The Ellipse Alternative concept was also developed as part of the District's Great Streets Initiative in 2006-2007. This alternative would function as a traffic circle but would also maintain the through-

movement for vehicles on Pennsylvania Avenue, SE. The Ellipse Alternative would maintain connections to all intersection roadways and would result in frontage changes to several properties, which would provide wider sidewalks and landscape areas. This alternative would also require a jurisdictional land exchange between NPS and DDOT.

With the design of the Ellipse Alternative, this configuration would require acquisition of three private properties and relocation assistance for four businesses that would be displaced at the intersection. Impacted businesses would include the Shell/Food Mart property at the southeast corner of the intersection (Pennsylvania Avenue and 25th Street, SE) and the two commercial walk-up eateries (Mario's Pizza House and AC Take-Out Chicken) at the 25th Street, SE and Minnesota Avenue, SE intersection. There would also be ROW required from the BP gas station at the northeast corner of the intersection (Pennsylvania and Minnesota Avenues, SE). The cost of ROW and relocation alone for this alternative was estimated to be $3.2 million (2006 dollars). Additionally, as with the Modified Square Alternative, there is a high likelihood for environmental impacts and necessary remediation under the Ellipse Alternative due to the impacts to existing gas station properties.

Given the potential economic impacts associated with displacing existing businesses and impacts to private ROW, the potential environmental impacts due to gas station contaminants and the high costs associated with this alternative, the Ellipse Alternative is not considered feasible and was dismissed from detailed study.

2.4 Construction and Staging

Construction staging areas would be selected to protect environmental resources, to meet the needs of the contractor based on the construction phasing plans, and to minimize disruptions and safety hazards for pedestrians, bicyclists and motorists who utilize the intersection.

Construction would be phased in such a way as to provide the safest and most logical detours around the road and sidewalk segments under construction. Notifications would be used to alert users in advance of any closures or detours required for construction. Notifications may include electronic signage, postings to the DDOT and FHWA websites and social network pages, and emails to interested parties identified during the scoping process.

It is recommended that work on the main intersection roads of Pennsylvania Avenue and Minnesota Avenue, SE, be done during off-peak traffic hours to minimize disruptions to traffic. As detailed in Title 20 of the District of Columbia Code of Municipal Regulations (DCMR), construction is allowed Monday through Saturday from 7 am to 7 pm without any special permits. Any construction scheduled outside of these times would require obtaining an after-hours permit.[32] It is estimated that construction would take approximately 18 to 24 months. The construction schedule is included in *Appendix D, Construction Cost Estimate and Schedule.*

Adequate construction techniques, including use of BMPs and LID strategies, would be adhered to so as to minimize the potential for impacts to the surrounding environment. Construction impacts are discussed within the appropriate environmental categories in *Section 4, Environmental Consequences.*

3.0 AFFECTED ENVIRONMENT

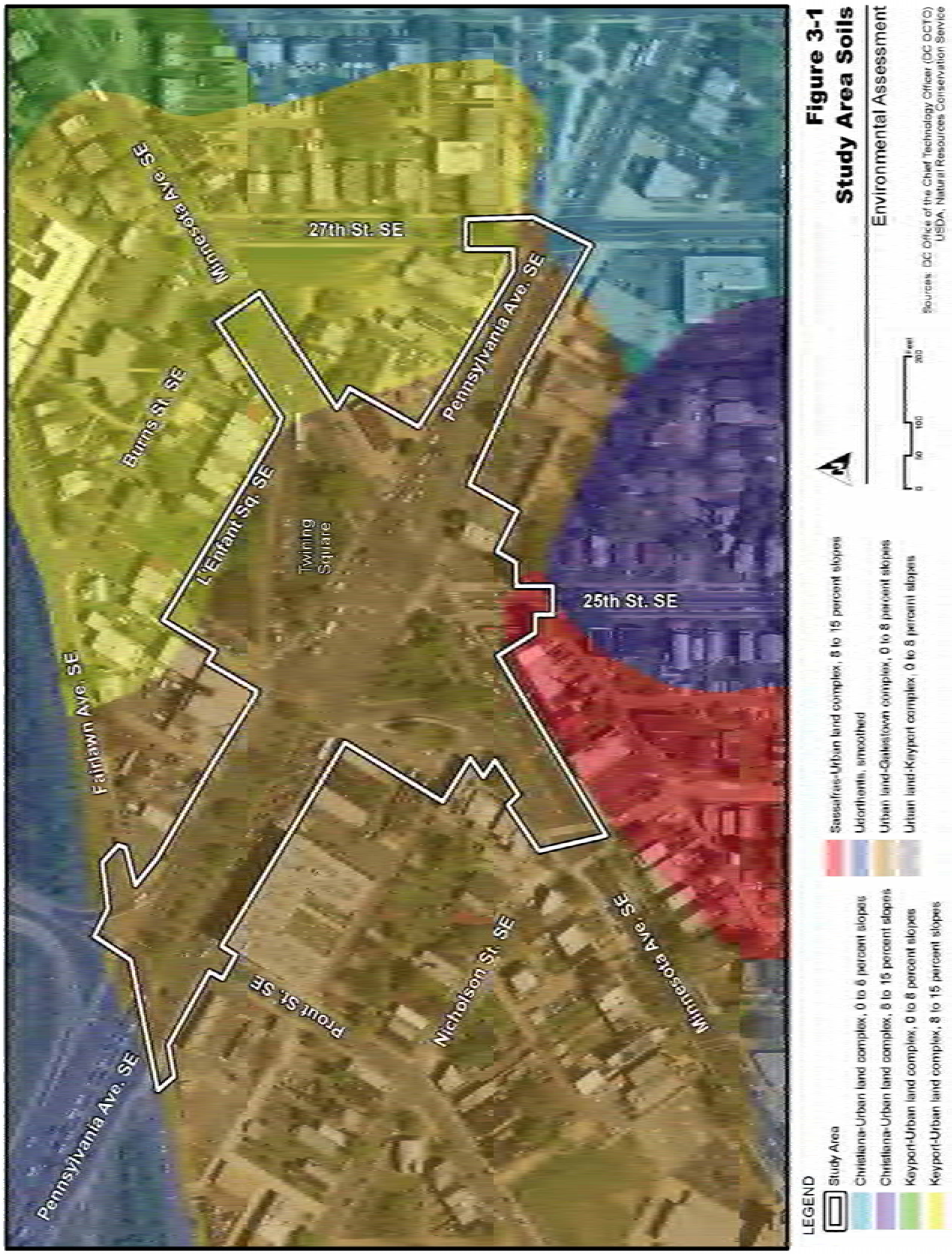
3.1 Natural Resources

3.1.1 Soils

Given the development history of the Study Area, most of the Study Area is expected to represent completely or partially disturbed soil sequences. The current use of land is roadway, sidewalk, and dry, grassed open space. The soil types in this area have only fair potential for landscaping because of droughtiness. Soils occurring in the Study Area include Urban land-Galestown complex, Keyport-Urban land complex, Sassafras-Urban land complex and Christiana-Urban land complex. The Urban land-Galestown complex is the most common soil, which is found in the western, central, and part of the northern sections of the Study Area.[33] The northern and eastern edges of the Study Area are reported as Keyport-Urban land complex. Small segments of Sassafras-Urban land complex and Christiana-Urban land complex are found along the southern edge of the Study Area. See **Figure 3-1** for an overview of the Study Area soils.

- **Urban land- Galestown complex (UmB).** Urban land- Galestown complex represents areas where roughly 70 percent of the soil surface is covered with impervious surfaces, with smaller areas of graded and reworked Galestown series soils exposed. The 1976 District soil survey notes that roughly 5 percent of Urban land-Galestown mapping units are relatively undisturbed Galestown soils. Galestown soils developed out of old marine deposits of sand and found on uplands and terraces along the Coastal Plain. They are generally deep and somewhat excessively drained. The typical profile includes a thick two-layer A Horizon of loamy sand over a very thick, coarse loamy sand B Horizon. The substratum is generally more than three feet below the surface.

- **Christiana-Urban land complex (CfC).** Christiana series soils are deep, well drained soils formed in silty material deposited over older clay deposits.[34] They are generally found on well-dissected uplands, and within the Study Area are reported as part of the Christiana-Urban land complex, where roughly 40 percent of the area is covered with impervious surfaces, 20 percent consists of reworked or graded Christiana series soils, and 20 percent consists of relatively undisturbed Christiana series soils. The remaining 20 percent includes a mixture of associated soil series and areas of eroded Christian series soils where the clayey subsoil is exposed. The typical profile for Christiana series soils includes a thin silt loam A Horizon over a two-layer subsoil. In its upper layer, the subsoil is a heavy yellowish brown silt loam, but changes to a red silty clay within a foot of the surface.


Minnesota Ave. SE
27th St. SE
Pennsylvania Ave. SE
Burns St. SE
L'Enfant Sq. SE
Fairlawn Ave. SE
Twining Square
25th St. SE
Pennsylvania Ave. SE
Minnesota Ave. SE
Nicholson St. SE
Prout St. SE
LEGEND
Study Area
Christiana-Urban land complex, 0 to 6 percent slopes
Christiana-Urban land complex, 8 to 15 percent slopes
Keyport-Urban land complex, 0 to 8 percent slopes
Keyport-Urban land complex, 8 to 15 percent slopes
Sassafras-Urban land complex, 8 to 15 percent slopes
Udorthents, smoothed
Urban land-Galestown complex, 0 to 8 percent slopes
Urban land-Keyport complex, 0 to 8 percent slopes
Figure 3-1
Study Area Soils
Environmental Assessment
Sources: DC Office of the Chief Technology Officer (DC OCTO)
USDA, Natural Resources Conservation Service

- **Keyport-Urban land complex (KmC).** Keyport soils are generally deep, moderately well drained soil developed in silty material over older clay deposits. They are typical found in lower settings in the Coastal Uplands. Areas in the Study Area which are reported as Keyport- Urban land complex consists of strongly slopes areas where roughly 40 percent of the area is covered with impervious surfaces, 20 percent consists of reworked or graded Keyport series soils, and 20 percent consists of relatively undisturbed Keyport series soils. The remaining 20 percent includes a mixture of associated soil series and areas of severely eroded Keyport series soils where the grey clayey subsoil is exposed. The typical soil profile for Keyport series soils includes a thin silt loam A Horizon, and a thick, multi-layered subsoil which is dominated by clay within a foot of the surface due to erosion deflation.

- **Sassafras-Urban land complex (SgC).** Sassafras series soils are deep, well drained soils formed in marine sediments, and found on side slopes and ridges tops in upland settings.[35] Sassafras series soils reported within the Study Area are included in Sassafras- Urban land complex mapping units where roughly 40 percent of the mapping unit is impervious surfaces, 20 percent is disturbed Sassafras series soils, 20 percent is undisturbed Sassafras series soils, and 20 percent consists of associated soils types. Typical soil profiles in strongly sloped areas of Sassafras soils consists of a sandy loam A Horizon less than a foot thick, over a multi-layer subsoil which approached two feet in thickness. Subsoil grades from sandy loam to sandy clay loam and back.

3.1.2 Water Resources

Groundwater

Groundwater in the vicinity of Pennsylvania and Minnesota Avenues, SE occurs within poorly consolidated sand and gravel aquifers of the Coastal Plan Physiographic Province. The Coastal Plain is characterized by unconsolidated interleaved deposits of gravel, sand, silt, and clay, with the surface soils in the vicinity of the Study Area formed in reworked river terrace deposits from the Pliocene and Pleistocene, as well as Potomac Group soils from the Cretaceous.[36] The Potomac Group is the oldest layer of the Coastal Plain deposits and consists of mostly silty clays with interbedded sand and gravel.[37] The Coastal Plain can be divided into six regional aquifers which are separated by four regional confining units that slow the vertical flow of groundwater. Groundwater in the District is not used as a potable water source.

Water Quality

While there are no surface waters within the Study Area, stormwater runoff from the Study Area ultimately enters tributaries which flow into the nearby Anacostia River. Due to its urbanized character, the Anacostia River has become highly degraded and thus the focus of restoration efforts by the District.

The 1972 Federal Water Pollution Control Act, as amended by the Clean Water Act of 1977, is a national policy to restore and maintain the chemical, physical, and biological integrity of the nation's waters; enhance the quality of water resources; and to prevent, control, and abate water pollution. Based on review of 2010 EPA water quality assessments, the Anacostia River is impaired for Protection of Human Health related to Consumption of Fish and Shellfish and for Secondary Contact Recreation and Aesthetic Enjoyment, both upstream and downstream of the project Study Area. These impairments are likely

caused by oxygen depletion in the water, as well as the presence of trash and other debris. A probable source contributing to impairment is urban-related stormwater runoff which brings oil and grease into the Anacostia River.

3.1.3 Wildlife

The Endangered Species Act of 1973 (ESA) provides for the conservation of species which are listed as endangered or threatened. The ESA is implemented by the U.S. Fish and Wildlife Service (FWS), who manages land and freshwater species, and by the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS), who manages marine species.

Terrestrial Organisms

The District provides habitat to a variety of wildlife species which are accustomed to urban conditions and frequent human disturbances. Common wildlife in the District include deer, raccoons, squirrels, chipmunks, frogs, salamanders, turtles, snakes, bats, ducks and a range of bird species.

Migratory Birds

The Study Area is located within the Atlantic Flyway, an important pathway for migratory birds traveling along the Atlantic coast and through parts of the Washington, D.C. area. Migratory bird species are known to utilize the Chesapeake Bay during their migration to feed, rest, winter and breed during the spring. Ospreys are a common migratory bird found in the Anacostia River watershed. They are known to nest high on trees or on lower platforms, such as the concrete pilings beneath the South Capitol Street Bridge.[38] In 2011, ospreys caused a stop-work order, as the birds had built a nest atop a construction crane being used on the Anacostia Riverwalk Trail.[39] The Study Area is within the Anacostia River watershed. However, it does provide any habitat for migratory birds, such as mature forests, wetlands or immediate proximity to the river corridor. The Study Area likely supports a limited population of birds, small mammals, reptiles and amphibians. Wildlife found in the Study Area are those that are able to adapt to the urban landscape.

3.1.4 Vegetation

The Study Area includes the 25th Street, SE intersection with Minnesota Avenue, the green space area designated as Twining Square, and two small cut-through/side streets designated as L'Enfant Square, SE. The primary vegetative areas within the Study Area are roadside and urban lawn, with low growing plants and trees. The NPS park land at the intersection, U.S. Reservation 487, is divided into four reservations totaling approximately 1.2 acres of grassed park property with interspersed trees throughout. The NPS medians in the Study Area are also grassed with interspersed street trees (approximately 0.24 acres). Based on an engineering survey of Pennsylvania Avenue, SE, there are approximately 15 trees in the northern reservation (north of Pennsylvania Avenue) and approximately 18 trees in the southern reservation (south of Pennsylvania Avenue). According to the D.C. Street Trees Map by Casey Trees®, Willow oak trees and Thornless honeylocust trees are both found in the vicinity of the Pennsylvania and Minnesota Avenues, SE intersection.[40]

Twining Square does not function as green space or as a visitor destination; the intersection is urban in nature, and is primarily used by commuters and residents as a through-way, rather than as a destination.

3.2 Cultural Resources

3.2.1 Historical Context

The following present a narrative of the development history of the Study Area, based on historic maps that were available for review. See ***Appendix E, Section 106 Consultation and Cultural Resources Information (Cultural Resources)*** for additional information, details and historic maps.

Based on a reconstruction of early land grants prepared as part of an archival study prepared for adjacent Anacostia Park, the present Study Area appears to have been primarily within "Green's Purchase," acquired by Luke Green in 1668.[41] Green's Purchase was likely subdivided into smaller tenancies and periodically transferred, and subsequently sold off as smaller parcels in the late eighteenth and early nineteenth centuries.

The first available cartographic source which depicted detail on the south side of the Anacostia River is Boschke's 1861 topographic map of Washington, DC. Based on the features indicated on this map, the Study Area was largely surrounded by undeveloped or rural land at that time. Although, there is what appears to be a small structure and orchard present in the southern section of the Study Area, while a second structure was present outside the northwest Study Area extension.

Anacostia Road, a precursor to present day Minnesota Avenue, was clearly well established by 1861. The less detailed picture provided by the 1879 Hopkins *Atlas of 15 Miles Around Washington* suggests that the orchard property belonged to Elizabeth Howard, while the structure off the northwestern Study Area extension belonged to Henry Naylor, one of eight structures that he is depicted as owning in the Study Area vicinity. One of those eight is the additional structure, built along the Anacostia-Bladensburg Road between 1861 and 1879, now visible within the southern portion of the Study Area. Another important development in the vicinity of the Study Area was the establishment of the Alexandria Branch of the B&O Railroad alignment passing to the west of the Study Area.

Additional detailed information available on the 1888 USCGS topographic sheets for the District indicates that both mid-nineteenth century structures within the Study Area, and the Howard orchard, survived into the last part of the nineteenth century. This highly detailed and accurate map also indicates that the present Study Area included a deeply incised stream valley filled with marsh, and bordered by a sand dune or possibly elevated fill along the subsequent alignment of the Pennsylvania Avenue extension. During this period a new Pennsylvania Avenue bridge was under construction, and plans were underway to develop the area south of the proposed Pennsylvania Avenue extension as Twining City. Overall, the topographic sheets indicated that the immediate Study Area vicinity remained rural, with large segments of woodland to the east.

Many of the avenues and streets east of the Anacostia River, including Pennsylvania Avenue did not exist as of 1901 but were proposed. By 1903 the Study Area vicinity was actively being developed as a suburb of the District, fully subdivided but only partially developed. The 1903 Baist *Real Estate Atlas of Surveys of Washington* indicated that neither of the mid-nineteenth century structures survived the extension of Pennsylvania Avenue and the development of the Twining City subdevelopment. Several modern elements within the Study Area are present on this source. The most significant is the depiction of L'Enfant Circle, although it is indicated as a perfect square reservation with a circular road exchange

within it, a configuration which is not supported by any other cartographic source reviewed during this historical context research. Most of the present lot configuration is also present on this source. However, very few structures had been constructed prior to 1903, and the handful of primarily wooden structures was restricted to the area south and west of the Study Area. Only one structure, in Lot 1 of Square 5560, appears to fall within the Study Area, and that may be an artifact of the georeferencing distortion.

Based on the sequence of Baist Real Estate Atlases, subsequent development of the Study Area vicinity was relatively slow but consistent. Prior to 1913, development was only present south of Pennsylvania Avenue. In 1913, a single structure was present along the north of Pennsylvania Avenue, and a small handful of frame structures had been completed along the south side of Burns Street on lots backing onto the square. See *Appendix E, Cultural Resources* to view the complete Historic Context Report with historic maps.

Review of the Baist series indicated that the park land reservation was established early in the twentieth century as an irregular rectangle which remained stable into the 1940s.

In the 1920s and early 1930s, Twining Square was known as L'Enfant Square. In 1929, the Office of Public Buildings and Public Parks of the National Capital assumed jurisdiction over Reservations 487 A, B, C and D (Twining Square and the adjacent medians) at the intersection of Pennsylvania and Minnesota Avenues, SE via the March 29, 1929 request of the Commissioners of the District. In 1933, in accordance with the recommendation of the National Capital Park and Planning Commissions, U.S. Reservation 487 officially became "Twining Square" instead of "L'Enfant Square." The name Twining Square was selected to honor the first military member of the District Commissioners, Major William Johnson Twining who served from 1878-1882.

Fewer mid-twentieth century cartographic resources were identified during the archival research. Aerial photographs from 1949, 1951, 1957, and 1963 were examined but provided little useful information about the interior of the Study Area beyond documenting the construction of access lanes within the reservation. Land transfer to and from the DC Commissioners modified the reservation space in 1938 (along the outer edges, Land Order 487), and again prior to 1949 to construct the internal access lanes (recorded in 1951, Land Order 463). A 1954 Baist map suggests that redevelopment was underway in the Study Area vicinity at that time, as the three early twentieth century frame structures on the south side of Burns Street had been removed to make room for a row of brick rowhouses. The structures previously present on either side of Pennsylvania Avenue east of Minnesota Avenue were also demolished in the mid-twentieth century, and service stations were constructed in their place.

Subsequent disturbance from the 1970s to present is more difficult to track, as few archival sources were readily available for review and most late twentieth century maps do not identify specific building footprints. Aerial photographs suggest redevelopment of the northeastern corner of Fairlawn and Pennsylvania Avenue between 1957 and 1963, the northeast corner of the Pennsylvania Avenue and Minnesota Avenue sometime between 1963 and 1980, and the northeastern corner of Fairlawn and Pennsylvania Avenue was again redeveloped between 1963 and 1980. The northeastern corner of Fairlawn and Pennsylvania Avenue is outside but adjacent to the Study Area, but the redeveloped lot on the northeastern corner of Pennsylvania and Minnesota extends into the Study Area.

**It is important to note that Build Alternative 1 – Revised Square Alternative is often referred to as the "Modified Square Alternative" in the cultural resources reports and correspondence.*

Area of Potential Effects (APE)

Direct and an Indirect Areas of Potential Effect (APE) were developed using a composite of the Build Alternatives considered for this project. Both the alternatives carried forward and the alternatives dismissed from further consideration were included in the development of the APE. **Figure 3-2** delineates the APE-Direct, which is equivalent to the Study Area. The APE-Direct was approved by the DC State Historic Preservation Office (SHPO) in April of 2011. The archaeological APE is restricted to the APE-Direct due to proposed ground disturbing activities.

The APE-Direct presently consists of a sloped streetscape, with the northern and southern extensions up Minnesota Avenue, SE and the eastern extension up Pennsylvania Avenue, SE rising in elevation, while the western extension has a very gentle slope down. Development is primarily commercial along Pennsylvania Avenue and the southern portion of Minnesota Avenue, while the northern extension of Minnesota Avenue and the other cross streets consist of residential development.

The historic architectural and history APE, also known as the APE-Indirect is based upon a site visit and line-of-sight survey. The Architectural APE-Indirect, illustrated in **Figure 3-3**, was delineated to include the full parcel of all structures adjacent to the APE-Direct, and includes one building beyond the APE-Direct (Pennsylvania Avenue, Minnesota Avenue, and 25th Street, and Pennsylvania Avenue and Fairlawn Avenue). A detailed description and photographs of the current visual conditions within the APE-Indirect are provided in *Appendix E.* The APE-Indirect was approved by the DC SHPO in April of 2011.

3.2.2 Historic Structures

Through research and coordination with the DC SHPO, it was determined that three buildings are eligible for the National Register of Historic Places (NRHP) for purposes of compliance with Section 106 of the National Historic Preservation Act (NHPA) for this project. These properties include the Morton's Department Store Building at 2324 Pennsylvania Avenue, SE; the Highland Theater Building at 2523 Pennsylvania Avenue, SE; and the Little Tavern Building at 2537 Pennsylvania Avenue, SE. The Little Tavern Building was demolished in 2012 and there are currently no buildings or structures that occupy the lot. **Figure 3-4** provides the locations of these structures within the APE-Indirect. See *Appendix E* for a description and photographs of the historic structures.

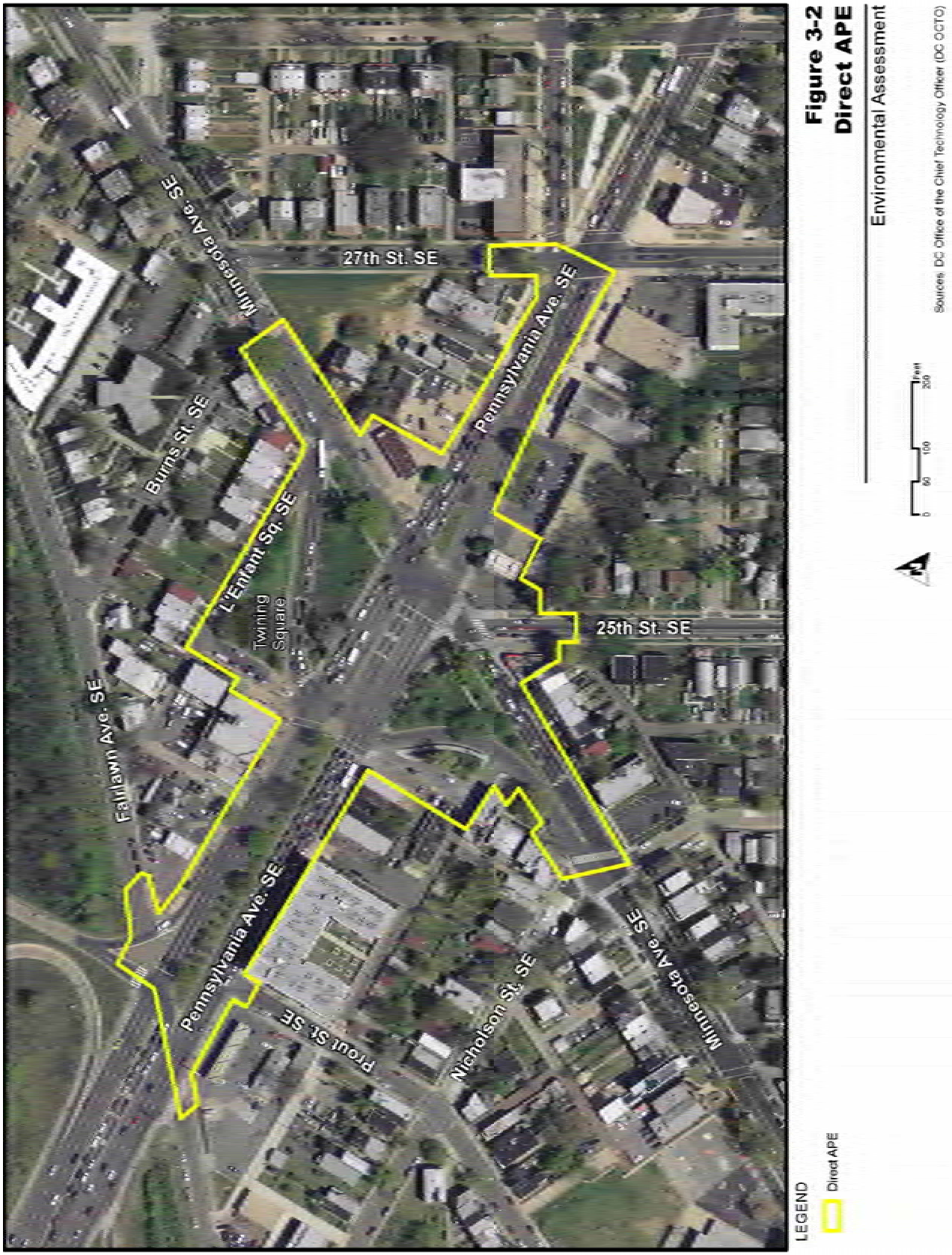


Figure 3-2
Direct APE
Environmental Assessment

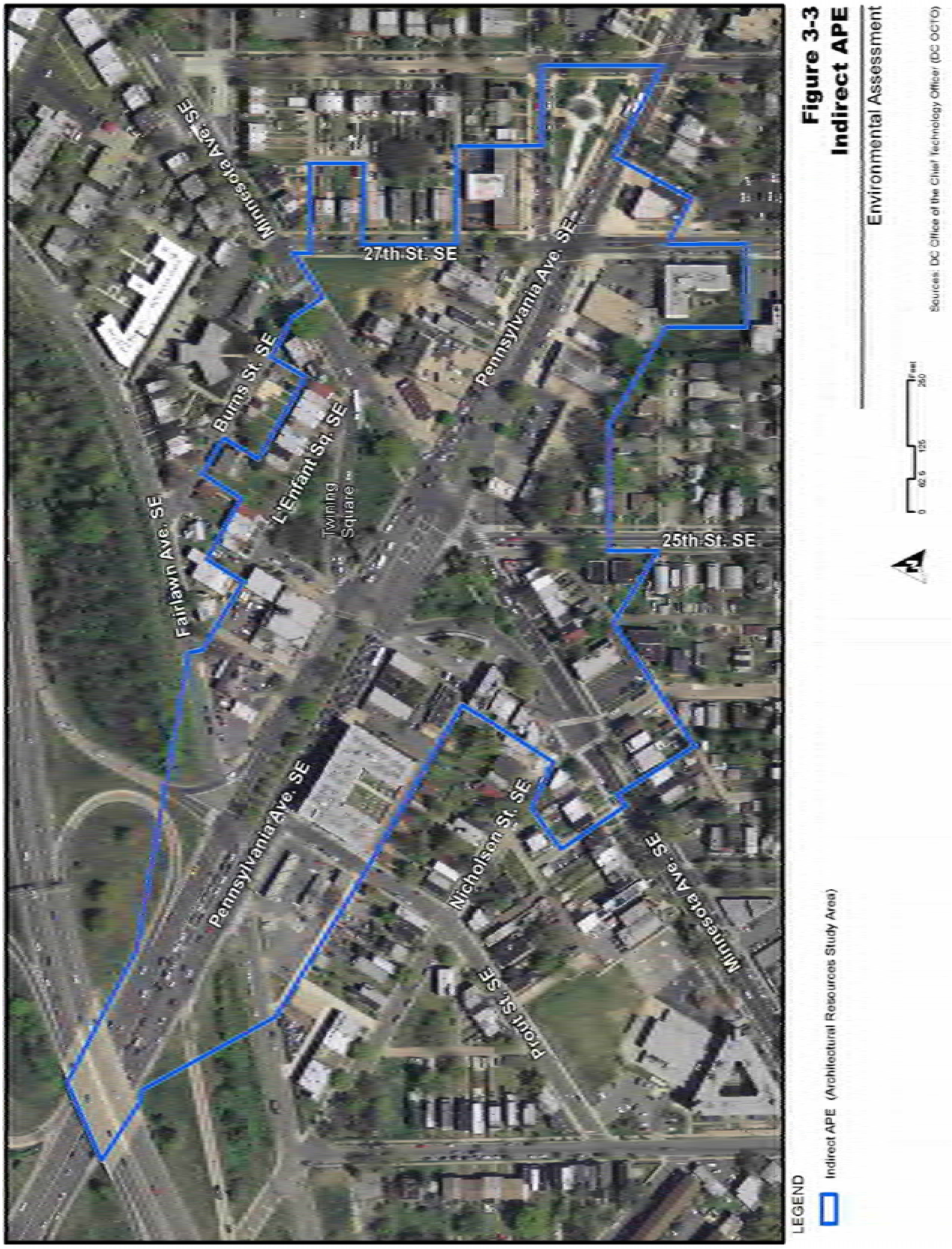


Figure 3-3
Indirect APE
Environmental Assessment

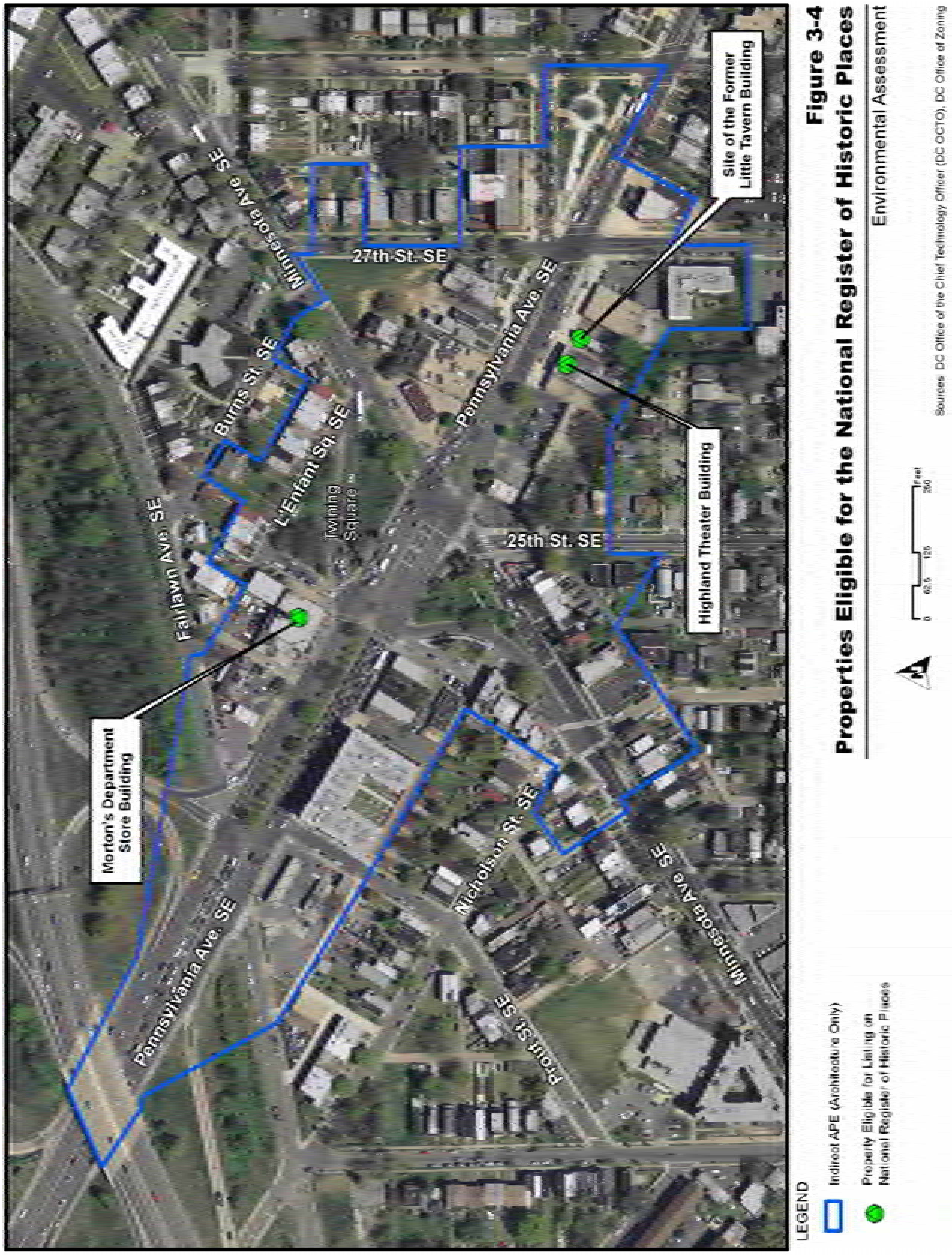


Figure 3-4
Properties Eligible for the National Register of Historic Places
Environmental Assessment

3.2.3 Cultural Landscapes

Cultural landscapes reflect the relationship between what is natural and what is man-made. According to *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes*, a cultural landscape is "a geographic area (including both cultural and natural resources and the wildlife or domestic animals therein) associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values."[42]

DDOT and NPS provided historic landscape photographs for review of cultural landscapes in the Study Area. The NPS photographs were associated with the 1938 Land Order transferring the outer north and western portions of the reservation to the District Commissioners. These included copies of three photographs, two dated 1929, taken looking from Pennsylvania Avenue across each portion of the reservation. Although the photographs were blurred, it was possible to get a sense of open space to the north of the reservation and wooded area to the south of the reservation.

Three photographs from the mid-1940s are shown below. The oldest, dated 1945, captures the southern reservation, looking northwest from a point on Minnesota Avenue near the Nicholson Street intersection (**Photo 1**). Both portions of the reservation appear to be essentially devoid of trees. The other two photographs, dated 1947 shows views east and west along Pennsylvania Avenue. **Photo 2** is the view looking west along Pennsylvania Avenue, presumably from the roof or upper floors of a multi-story structure, looking across a tree-less reservation and commercial development on Pennsylvania Avenue. The front entrances of both Minnesota Avenue service stations are visible. **Photo 3** is the corresponding view looking east along Pennsylvania Avenue from a point west of the Fairlawn intersection, again documenting the essentially commercial nature of development in this area. Neither portion of the reservation is visible in this photograph.

Photo 1

1945 Photograph looking northwest across the southern portion of Reservation 487

Photograph courtesy of DDOT.

Photo 2

1947 Photograph looking along Pennsylvania Avenue

Photograph courtesy of DDOT.

Photo 3

1947 View looking east along Pennsylvania Avenue

Photograph courtesy of DDOT.

3.2.4 Archaeology

Thorough assessments of potential for both prehistoric and historic archaeological resources are included in the *Archaeological Assessment of Potential for the Proposed Pennsylvania Avenue and Minnesota Avenue Land Exchange and Intersection Improvements Project* in *Appendix E*. Below is a summary of findings.

The APE lends itself to four primary divisions based on the character of current conditions, further discussed below: the northern reservation (green space north of Pennsylvania Avenue); the southern reservation (bifurcated green space south of Pennsylvania Avenue); the area of new ROW acquisition (only applied to alternatives dismissed from further consideration); and areas under existing roadbed. Because the Build Alternatives carried forward (Build Alternatives 1 and 2) would not require any new ROW acquisition, that part of the discussion is not discussed further. However, the area of new ROW acquisition is included in the *Archaeological Assessment of Effects Report* in *Appendix E*.

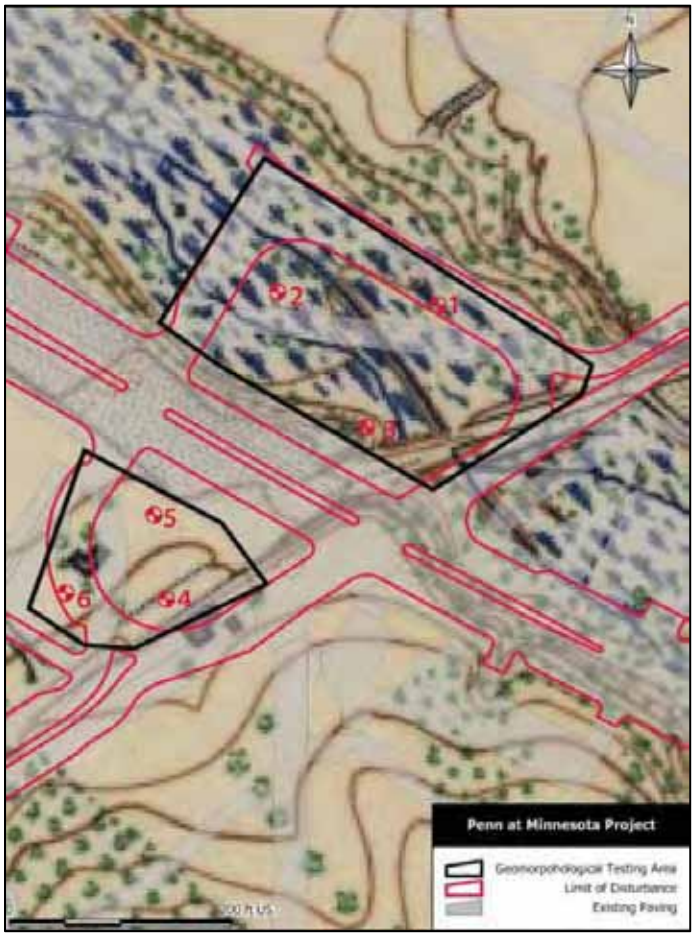
Based on archival research and coordination with the DC SHPO City Archaeologist, it was determined that an archaeological investigation was needed for the Proposed Action. Geoarchaeological coring was conducted in November 2012 to assess the soils and landscapes available to prehistoric populations, as well as the extent of historic impacts accrued since the initiation of European settlement over 300 years ago. Investigations were directed toward examinations and analyses of soil and geomorphic features for indications of landscape stability, buried surface levels, deposit types, and environmental conditions relating to human utilization of a landscape. The Geoprobe borings were made at selected locations determined on the basis of historic mapping showing a wetland northeast of Pennsylvania Avenue and apparent uplands to the southwest. Three borings were made on each side of Pennsylvania Avenue, and approximate locations of the borings are shown in **Figure 3-5**. The associated report, *Geoarchaeological Interpretations in the Vicinity of the Intersection of Pennsylvania and Minnesota Avenues in the Anacostia Section of Washington, D.C.* and the findings of the investigation are included in *Appendix E*.

The Northern Reservation

Overall, the northern reservation appeared to have little potential for archaeological resources. Based on the most accurate detailed map available (the 1888/1892 topographic plate), the area north of Pennsylvania Avenue consisted primarily of marsh prior to infilling for the late nineteenth-early twentieth century development of the Twining City subdivision. Based on the 1888 topographic sheet, this stream valley was deeply cut suggesting removal of considerable amounts of soil and reflected a deep erosion environment prior to inundation. Once flooded, there was little likelihood of human occupation. As such, no further cultural resources consideration in this area appears warranted.

Geoarchaeological coring confirmed that the northern reservation is too poorly drained for occupation; the wetland north of Pennsylvania Avenue would likely have been an attractive draw throughout the Holocene era. Probably altered by a century or more of agricultural run-off and then intentionally filled, the wetland identified on a historic map is still present, but now lies as much as 15 feet below the modern surface.

Figure 3-5
Boring Locations and Study Area Superimposed on 1892 Map



Source: EAC/Archaeology, Inc., 2011.

The Southern Reservation

The southern reservation was considered a zone of high potential for prehistoric resources, as well as historic resources associated with nineteenth century residences. Subsequent establishment of the right turn lane which bisects the reservation represents a substantial source of disturbance, but does not appear to have affected the entire reservation. Utility disturbance in this area appears to have been restricted to the early twentieth century, and consisted of one or at most two alignments established prior to 1913, when excavation would have consisted of less destructive manual labor. By 1921, maps indicate a marked preference for utility placement under the adjacent street beds, which may have minimized subsequent disturbance in this area.

Geoarchaeological coring found that, as would be expected in such an urban setting, the upland south of Pennsylvania Avenue has been variably disturbed. Consequently, although this ancient landscape would have been well suited for occupation, it has only very limited prospects for early cultural resources.

Areas under Existing Roadbeds

This area includes the Pennsylvania and Minnesota Avenue roadbeds, and small connecting segments of 25th and 27th Streets, as well as the Twining Square access roads (both internal and external). Most of these pass over areas of high potential, but archival documentation indicates that the Pennsylvania Avenue, Minnesota Avenue, and 25th Street roadbeds had all been substantially disturbed by the mid and late twentieth century preference for placing utilities under them. Three of the four Twining Square access roads pass exclusively over areas considered to have little potential for intact resources due to prior stream scrubbing and erosion, and the final southern internal access road was tested with the southern reservation area. No information about prior disturbance under 27th Street was found during the archival research, but as project impacts in this area would appear to be largely cosmetic changes to blend into the proposed new Pennsylvania Avenue configuration, no testing was warranted at this location.

3.3 Socioeconomic Resources

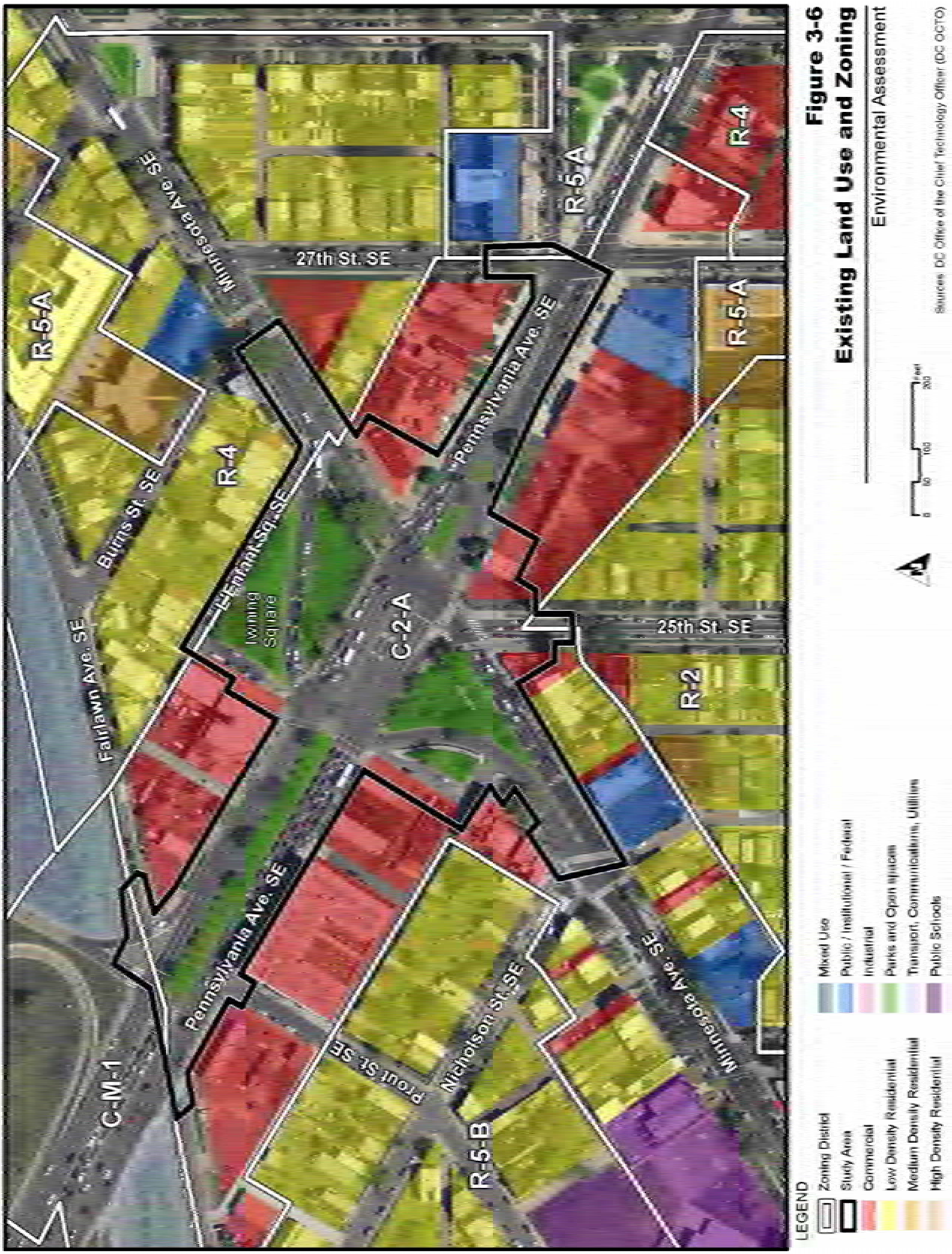
3.3.1 Land Use

Land use designations within the Study Area were determined using the *District of Columbia Generalized Land Use Layer*. Land use within the Study Area is designated as commercial, parks and open space and low- and medium- density residential. Commercial land uses line Pennsylvania Avenue, SE on both sides of the street within the Study Area and at all of the intersection corners. Low density residential land use is found on Minnesota Avenue, SE and to the north of L'Enfant Square, SE (north of Twining Square). The parks and open space land use consists of Twining Square and the center medians on Pennsylvania Avenue. Public/Institutional/Federal land uses are interspersed throughout the area. See **Figure 3-6** for land use designations within the Study Area.

Neighborhoods in the vicinity of the project Study Area include Hillcrest, Randle Heights, Anacostia, and Fort DuPont Park. Retail pockets are auto-oriented in character, and offer limited services. The corridor has several major parks (Fort Davis, Fort DuPont and Fort Stanton) and smaller pocket parks; however pedestrian access to the parks is hindered or restricted due to the heavily traveled, automobile-oriented Pennsylvania Avenue, SE.

3.3.2 Zoning

The District of Columbia Office of Zoning *District of Columbia Zoning Map*[43] identifies the subject intersection and its immediate surroundings to the east and west along Pennsylvania Avenue and to the south on Minnesota Avenue as Zone C-2-A, which permits low density development, including office employment centers, shopping centers, medium-bulk mixed use centers, and housing. The residences just north of the square, lining L'Enfant Square, SE (street) are zoned R-4, which permits matter-of-right development of single-family residential uses (including detached, semi-detached, row dwellings, and flats), churches and public schools with minimum lot widths, etc.[44] Commercial, parks and open space, and low density residential are predominant in the Study Area. 2300 Pennsylvania Avenue, a block west of the intersection, is zoned as a C-2-A active Planned Unit Development (PUD). Zoning classifications are shown on Figure 3-6.


R-5-A
R-5-A
R-4
R-5-A
R-4
R-5-A
R-4
C-2-A
R-2
C-M-1
R-5-B
Minnesota Ave. SE
27th St. SE
Pennsylvania Ave. SE
Fairlawn Ave. SE
Burns St. SE
Benning Rd. SE
Ivy Ivy Square
25th St. SE
Pennsylvania Ave. SE
Pennsylvania Ave. SE
Nicholson St. SE
Prout St. SE
Minnesota Ave. SE
LEGEND
Zoning District
Study Area
Commercial
Low Density Residential
Medium Density Residential
High Density Residential
Mixed Use
Public / Institutional / Federal
Industrial
Parks and Open spaces
Transport, Communications, Utilities
Public Schools
Figure 3-6
Existing Land Use and Zoning
Environmental Assessment
0 50 100 200 Feet
Sources: DC Office of the Chief Technology Officer (DC OCTO)

3.3.3 Demography

The Study Area is adjacent to or located within three Census tracts (CTs): 77.09, 76.01 and 76.04, shown in **Figure 3-7**. These CTs are bordered to the northwest by the Anacostia River, to the west by Fort DuPont and Pope Branch Park, and to the south by Good Hope Rd SE and Alabama Ave SE. Census data was gathered for the three CTs and for the District. Figure 3-7 also illustrates the relevant Census block groups. Employment and income information is only available at the CT level; therefore block group information is only referenced for population and race.

Table 3.1 provides the population in the Study Area by CT, including population change from 1980 to 2010 as compared to population trends in the average CT in the District. Population in the Study Area has declined in the last three decades, but much less so between 2000 and 2010 than the previous decades. The average District CT declined in population in the 1980s and 1990s, but reversed this trend between 2000 and 2010 with a 5 percent increase in population.

Based on 2010 U.S. Census Bureau data, the predominant race within the Study Area is Black or African American. **Table 3.2** shows the demography for the CTs and the District. The CTs within the Study Area have over 96% minority populations, as compared to the District which has a 65% minority population. As shown on **Table 3.3**, the block groups range from 96 to 99% minority.

Based on 2010 Demographic Profile Data, the median age of the population of the District is 33.8 years. The median age of the populations in the CTs adjacent to the Study Area is between 40 and 44 years. Percent of the population in the Study Area receiving a high school diploma has improved in the last few decades, as shown by the drop in percent of persons without a high school degree, shown in **Table 3.4**. This trend is consistent with the average District CTs.

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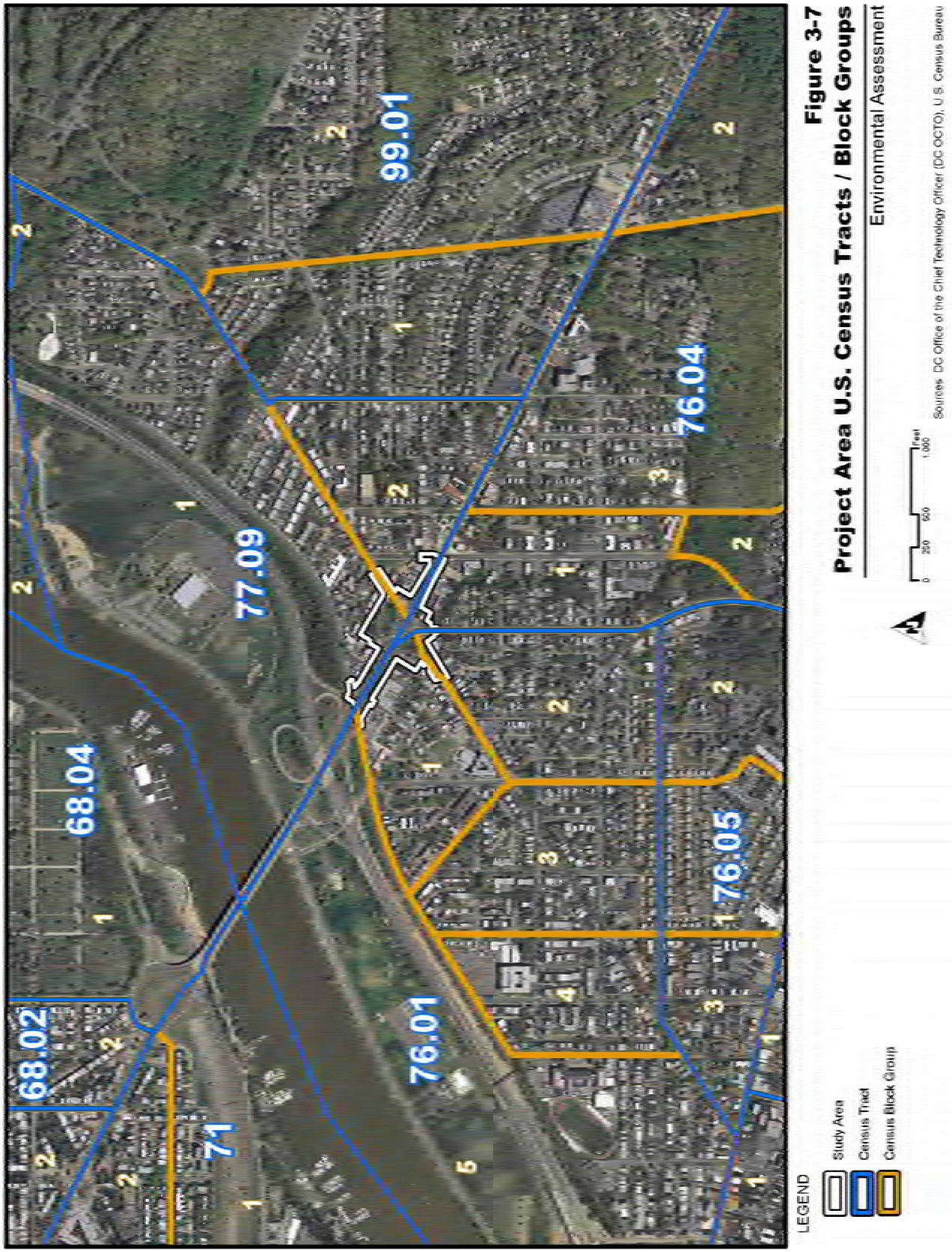

68.02
68.04
77.09
99.01
76.04
76.01
76.05
71
LEGEND
Study Area
Census Tract
Census Block Group
Figure 3-7
Project Area U.S. Census Tracts / Block Groups
Environmental Assessment
0 250 500 1,000 Feet
Sources: DC Office of the Chief Technology Officer (DC OCTO), U.S. Census Bureau

Table 3.1
Change in Population in the Study Area (1980-2010)

	1980	1990	2000	2010	% Change ('80-'90)	% Change ('90-'00)	% Change ('00-'10)
CT 77.09	2,594	2,367	2,031	2,007	-8.8%	-14%	-1.2%
CT 76.01	5,893	5,226	4,572	4,355	-11%	-13%	-4.7%
CT 76.04	4,642	4,410	3,764	3,644	-5%	-15%	-3.2%
Avg all CTs in District	3,566	3,391	3,196	3,362	-4.9%	-5.7%	5.2%

Source: Neighborhood Info DC (U.S. Census 2010), 2012

Table 3.2
Study Area Demography by Census Tract

Subject		CT 77.09		CT 76.01		CT 76.04		District of Columbia	
		Estimate	%	Estimate	%	Estimate	%	Estimate	%
Total Population		2,007	100	4,355	100	3,644	100	601,723	100
Not Hispanic or Latino	White	29	1.9	124	3.2	127	4.1	209,464	38.5
	Black or African American	1,884	94.5	4,075	94.4	3,387	93.6	301,053	50.7
	American Indian & Alaska Native	7	0.4	6	0.2	9	0.3	1,322	0.3
	Asian	3	0.1	21	0.5	10	0.3	20,818	3.5
	Native Hawaiian and Other Pacific Islander	0	0	0	0	1	0	216	0.1
	Other Race	8	1.3	4	0.2	4	0.4	1,451	4.1
	Two or More Races	29	1.7	64	1.6	47	1.4	12,650	2.9
Hispanic or Latino		47	2.3	61	1.4	59	1.6	54,749	9.1
Total Minority		1,978	98.6	4,231	97.2	3,517	96.5	392,259	65.2

Source: U.S. Census Bureau, 2010.

Table 3.3
Study Area Demography by Block Group

Subject		CT 77.09				CT 76.01				CT 76.04	
		BG 1		BG 2		BG 1		BG 2		BG 1	
		Estimate	%	Estimate	%	Estimate	%	Estimate	%	Estimate	%
Total Population		1,239	100	768	100	645	100	665	100	1,058	100
Not Hispanic or Latino	White	16	1.3	13	1.7	24	3.7	25	3.8	20	1.9
	Black or African American	1,161	93.7	723	94.1	586	90.9	630	94.7	1,004	94.9
	American Indian & Alaska Native	4	0.3	3	0.4	2	0.3%	2	0.3	3	0.3
	Asian	3	0.2	0	0	3	0.5	2	0.3	1	0.1
	Native Hawaiian and Other Pacific Islander	0	0	0	0	0	0	0	0	0	0
	Other Race	2	0	6	0.8	0	0	0	0.0	0	0
	Two or More Races	22	1.8	7	0.9	16	2.5	4	0.6	16	1.5
Hispanic or Latino		31	2.5	16	2.1	14	2.2	2	0.3	14	1.3
Total Minority		1,223	98.7	755	98.3	621	96.3	640	96.2	1,038	98.1

Source: U.S. Census Bureau, 2010.

Table 3.4
Persons without a High School Diploma in the Study Area (1980-2010)

	Number				As a percent of population			
	1980	1990	2000	2005-2009	1980	1990	2000	2005-2009
CT 77.09	43	38	30	25	1.7%	1.6%	1.5%	1.2%
CT 76.01	42	33	32	18	0.7%	0.6%	0.7%	0.4%
CT 76.04	31	20	17	12	0.7%	0.5%	0.5%	0.3%
Avg all CTs in District	33	27	22	15	0.9%	0.8%	0.7%	0.4%

Source: Neighborhood Info DC (U.S. Census 2010), 2012.

3.3.4 Environmental Justice

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" 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. In order to identify potential disproportionate impacts associated with the proposed action, the following steps must be taken:

1. Identify the potentially affected population within the Study Area.
2. Characterize the Study Area population with respect to minorities and low-income populations.
3. Determine potentially significant adverse impacts of the alternatives.
4. Evaluate the potential for disproportionately high and adverse impacts on minority or low-income populations in the Study Area.

EO 12898 does not define the terms "minority" or "low-income." However, guidance provided by the CEQ describes these terms in the context of an Environmental Justice (EJ) analysis. The following definitions taken from the CEQ guidance are unique to EJ analysis and were used to identify minority and low-income populations living near the LOD:

Minority Individual. A Minority Individual is classified by the U.S. Census Bureau as belonging to one of the following groups: American Indian or Alaskan Native, Asian or Pacific Islander, Black (not of Hispanic Origin), and Hispanic. Minority Populations – According to the CEQ guidelines, should be identified where either (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

Low-income Population. Low-income populations are identified where individuals have incomes below the U.S. Department of Health and Human Services poverty guidelines. A low-income population is either a group of low-income individuals living in proximity to one another or a set of individuals who share common conditions of environmental exposure or effect.

Adapted from CEQ's *Environmental Justice Under the National Environmental Policy Act*, the threshold for further analysis is met in either of the following cases:

- Census block groups where the minority or low-income population in the Census block group equals or exceeds 50 percent of the population in that Census block group.
- Census block groups where the percentage of the minority or low-income population is at least 10 percent higher than the minority or low-income population percentage for the District of Columbia.
- Impacts to Census block groups meeting the EJ threshold have the potential to be disproportionately borne by minority or low-income populations. The EJ analysis performed for this project focuses on these areas. No further EJ impact analysis is performed on the areas not meeting the EJ threshold.

Based on the demographics of the surrounding Census tracts (CTs) and block groups, there are minority populations within the Study Area. The minority population exceeds 50 percent of the population of the Census block groups. The Census block group and CT populations in the Study Area range from 96 to 99 percent minority. These minority populations are 10+ percent higher than the minority population of the District (approx. 65%). Specifically, the Black or African American population in the Study Area CTs and block groups is significantly higher in proportion to the total population of Black or African Americans in the District.

The percent of population with low income is not available at the Census block level, however the economic data by CT is provided in *Section 3.3.5, Economics and Development.* Families and individuals below the poverty line do not exceed 50 percent of the population total in any of the adjacent CTs. Families and individuals below the poverty line are lower than the District average for CTs 76.01 and 76.04 and is less than 10 percent higher than the District average in CT 77.09. Although no CTs were found to meet the threshold for low-income populations, this does not rule out the possibility of Census blocks meeting this threshold.

3.3.5 Economics and Development

The median household income in the District is $61,835.[45] The median household incomes for the CTs surrounding the project Study Area are all below the median for the District. CT 77.09 has a median household income which is less than half that of the District. With regard to the poverty rate, the District has a median of 18.2 percent of individuals below the poverty line. Percentages for the CTs around the project Study Area are similar, with CT 76.01 and 76.04 slightly lower at 17.2 and 17.3 percent, respectively, and CT 77.09 slightly higher at 18.9 percent. **Table 3.5** shows the economic data for the CTs and the District.

Table 3.5
Study Area Economic Data

Subject	CT 77.09	CT 76.01	CT 76.04	District
Median Household Income ($)	28,490	40,681	51,074	61,835
Families below the poverty line (%)	0.0[1]	7.1	11.0	13.9
Individuals below the poverty line (%)	18.9	17.2	17.3	18.2

Notes: [1] Unavailable. Census data also provides a margin of error for each statistic. CT 77.09 has 0.0 +- 12.7% of families below the poverty line.

Source: 2011 ACS Demographic and Housing Estimates (2007-2011) 5 Year Estimates.

DMPED has plans to facilitate development along the 2300 block of Pennsylvania Avenue, SE. This block is within the project Study Area and is located immediately west of Twining Square. The District aims to help implement the goals of the Great Streets Initiative by redeveloping this key corridor to eliminate blight, provide quality neighborhood-serving retail and potential job creation. DMPED has already acquired 2337 Pennsylvania Avenue, SE. The next steps in development will be to negotiate with private land owners on the 2300 block in order to develop the properties. [46]

3.3.6 Aesthetics and Visual Quality

Visibility of a proposed action to viewers from public places determines the visual influence a project may have on its surroundings. The viewshed of a project depends on the scale of the project, its proposed location and the topography of the area. Resources that may have a greater sensitivity within any Study Area include land at higher topography.

The Study Area includes the 25th Street, SE intersection with Minnesota Avenue, the green space area designated as Twining Square, and two small cut-through/side streets designated as L'Enfant Square, SE. The Study Area is currently a mixture of residential rowhouses and 1- to 2-story commercial structures, and includes businesses such as gas stations and walk-up eateries. Roadway, traffic signals, underutilized properties and auto-oriented commercial uses currently dominate the intersection. "Twining Square" does not function as green space or as a visitor destination and is not visually appealing as it exists today. The intersection is urban in nature, and is primarily used by commuters and residents as a through-way, rather than as a destination.

There are no views toward any of the District's significant monuments or vistas from the Study Area. Line of sight is truncated in the northwest portion of the Study Area by the artificial berms constructed to carry I-295 over Pennsylvania Avenue. From this overpass, the visual boundary runs southeast towards Fairlawn Avenue, passing over the elevated CSX tracks, and crossing Fairlawn Avenue at its intersection with the western extension of the L'Enfant Square, SE roadway. Beyond this point on Fairlawn Avenue, line of sight is either interrupted or occluded by other structures fronting Pennsylvania Avenue and Fairlawn Avenue.

3.3.7 Health and Safety

The primary concerns with health and safety in the Study Area are related to vehicular and pedestrian safety due to traffic operations. Although air quality is a regional issue, it is not of concern to human health and safety at the intersection. Congested urban roads tend to be the principal cause of carbon monoxide (CO) pollution at intersections such as Pennsylvania Avenue and Minnesota Avenue. Air quality modeling for a CO -hot spot analysis in the Study Area shows that the 1-hour and 8-hour CO concentrations do not exceed either the 1-hour (35 ppm) or 8-hour (9 ppm) National Ambient Air Quality Standards (NAAQS). See Section 3.5 for a full discussion of air quality in the Study Area. Additionally, there are no known hazardous wastes, contamination sites, or leaking underground storage tank sites or landfills in the Study Area impacting human health and safety.

The safety issues at the Pennsylvania and Minnesota Avenues, SE intersection are related to traffic operations. The intersection is a safety hazard for pedestrians, bicyclists and motorists. The unsafe conditions are a result of the existing intersection configuration, which lead to unsafe traffic and pedestrian movements. Traffic congestion, poor design and visibility, insufficient storage area for vehicles, frequent bus stops, and multiple intersection connections all make this intersection confusing to navigate and generate unsafe conditions for vehicles and pedestrians. Compounding the safety issues at this intersection is the fact that motorists cut through the neighborhood streets in the communities surrounding this intersection in order to bypass the traffic congestion.

Vehicular Safety

The Pennsylvania and Minnesota Avenues, SE intersection has a high volume of accidents and injuries, as discussed in Section 1.2.1 of the Purpose and Need. A total of 123 reported crashes and 60 reported injuries occurred at this intersection during the most recent 3-year reporting period (2009 to 2011).

Along Pennsylvania Avenue, SE, crash data collected between 2009 to 2011 indicate that side swipes (31%), right-angle (20%), and rear-end collisions (18%) are the prevalent accident types at this intersection.[47] As indicated from the accident summaries, the number of accidents can largely be attributed to the congestion of the roadway in the weekday-evening hours. In addition, the rear-end accidents are also a result of stop-and-go conditions. The side-swipe accidents can be attributed to vehicles changing lanes and aggressive driving, while the right-angle accidents largely occur due to congestion and frustration resulting in motorists taking chances to clear the intersection.[48]

Existing intersection geometries and signal phasing are factors contributing to crash occurrences at the intersection. Congested conditions during peak periods and excessively high vehicle speeds during off-peak periods are also contributing factors.[49] Additionally, problems at the intersection are exacerbated by the lack of an interchange movement for motorists traveling from the Anacostia Freeway (I-295) southbound to Pennsylvania Avenue, SE westbound. This causes motorists to make frequent illegal traffic movements at this intersection. In order to reach Pennsylvania Avenue, SE westbound, motorists make illegal U-turns, or make a left turn on Minnesota Avenue, SE northbound followed by a left turn onto Minnesota Avenue southbound.[50]

Pedestrian Safety

The intersection is heavily used by pedestrians commuting to and from work or using the bus stops at the intersection. Many of the existing crosswalks at the intersection are inconvenient to use due to placement and long crossing length. This discourages pedestrian use, and instead of using the signalized crosswalks provided, pedestrians crossing to and from bus stops and commercial properties choose unmarked, more direct routes across the medians and busy lanes of traffic. The intersection has a large number of pedestrian and vehicle "conflict points" under the existing configuration. Pedestrians frequently jaywalk at this intersection and cross Pennsylvania Avenue, SE without waiting for a Walk indication in order to get to bus stops across the street. A review of the police crash records indicated that five pedestrians were injured at this intersection in the past three years (2010 to 2012). However, during field observations of a one-hour AM peak period in March of 2013, three minor pedestrian/vehicle incidents were observed and dismissed without being reporting to the police.

3.3.8 Community Resources

Figure 3-8 illustrates community resources, including nearby emergency response centers, places of worship and schools.

Emergency Response

The Study Area is within the District's Sixth Police District. The Sixth Police District substation is located at 2701 Pennsylvania Avenue, SE, one block east on Pennsylvania Avenue from the intersection with Minnesota Avenue, SE. The annual rate of reported crime in the Sixth District has remained steady

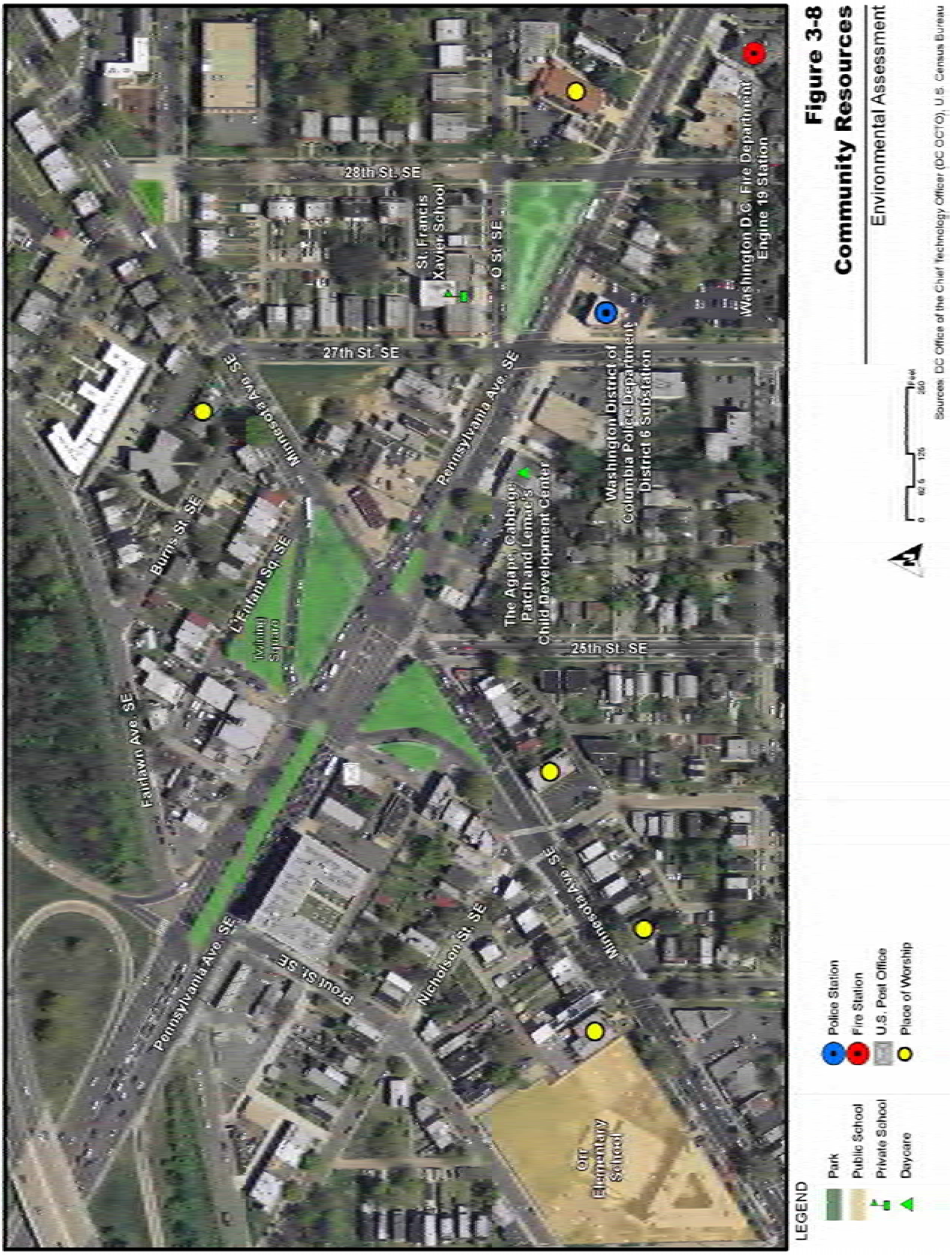


Figure 3-8
Community Resources
Environmental Assessment

over the past five years, with 4,627 crimes in 2007 and 4,684 crimes in 2011. These trends are consistent with the steady crime rates throughout the District in the 2007 to 2011 timeframe.[51]

Fire and rescue services for the Study Area are provided by the District Fire and Emergency Medical Services Department. The closest emergency medical station is located at 2813 Pennsylvania Avenue, SE, and houses the Engine Company 19.[52]

Schools

Schools closest to the Study Area include Orr Elementary School and St. Francis Xavier Catholic School. Orr Elementary School is located at 2200 Minnesota Avenue, SE, approximately 0.2 miles south of the Study Area. St. Francis Xavier is located at 2700 O Street SE, approximately two blocks from the Study Area. Additional schools within the vicinity of the Study Area include Randle Highlands Elementary School and Howard Road Academy, both located east on Pennsylvania Avenue, SE.

The Agape, Cabbage Patch and Lemae's Child Development Center daycare is located less than a block from the project intersection at 2533 Pennsylvania Avenue, SE.

Places of Worship

There are several places of worship located within the vicinity of the Study Area. The places of worship closest to the Study Area include Grace Memorial Baptist Church and Emmanuel Church of God-Christ. Grace Memorial Baptist Church is located at 2407 Minnesota Ave, S.E., less than 0.1 miles south of the intersection with Pennsylvania Ave, S.E. Emmanuel Church of God-Christ is located at 2600 Minnesota Ave, S.E., approximately 0.1 miles north of the intersection with Pennsylvania Ave, S.E. Additional places of worship within the vicinity of the Study Area include: Galilee Baptist Church, Second St. James Baptist Church and St. Francis Xavier Church.

Parks and Recreation Areas

Twining Square is located in the Study Area and is integral to the project intersection of Pennsylvania and Minnesota Avenues, SE. Twining Square is one of the Capitol Hill Parks, a collection of 59 triangles and squares owned by the NPS. "Twining Park" is the name given to the small parks owned by the NPS along Pennsylvania Avenue, SE, between Minnesota Avenue and 28th Street. As noted previously, Twining Square at this intersection is U.S. Reservation 487. U.S. Reservation 336A is also known as "Twining Square" by some and lies a few blocks east of the project intersection on Pennsylvania Avenue between 27th and 28th Streets SE. For more history of Twining Square, see *Section 1.3.2, Description of Study Area.*

The existing NPS-owned land in the Study Area does not operate as a park or recreation area and is not actively managed, with the exception of periodic mowing. NPS currently maintains the median of Pennsylvania Avenue at this intersection, as well as the park land at the intersection. The park land is fragmented by roadway, which results in the park land being used primarily as traffic islands for pedestrians crossing the streets.

Additional Resources

A U.S. Post Office is located at 2341 Pennsylvania Avenue, SE, at the southern corner of the intersection with L'Enfant Square, SE.

3.3.9 Utilities and Infrastructure

Most of the utilities at the intersection are located under the existing roadbeds of Pennsylvania and Minnesota Avenues SE, and the presence of a 72" sewer cutting northwest to southeast through the northern reservation suggests at least one major utility runs underneath the Twining Square park area as well. Archival research shows that extensive utility placement occurred around this intersection during the early 20th century. **Figure 3-9** provides an illustration of utilities in the Study Area, including electric, storm/water, gas, telephone and sewer lines.

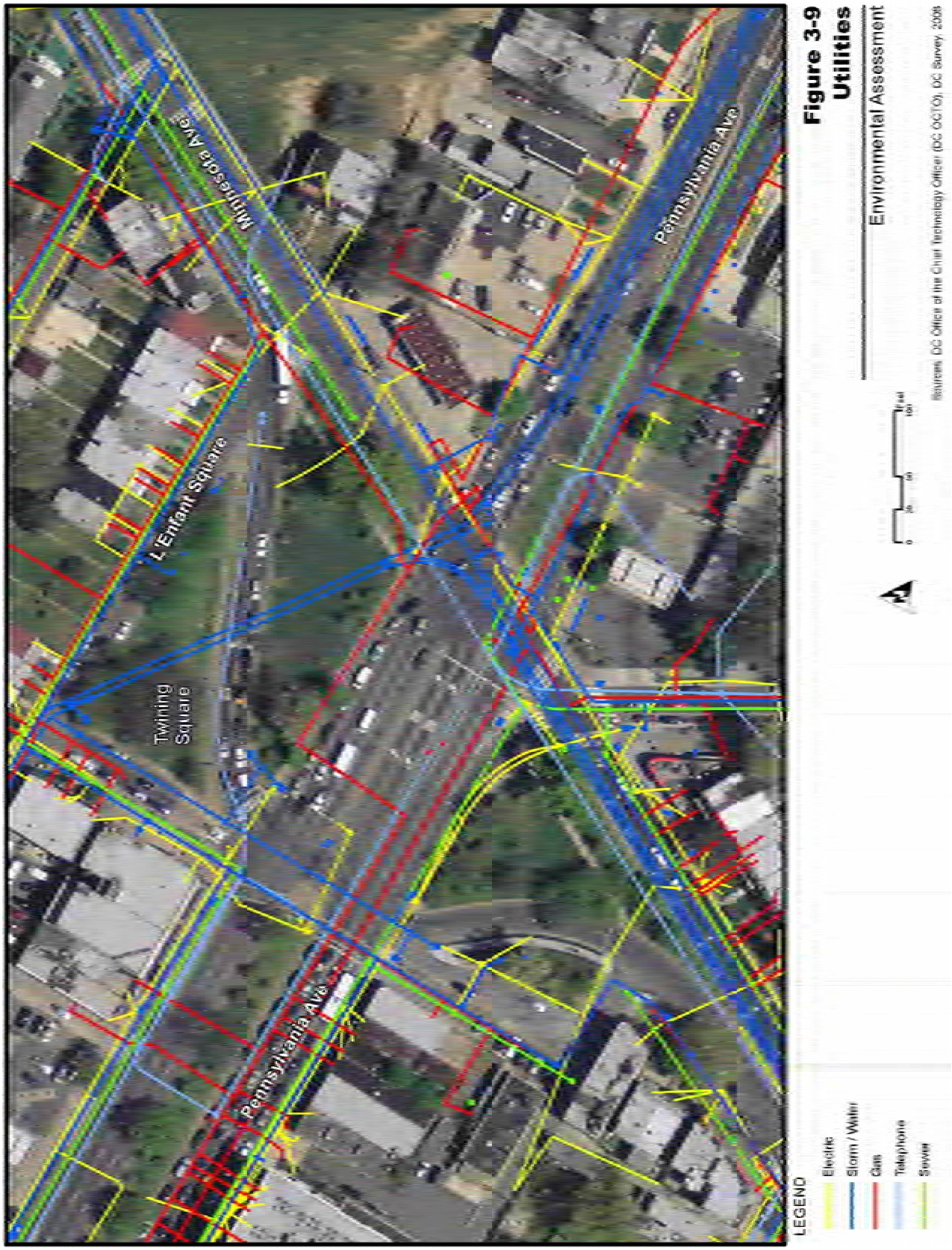
District of Columbia Water and Sewer Authority (DC Water)

DC Water maintains and operates the water and sewer system throughout the District. Water distributed to the District is treated to meet or exceed all water quality standards at the USACE Washington Aqueduct treatment plant. The plant treats water from Great Falls on the Potomac River, which is then sold to DC Water for distribution. The DC Water system includes 1,300 miles of water pipelines where water is conveyed to the homes and businesses in the District.[53]

The existing storm and sanitary sewer system is a combined sewer system (CSS) in one-third of the District and is a municipal separate storm sewer system (MS4) in two-thirds of the District, including the project Study Area.[54] An MS4 includes two independent systems: one system to convey sanitary sewage from homes and businesses and one system to convey storm water. In the Study Area, the storm water runoff enters the storm water system and discharges into the Anacostia River. Sewage enters the sanitary sewer system, is treated at the Blue Plains Wastewater Treatment Plant and the treated wastewater is then discharged into the Potomac River. The Anacostia River is under tidal influence and therefore, the DDOE does not require water quantity control. Storm and sewer lines exist throughout the project intersection and run mostly parallel to the street network. As previously indicated, there is a 72" sewer main that runs west along Pennsylvania Avenue up to the Minnesota Avenue intersection, and then cuts northwest to southeast through the northern reservation.

Washington Gas

Washington Gas provides natural gas to customers in the District, Maryland and Virginia. Underground gas utility lines are located in the Study Area. The gas lines appear to run primarily beneath roadway along the major streets in the Study Area with connections to most residences and businesses.


Minnesota Ave
L'Enfant Square
Pennsylvania Ave
Twining Square
Pennsylvania Ave
Pennsylvania Ave
LEGEND
Electric
Storm / Water
Gas
Telephone
Sewer
Figure 3-9
Utilities
Environmental Assessment
Sources: DC Office of the Chief Technology Officer (DC OCTO), DC Survey, 2008

WMATA

Typically, WMATA utilities are present in the right-of-way because of the Metro rail stations. Although, WMATA operates several Metrobus routes along Pennsylvania Avenue, SE, there are no Metro rail stations within the Study Area. The closest Metro station is the Potomac Avenue Metro Station, which is approximately 1.3 miles north of the Study Area at the intersection of Pennsylvania and Potomac Avenues, SE. Other nearby Metro stations are approximately two miles away (Anacostia Metro and Congress Heights on the green line and Benning Road on the blue line). Additionally, there are no bus shelters in the study area; therefore no WMATA infrastructure is present in the area. During the interagency meeting on September 6, 2012, WMATA noted that the project intersection is often used as a "lay-by area" where buses pull over and wait when they are running ahead of schedule. Transit operations are discussed in *Section 3.4.3, Transit*.

PEPCO

Potomac Electric Power Company (PEPCO) provides electric service to the District, including the Study Area. Power lines and utility poles connect to each of the buildings in the Study Area and run along Pennsylvania Avenue, SE on both sides of the street. Utility poles do not run through Twining Square parkland; however, they do border much of the park area. Traffic lights are also served by electricity in the Study Area.

3.4 Transportation

3.4.1 Pedestrian and Bicycle Network

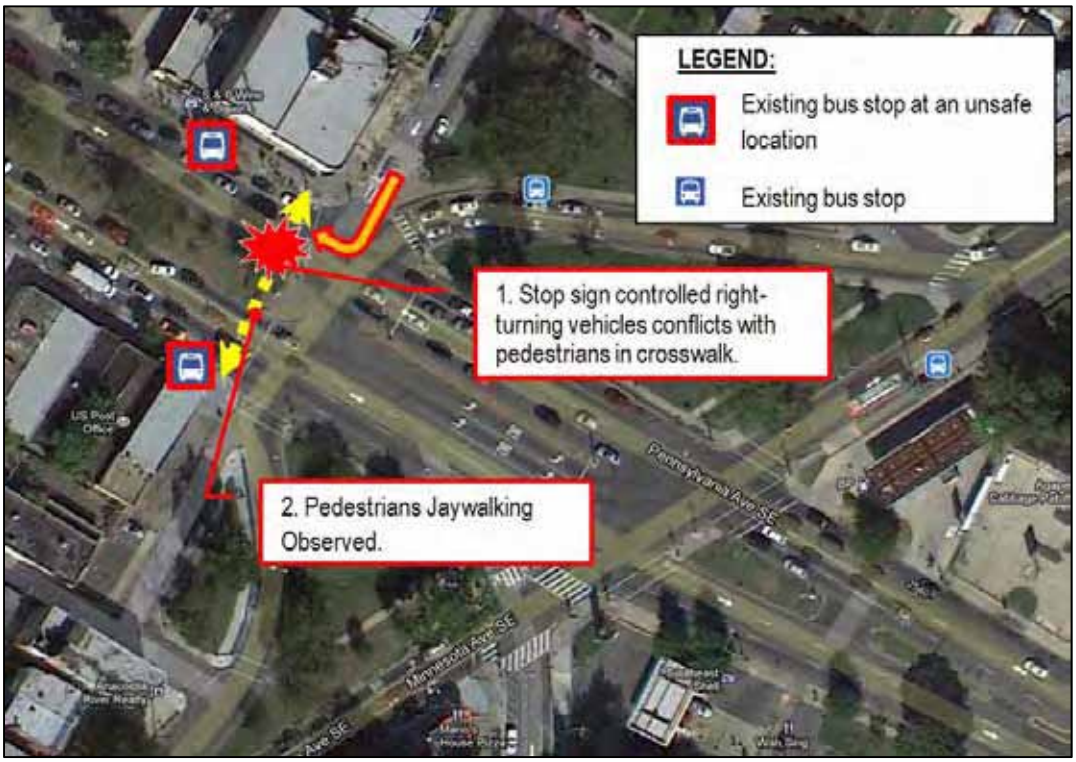
Pedestrian Network

As shown in **Figure 3-10**, there are two heavily used bus stops on Pennsylvania Avenue, SE just west of the square. During mid-week field observations January 8th through 10th, 2013, over 150 pedestrians were observed crossing Pennsylvania Avenue, SE. The pedestrians were observed using the west side crosswalk alone to access two heavily used bus stops on Pennsylvania Avenue, SE just west of Twining Square during both the AM and PM peak hours. The numbers below correspond to Figure 3-10 to identify two of the primary dangerous behaviors associated with the pedestrians crossing at this location during field observation:

1. Although an Exclusive Pedestrian Phase is provided in the signal timing to stop all vehicles and only allow pedestrians to cross Pennsylvania Avenue, the vehicles from the unsignalized local driveway still attempt to make abrupt right turns between gaps of pedestrians; any vehicle failing to finish the turn must suddenly stop, forcing vehicles behind to stop suddenly as well. Field observations found that in a one-hour period during the morning peak hour, three minor scratches involving pedestrians were seen and dismissed without reporting to the police.
2. It was observed that some pedestrians jaywalked to cross Pennsylvania Avenue, SE without waiting for a Walk indication, in order to get to the bus stop across the street. A review of the police crash records indicated that five pedestrians were injured at this intersection in the past three years (2011 to 2013).

Figure 3-10

Existing Safety Concerns for Pedestrians



Source: Google Maps and HNTB Corporation, 2013

Bicycle Network

For bicyclists, field observations were conducted and safety records were reviewed. The following observations were noted:

1. The majority of cyclists currently use the sidewalks and crosswalks on the south side of Pennsylvania Avenue, for two main reasons:
   a. The vehicular traffic is heavy during peak hours and bicyclists feel more comfortable riding on sidewalks rather than in the roadway[55];
   b. Although sidewalks and crosswalks are present on both sides of Pennsylvania Avenue near Minnesota Avenue, SE, bicyclists prefer to ride on the south side because continuous sidewalk and curb-cuts on the north side at the area west of the northbound I-295 on-ramp are not available.
2. No major bicyclist safety concerns were identified in the field observation or from the accident history.

3.4.2 Road Network

The study intersection is located on a major commuter route, Pennsylvania Avenue, SE, in an urban environment at its crossing with the local travel route of Minnesota Avenue, SE. To assess the traffic impacts to the surrounding area, the adjacent intersections to the subject intersection were also included in the traffic analysis. For detailed methodology, data collection methods, traffic volume development, and traffic simulation model calibration techniques, refer to ***Appendix F, Traffic Analysis Report***.

The streets included in the Study Area are described as follows:

- Pennsylvania Avenue, SE is a median-separated Principle Arterial according to the DDOT Roadway Functional Classification and presently with an average annual daily traffic (AADT) of 42,500 vehicles per day. It is one of the few major gateways used by motorists to reach Downtown Washington, DC from Southeast DC east of the Anacostia River and Maryland.
- Minnesota Avenue, SE is as a Minor Arterial with AADT of 10,200 vehicles per day.
- 25th Street, SE is a Minor Arterial with AADT of 5,800 vehicles per day. It is a one-way street going southbound within the Study Area.

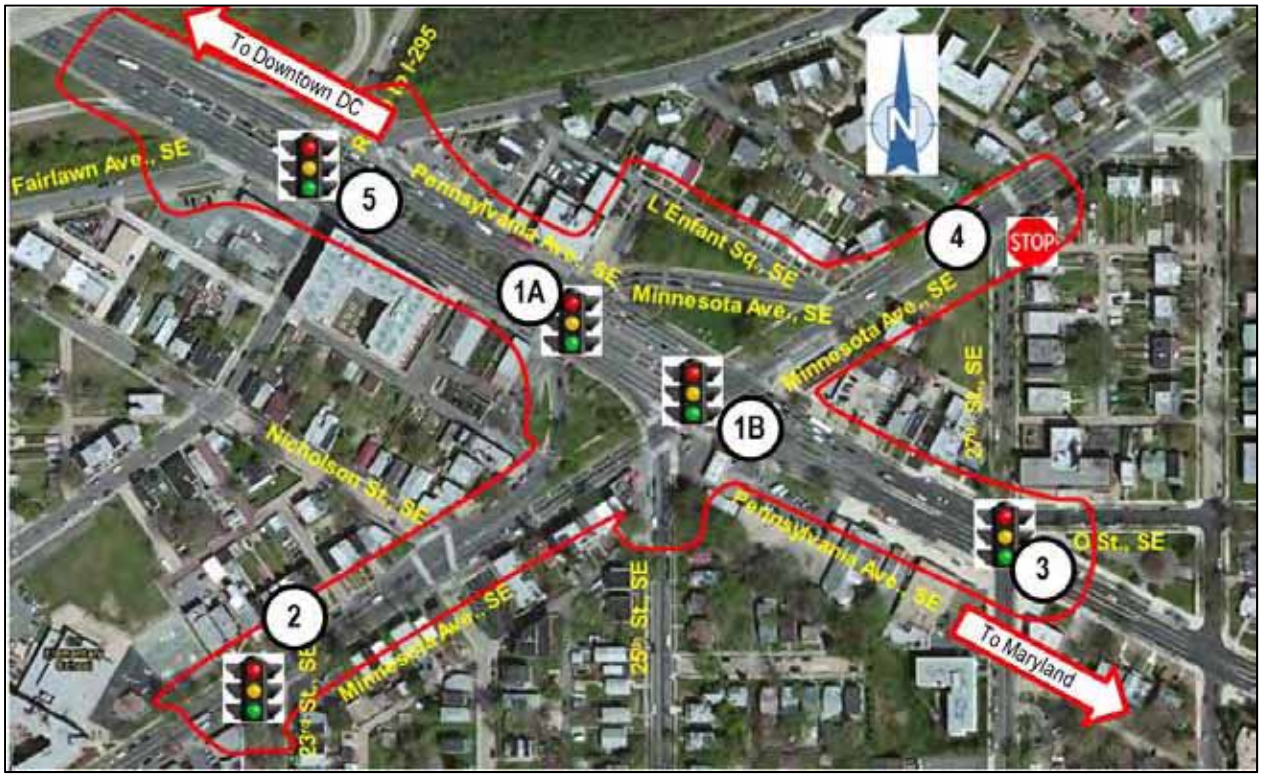
The intersections in the Study Area are provided in **Table 3.6** and shown in **Figure 3-11.** Note that Intersection Numbers 2 through 5 in the table are intersections adjacent to the subject intersection (1A and 1B) that would not be modified by any of the Build Alternatives; however, nearby impacts to these adjacent intersections due to each of the Build Alternatives are considered in this EA.

Table 3.6
List of Intersections in the Study Area

ID	Intersection	Traffic Control
1A	Pennsylvania Ave. and Minnesota Ave., SE West	Signalized
1B	Pennsylvania Ave. and Minnesota Ave., SE East	Signalized
2	Minnesota Ave. and 23rd St., SE	Signalized
3	Pennsylvania Ave., 27th St. and O St., SE	Signalized
4	Minnesota Ave. and 27th St., SE	Un-signalized
5	Pennsylvania Ave., I-295 N.B. On Ramp and Fairlawn Ave., SE	Signalized

Figure 3-11

Study Area for Traffic Impact Analysis



Source: Background aerial image from ESRI.

In the existing configuration, shown in **Figure 3-12**, Pennsylvania Avenue, SE is a two-way street with a concrete median; it has three or four travel lanes in each direction with two added lanes at the left turn onto northbound Minnesota Avenue. Minnesota Avenue is a two-way undivided street south of Nicholson Street and north of L'Enfant Square, SE. Within the Study Area, the NPS-owned park area separates Minnesota Avenue, SE into two one-way streets and this forms two signalized intersections on Pennsylvania Avenue, SE (1A and 1B). L'Enfant Square, SE is a one-lane, one-way street with on-street parking on both sides, providing access to the local residences and shops; it joins the west Pennsylvania Avenue, SE and Minnesota Avenue, SE intersection (1A), however it is not controlled by any traffic signals – only right turns are allowed and they are controlled by a Stop sign.

Figure 3-12

Existing Roadway Configuration

Source: HNTB Corporation, 2013.

Existing Condition Traffic Analysis

Delays and LOS

A key metric used in assessing traffic operations is Level of Service (LOS). LOS is an estimate of the performance efficiency and quality of an intersection or roadway as established by the *Highway Capacity Manual (HCM)*[56] methodology. The HCM methodology measures the degree of delay at intersections using a letter scale from A to F, "A" being the free flow condition and "F" being the total gridlock. LOS D or better is desirable for urban corridors.

For signalized intersections, **Table 3.7** provides the LOS scales and their descriptions.

Table 3.7
Level of Service Definitions

LOS	Vehicular Delay	Description
A	< 10 sec/veh	Desirable - free flow
B	10 – 20 sec/veh	Desirable - nearly free flow
C	20 - 35 sec/veh	Desirable - stable traffic flow
D	35 – 55 sec/veh	Acceptable - unstable traffic flow
E	55 – 80 sec/veh	Congestion - operation at capacity
F	> 80 sec/veh	Gridlock - over capacity

Source: Transportation Research Board, *Highway Capacity Manual*, 2000.

The traffic delay and LOS results are presented in **Tables 3.8** and **3.9** and discussed in this section.

In the existing year, all intersections operate at an acceptable level of service during the AM peak hour, except the Pennsylvania Avenue and 27th Street intersection (Intersection ID 3) operates at LOS E, slightly below the threshold of LOS D (55.0 sec/veh). The peak travel direction, northwest Pennsylvania Avenue towards Downtown DC operates at LOS B, except at 27th Street.

Table 3.8
Traffic Delay and LOS Results – Existing AM

ID	INTERSECTION	APPROACH	EXISTING			
			APPROACH		INTERSECTION	
			DELAY	LOS	DELAY	LOS
1A	L'Enfant Sq & Pennsylvania Ave	SWB	287.5	F	39.5	D
		SWR (L'Enfant Sq.)	0.4	A		
		SEB	12.6	B		
		NWB	12.4	B		
1B	Pennsylvania Ave & Minnesota Ave	SEB	18.4	B	18.4	B
		NWB	19.5	B		
		NEB	14.1	B		
		SWB	-			
1C*	L'Enfant Sq South & Minnesota Ave NB	NET	-		-	
		SEL				
2	Minnesota Ave & 23rd St	EB	4.5	A	10.8	B
		WB	4.0	A		
		NB	29.3	C		
3	Pennsylvania Ave & 27th St	WB	101.1	F	59.4	E
		NB	108.1	F		
		SEB	14.4	B		
		NWB	57.1	E		
4	Minnesota Ave & 27th St	NB	10.4	B	0.9	A
		NEB	0.0	A		
		SWB	0.0	A		
5	Pennsylvania Ave & NB 295 Ramp	SEB	24.9	C	23.4	C
		NWB	23.0	C		

Note: * Intersection 1C only exists in the Revised Square Alternative.
Source: HNTB Corporation, 2013.

In the existing year, all intersections in the Study Area operate at a LOS D or better during the PM peak hour. The southwest bound approach at Intersection 1A experiences heavy delay and operates at an LOS F during both AM and PM conditions. The peak travel direction during the PM rush hour is southeast on Pennsylvania Avenue, and operates at LOS C or better.

Table 3.9
Traffic Delay and LOS Results – Existing PM

ID	INTERSECTION	APPROACH	EXISTING			
			APPROACH		INTERSECTION	
			DELAY	LOS	DELAY	LOS
1A	L'Enfant Sq & Pennsylvania Ave	SWB	186.2	F	35.2	D
		SWR (L'Enfant Sq.)	0.2	A		
		SEB	27.9	C		
		NWB	4.2	A		
1B	Pennsylvania Ave & Minnesota Ave	SEB	3.6	A	24.8	C
		NWB	73.0	E		
		NEB	49.3	D		
		SWB	-			
1C*	L'Enfant Sq South & Minnesota Ave NB	NET	-		-	
		SEL				
2	Minnesota Ave & 23rd St	EB	4.7	A	8.1	A
		WB	4.4	A		
		NB	29.0	C		
3	Pennsylvania Ave & 27th St	WB	57.1	E	17.3	B
		NB	51.8	D		
		SEB	10.8	B		
		NWB	19.9	B		
4	Minnesota Ave & 27th St	NB	14.7	B	1.1	A
		NEB	0.0	A		
		SWB	0.0	A		
5	Pennsylvania Ave & NB 295 Ramp	SEB	5.8	A	7.3	A
		NWB	11.9	B		

Note: * Intersection 1C only exists in the Revised Square Alternative.
Source: HNTB Corporation, 2013.

Queues

Table 3.10 provides the queuing analysis results on key movements at the intersections for the existing condition in the AM peak hour at the Pennsylvania and Minnesota Avenues, SE intersection.

Table 3.11 provides the queuing analysis results on key movements at the intersections for the existing condition in the PM peak hour. In the PM peak hour, similar queue results were found.

Table 3.10
Queuing Analysis Results (in Feet) – Existing AM

ID	Intersection	Direction	Existing
1A	L'Enfant Sq & Pennsylvania Ave	SWT	~333
		SET	165
		NWT	619
1B	Pennsylvania Ave & Minnesota Ave	SEL	136
		SET	5
		NWL	-
		NWT	338
		NEL	~102
		NET	0
		SWL	-
		SWT	-

Note: ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

Source: HNTB Corporation, 2013.

Table 3.11
Queuing Analysis Results (in Feet) – Existing PM

ID	Intersection	Direction	Existing
1A	L'Enfant Sq & Pennsylvania Ave	SWT	~314
		SET	775
		NWT	79
1B	Pennsylvania Ave & Minnesota Ave	SEL	179
		SET	12
		NWL	-
		NWT	250
		NEL	172
		NET	170
		SWL	-
		SWT	-

Note: ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

Source: HNTB Corporation, 2013.

Travel Times

Travel time, the amount of time it takes for a motorist to travel from point A to point B, is a direct reflection of motorist experience. Existing travel times are shown in **Tables 3.12** and **3.13.**

Table 3.12
Existing Travel Times (in Minutes) – AM

From	To	Movement	Existing
Penn Ave/295NB Ramp	Minn Ave/27th St	EBL	2.6
Penn Ave/295NB Ramp	Penn Ave/27th St	EBT	1.8
Penn Ave/295NB Ramp	Minn Ave/23rd St	EBR	2.3
Penn Ave/295NB Ramp	Minn Ave/25th St	EBR	1.8
Penn Ave/27th St	Penn Ave/295NB Ramp	WBT	1.3
Penn Ave/27th St	Minn Ave/23rd St	WBR	1.0
Minn Ave/23rd St	Penn Ave/295NB Ramp	NBL	6.1
Minn Ave/23rd St	Minn Ave/27th St	NBT	3.8
Minn Ave/23rd St	Penn Ave/27th St	NBR	4.3
Minn Ave/23rd St	Minn Ave/25th St	NBR	3.7
Minn Ave/27th St	Minn Ave/25th St	SBL	4.4
Minn Ave/27th St	Minn Ave/23rd St	SBT	4.5
Minn Ave/27th St	Penn Ave/295NB Ramp	SBR	4.9

Source: HNTB Corporation, 2013.

Table 3.13
Existing Travel Times (in Minutes) – PM

From	To	Movement	Existing
Penn Ave/295NB Ramp	Minn Ave/27th St	EBL	3.4
Penn Ave/295NB Ramp	Penn Ave/27th St	EBT	3.4
Penn Ave/295NB Ramp	Minn Ave/23rd St	EBR	4.2
Penn Ave/295NB Ramp	Minn Ave/25th St	EBR	4.1
Penn Ave/27th St	Penn Ave/295NB Ramp	WBT	2.2
Penn Ave/27th St	Minn Ave/23rd St	WBR	1.8
Minn Ave/23rd St	Penn Ave/295NB Ramp	NBL	2.3
Minn Ave/23rd St	Minn Ave/27th St	NBT	2.4
Minn Ave/23rd St	Penn Ave/27th St	NBR	3.2
Minn Ave/23rd St	Minn Ave/25th St	NBR	2.4
Minn Ave/27th St	Minn Ave/25th St	SBL	3.0
Minn Ave/27th St	Minn Ave/23rd St	SBT	3.0
Minn Ave/27th St	Penn Ave/295NB Ramp	SBR	1.8

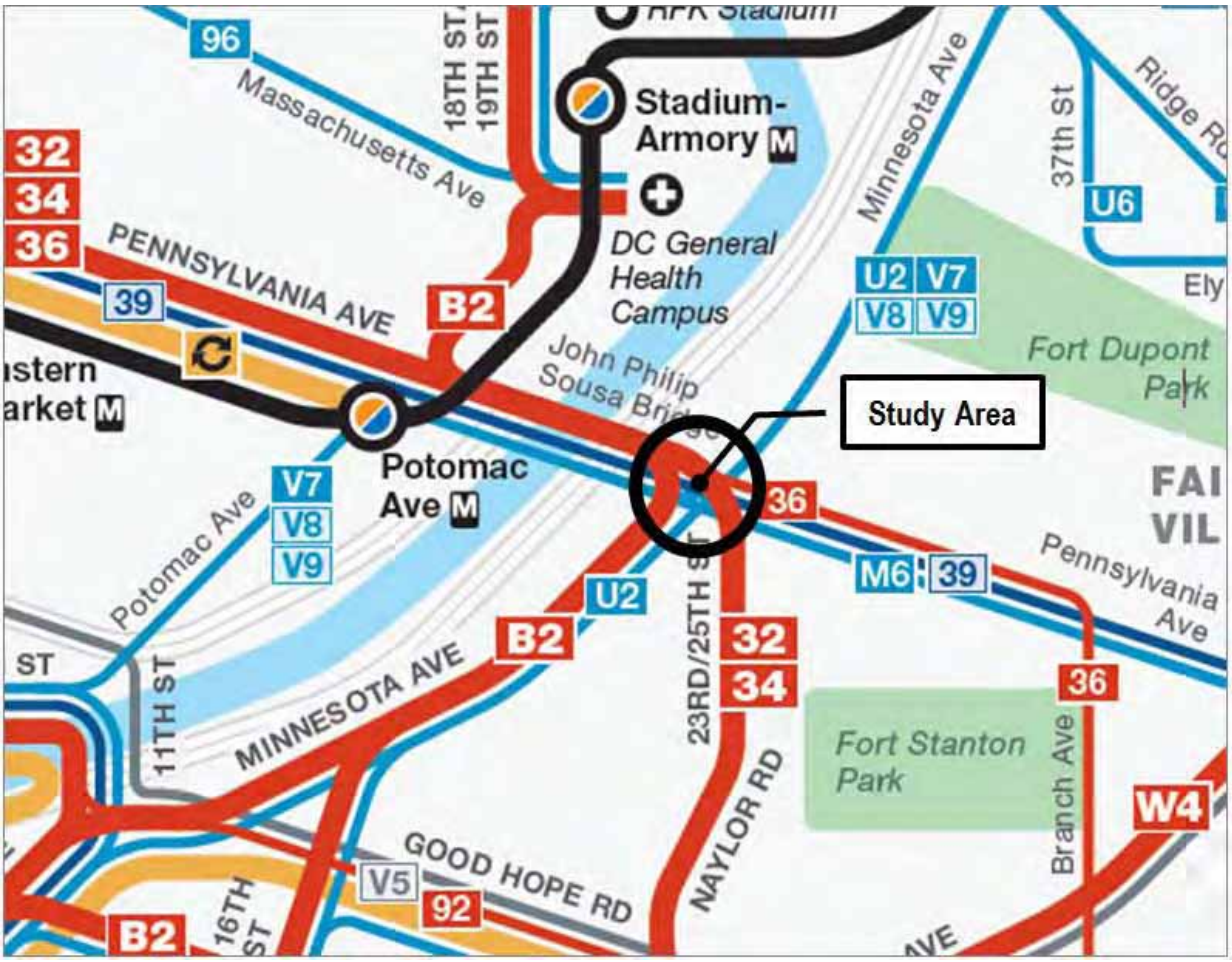
Source: HNTB Corporation, 2013.

3.4.3 Transit

Currently there are twelve bus routes (32, 34, 36, 39, A11, B2, J13, K11, M6, V7, V8 and V9) using Pennsylvania Avenue, five routes (B2, U2, V7, V8 and V9) on Minnesota Avenue and two (32 and 34) on 25th Street, as shown in **Figure 3-13**. While not shown on Figure 3-13, bus route 39 is an express bus route that runs along Pennsylvania Avenue. The nearest Metro station is the Potomac Avenue Station which is located one mile to the west of the Study Area.

Figure 3-13

Bus Routes within the Study Area and the Vicinity

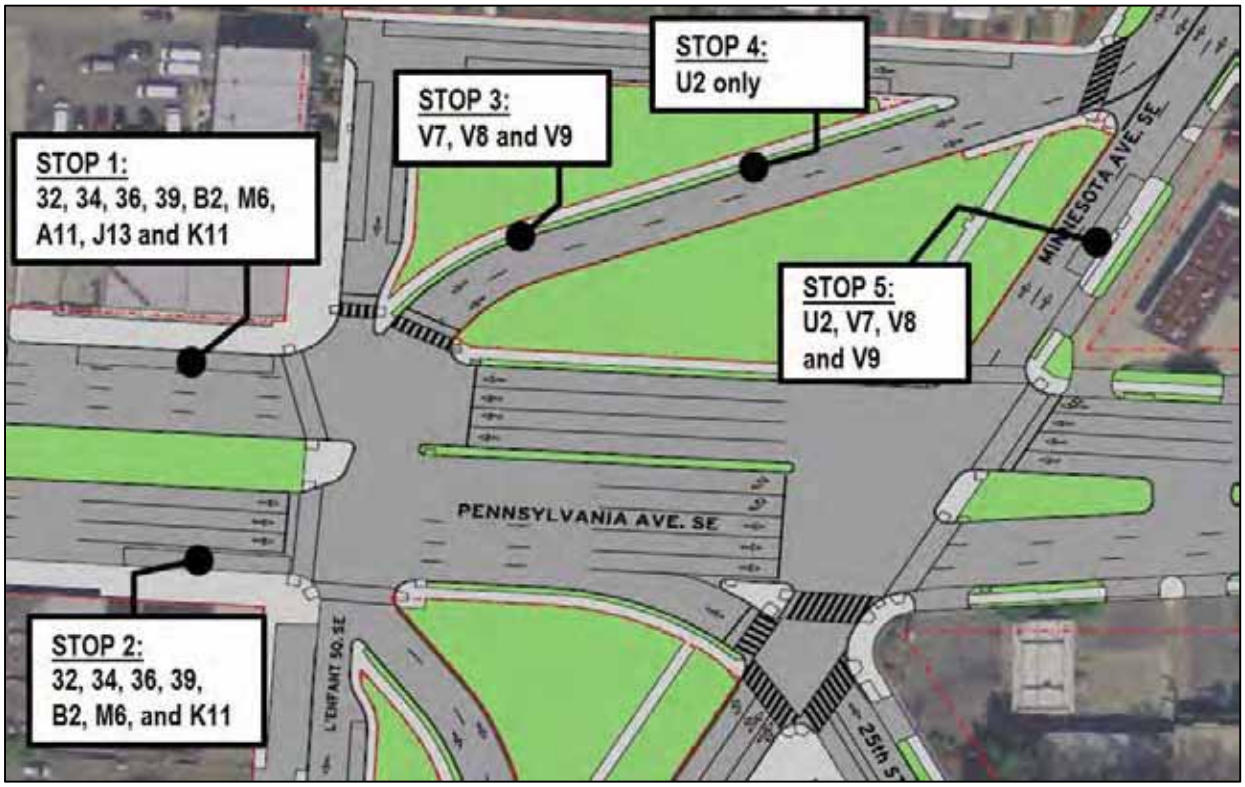


Source: Washington Metropolitan Area Transit Authority website www.wmata.com, 2013.

Figure 3-14 shows the five existing bus stops within the Study Area. Stops 1 and 2 are located on Pennsylvania Avenue west of L'Enfant Square; Stops 3 and 4 are on southbound Minnesota Avenue between the two NPS-owned park spaces north of Pennsylvania Avenue; and Stop 5 is on northbound Minnesota Avenue north of Pennsylvania Avenue.

Figure 3-14

Bus Stops in the Existing Condition



Source: HNTB Corporation, 2013.

3.5 Air Quality

3.5.1 Criteria Pollutants

The Federal Clean Air Act of 1970 established the National Ambient Air Quality Standards (NAAQS) (**Table 3.14**). These standards were established by the United States Environmental Protection Agency (EPA) to protect public health, safety, and welfare from known or anticipated effects of sulfur dioxide (SO_2), particulate matter (PM_{10}, 10-micron in diameter and smaller along with $PM_{2.5}$, 2.5 micron in diameter and smaller), carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), and lead (Pb). EPA refers to these pollutants as the "criteria" pollutants.

Table 3.14
National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)	Primary	8 – Hour	9 ppm	Not to be exceeded more than once per year
		1 – Hour	35 ppm	
Lead (Pb)	Primary and secondary	Rolling 3-Month Average	0.15 µg/m^3 (1)	Not to be exceeded
Nitrogen Dioxide (NO_2)	Primary	1 – Hour	100 ppb 5)	98th percentile, averaged over 3 years
	Primary and secondary	Annual Mean	53 ppb (2)	Annual Mean
Ozone (O_3)	Primary and secondary	8 – Hour	0.075 ppm (3)	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
Particulate Matter (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 Dioxides (SO_2)	Primary	1-hour	75 ppb (4)	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

(1) Final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

(2) The official level of the annual NO2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.

(3) Final rule signed March 12, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, EPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.

(4) Final rule signed June 2, 2010. The 1971 annual and 24-hour SO2 standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

Source: http://www.epa.gov/air/criteria.html, accessed May 29, 2013

The primary pollutants from motor vehicles are unburned hydrocarbons, NO_x, CO, and particulates. Hydrocarbons (HC) and nitrogen oxides (NO_x) can combine in a complex series of reactions catalyzed by sunlight to produce photochemical oxidants such as ozone and NO_2. Because these reactions take place over a period of several hours, maximum concentrations of photochemical oxidants are often found far downwind of the precursor sources. Ozone and NO_2 are regional problems.

Carbon monoxide is a colorless and odorless gas which is the product of incomplete combustion, and is the major pollutant from gasoline fueled motor vehicles. CO is a localized air quality issue.

Particulate matter includes both airborne solid particles and liquid droplets. These liquid particles come in a wide range of sizes. PM_{10} particulates are coarse particles, such as windblown dust from fields and unpaved roads. $PM_{2.5}$ particulates are fine particles generally emitted from activities such as industrial and residential combustion and from vehicle exhaust. Particulates from transportation can be a localized issue when a project is determined to be a project of air quality concern for either PM_{10} or $PM_{2.5}$ emissions.

An exceedance of the NAAQS pollutant level does not necessarily constitute a violation of the standard. Some of the criteria pollutants (including CO) are allowed one exceedance of the maximum level per year, while for other pollutants criteria levels cannot be exceeded. Violation criteria for other pollutants are based on past recorded exceedances. Table 3.14 lists the allowable exceedances for the EPA criteria pollutants.

3.5.2 Attainment Designations

The Clean Air Act Amendments (CAAA) of 1977 and 1990 required all states to submit to the EPA a list identifying those air quality regions, or portions thereof, which meet or exceed the NAAQS or cannot be classified because of insufficient data. Portions of air quality control regions which are shown by monitored data or air quality modeling to exceed the NAAQS for any criteria pollutant are designated "nonattainment" areas for that pollutant. The CAAA also established time schedules for the states to attain the NAAQS.

States that have nonattainment areas are required to prepare State Implementation Plans (SIP) that lay out a plan to show how the state will improve the air quality to attain the NAAQS. Both new and improvement highway projects must be contained in the area's Long-Range Plan (LRP) and Transportation Improvement Program (TIP). The Metropolitan Washington Council of Governments (MWCOG) along with the District of Columbia and the states of Maryland and Virginia are responsible for preparing the LRP and TIPs. Once the Metropolitan Planning Organizations (MPO) has completed the LRP and TIP, they are submitted to the FHWA for review and approval according to the requirements of the CAAA and related implementation regulations.

The Study Area is located within the National Capital Interstate Air Quality Control Region (AQCR #47). This AQCR includes the District of Columbia, Maryland, and Virginia Intrastate Air Quality Control Region. The District of Columbia is currently in attainment status for 4 of the 7 criteria pollutants (Pb, NO_2, PM_{10} and SO_2,); re-classified from nonattainment to maintenance for CO; and has been classified as being in nonattainment for the 1997 and 2008 8-hour ozone, and the 1997 $PM_{2.5}$ standards.

3.5.3 Existing Conditions

The results of the CO microscale air quality modeling for existing conditions were analyzed as part of the air quality analysis conducted for the EA. The maximum 1-hour CO concentrations in the existing condition (2012) are 4.8 ppm, and the maximum 8-hour CO concentrations are 3.8 ppm. The 1-hour concentrations include a background concentration of 2.9 ppm and the 8-hour concentrations include a background concentration of 2.5 ppm. These concentrations do not exceed either the 1-hour (35 ppm) or 8-hour (9 ppm) NAAQS.

Refer to ***Appendix G, Air Quality Report*** for detailed air quality analysis and results.

3.6 Noise

3.6.1 Noise Model and Analysis

The FHWA's Procedures for Abatement of Highway Traffic Noise and Construction Noise is presented in the Code of Federal Regulations, Title 23 Part 772 (23 CFR 772). This regulation, plus other guidance documents written to explain the regulation, sets forth the process for performing a traffic noise analysis. The process includes the following:

- Identify existing and proposed land uses in the Study Area;
- Determine existing noise levels either:
  - through modeling, or
  - noise measurements with concurrent classification counts of vehicles passing the noise monitoring site;
- Validate predicted noise levels through comparison between measured and predicted levels;
- Model future design year traffic noise levels which will yield the worst hourly traffic noise on a regular basis (PM peak hour noise levels);
- Identify locations that would be exposed to a noise impact based upon the Noise Abatement Criteria (NAC) as presented in **Table 3.15**;
- Model noise abatement measures to mitigate the predicted design year traffic noise impacts; and
- Modeling must be performed with FHWA’s most recent version of the Traffic Noise Model® (TNM).

DDOT’s Noise Policy is the District’s tool for implementing 23 CFR 772. The NAC, which is presented in 23 CFR 772, establishes the noise abatement criteria for various land uses. The noise level descriptor used is the equivalent sound level, L_{eq}, defined as the steady state sound level which, in a stated time period (usually one hour), contains the same sound energy as the actual time-varying sound.

Table 3.15
Noise Abatement Criteria (NAC) – Hourly A-Weighted Sound Level-Decibels (dBA)

Activity Category	Activity Criteria $L_{eq}(h)$	Evaluation Location	Activity Description
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67	Exterior	Residential
C	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	Interior	Auditoriums, daycare centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	N/A	N/A	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	N/A	N/A	Undeveloped lands that are not permitted.

Source: **"**District of Columbia Department of Transportation Noise Policy," District Department of Transportation, July 11, 2011.

Noise abatement measures are considered when the predicted noise levels approach or exceed those values shown for the appropriate activity category in Table 3.15, or when the predicted traffic noise levels substantially exceed the existing noise levels. DDOT has defined the approach value as being 1 dBA less than the noise levels shown in Table 3.11. DDOT has defined an increase over existing noise levels of 10 decibels or more as being substantial.

TNM® is FHWA's "computer program for highway traffic noise prediction and analysis."[57] The following parameters are used in this model to calculate an hourly $L_{eq}(h)$ at a specific receiver location:

- Distance between roadway and receiver;
- Relative elevations of roadway and receiver;
- Hourly traffic volume in light-duty (two axles, four tires), medium-duty (two axles, six tires), and heavy-duty (three or more axles) vehicles;
- Vehicle speed;
- Ground absorption; and
- Topographic features, including retaining walls and berms.

The Pennsylvania Avenue/Minnesota Avenue Study Area consists of medium-density residential, retail, and recreational areas. The criteria stated in Table 3.15 will help to determine whether or not the Proposed Action will impact uses throughout the corridor.

3.6.2 Noise Measurements

Existing noise level measurements were conducted on March 21, 2013 at four representative sites in the Study Area. A 20-minute measurement was taken at each site. The measurements were made in accordance with FHWA and DDOT guidelines using an integrating sound level analyzer meeting ANSI and IEC Type 1 specifications. Traffic counts were taken at each site, concurrent with the noise measurements. Traffic data were obtained at all the field sites. **Table 3.16** contains observed traffic data, a site description, date, start time and duration of the noise measurements. The measurement locations were selected adjacent to the proposed alignments. The noise measurement sites and modeled noise receiver locations are shown on **Figure 3-15** and **Figure 3-16**. The field data sheets are presented in ***Appendix H, Noise Technical Report***.

Table 3.16

Measured Existing Noise Levels

Field Site #	Site Description	Date	Start Time	Duration (minutes)	Traffic[(1)] Roadway	A[a]	MT[b]	HT[c]	Buses[d]	Speed (mph)	Noise Level, dBA $L_{eq}(h)$
FS-1	Vacant lot on north side of L'Enfant Square SE between 2404 and 2420 L'Enfant Square SE.	3/21/2013	8:00 AM	20	L'Enfant Square WB	84	0	0	0	5 to 15	61.5
FS-2	Twining Square, 27 ft. north to L'Enfant Square. 29 ft. south to WB Pennsylvania Avenue, 109 ft. west to 54 ft. to SB Minnesota Avenue.	3/21/2013	8:30 AM	20	Pennsylvania Avenue (EB and WB); Minnesota Avenue (SB)	1,330	17	25	23	15 to 40	73.1
FS-3	Terrace next to sidewalk. 30 ft. to EB Pennsylvania Avenue. 76 ft. to north corner of 2529 Pennsylvania Avenue.	3/21/2013	9:00 AM	20	Pennsylvania Avenue (EB and WB)	931	21	14	6	25 to 35	71.1
FS-4	NPS reservation area. Surrounded by L'Enfant Square SE and SB Minnesota Avenue, south of Pennsylvania Avenue. 16 ft. east of L'Enfant Square SE, 38 ft. west of SB Minnesota Avenue.	3/21/2013	9:30 AM	20	Pennsylvania Avenue (EB); Minnesota Avenue (NB and SB); L'Enfant Square SB	629	18	22	17	20 to 35	69.7

Note: (1) Vehicle counts classified as follows:

a. Autos (A) defined as vehicles with 2-axles and 4-tires.

b. Medium trucks (MT) defined as vehicles with 2-axles and 6-tires.

c. Heavy trucks (HT) defined as vehicles with 3 or more axles.

d. Buses defined as vehicles carrying more than 9 passengers.

Source: HNTB Corporation, March 2013.

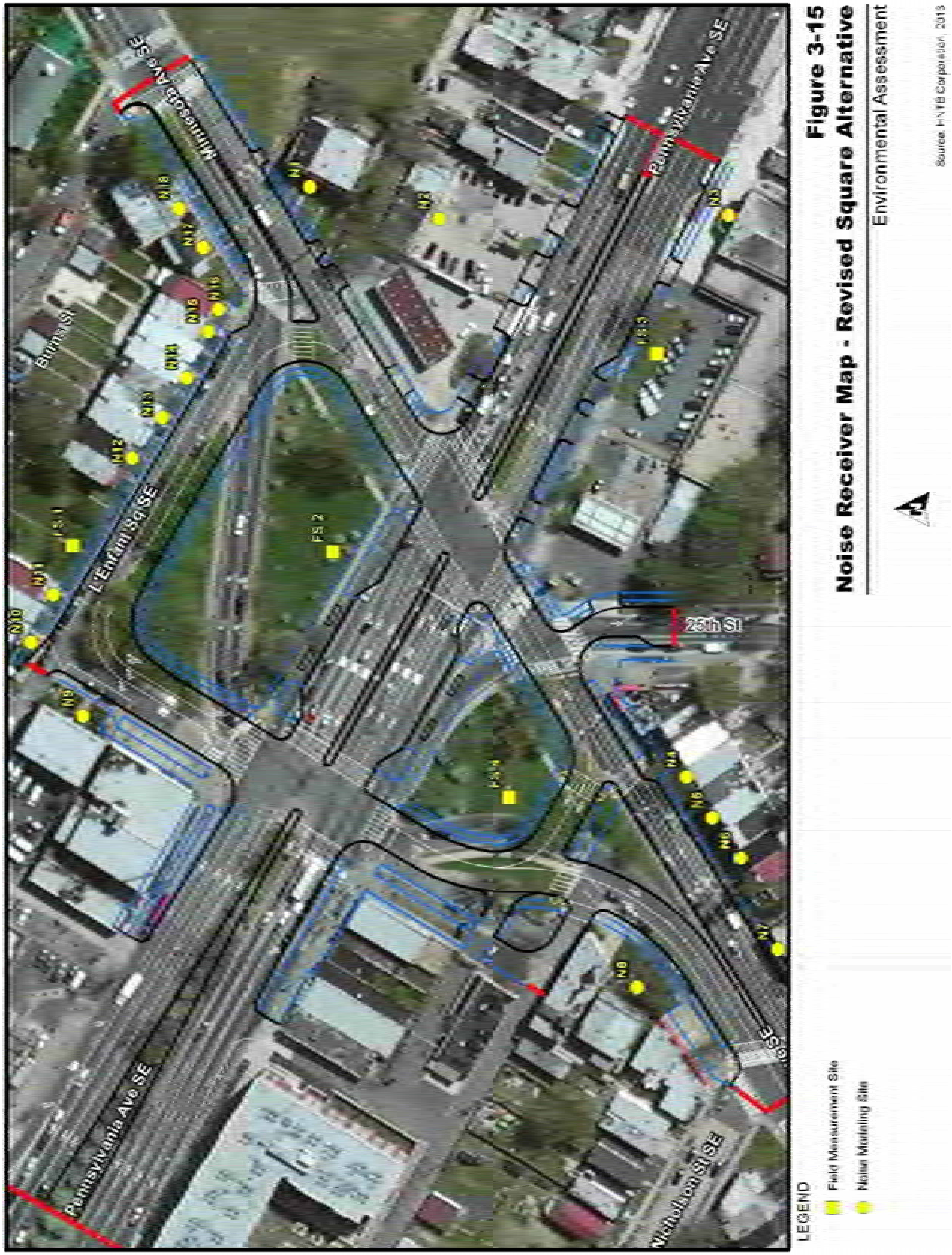


Figure 3-15
Noise Receiver Map - Revised Square Alternative
Environmental Assessment

Source: HNTB Corporation, 2013

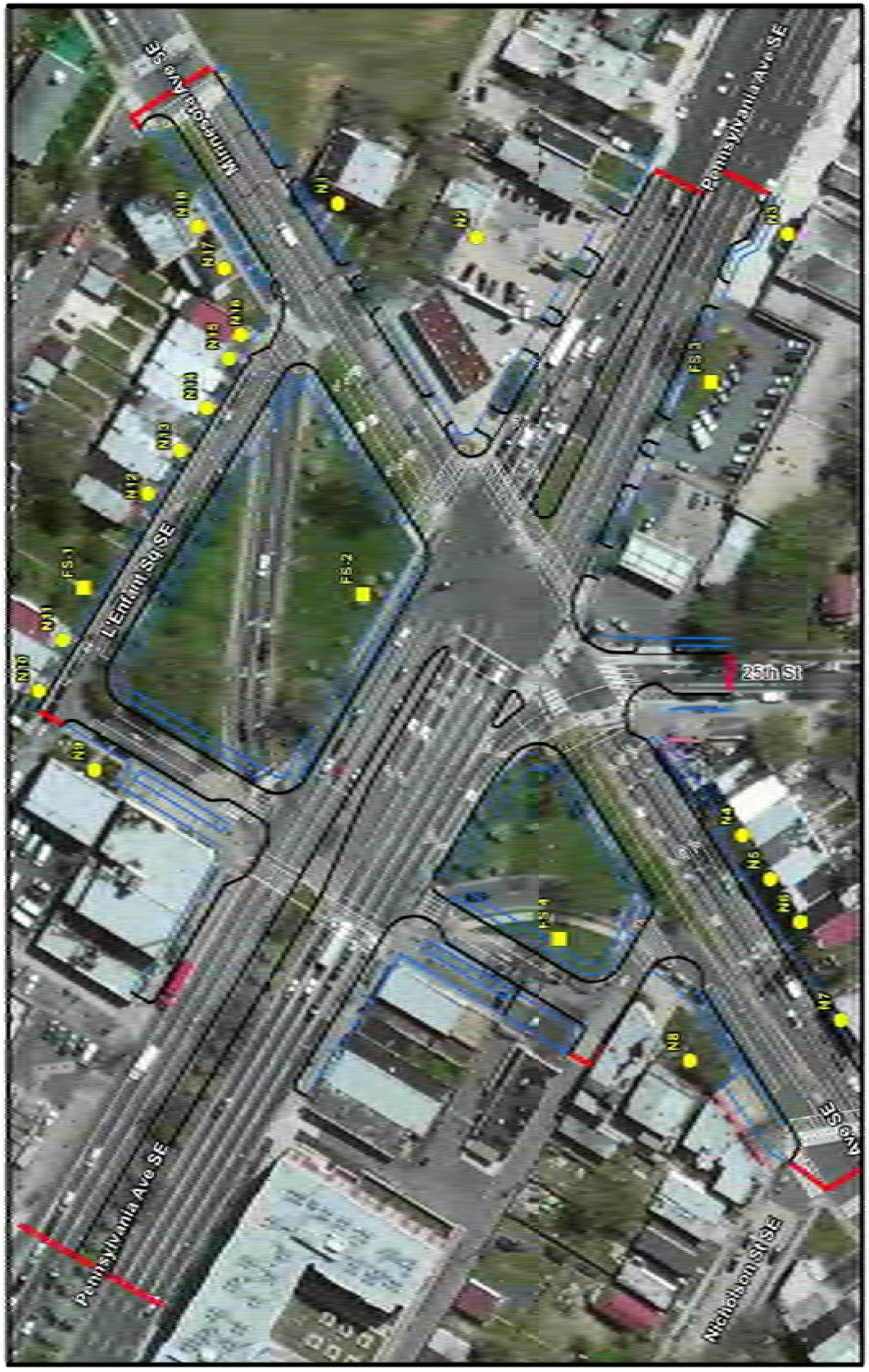


Figure 3-16
Noise Receiver Map - Conventional Intersection Alternative
Environmental Assessment

Source: HNTB Corporation, 2013

Measured vs. Modeled

TNM® 2.5 was used to validate the predicted noise levels through comparison with the measured and predicted noise levels. Traffic was counted and classified concurrently with each noise measurement by vehicle type: cars, medium trucks, heavy trucks, and buses. Traffic counts, concurrent with the noise measurements, were taken at four measurement sites. The traffic data from the four sites were used in the model. The site by site comparison is presented in **Table 3.17**. All four field site modeled data compared within 0-3 dB of the measured noise levels. This represents reasonable correlation since the human ear can barely distinguish a 3 dBA change in the $L_{eq}(h)$ noise level in the urban environment.

Table 3.17
Comparison of Measured and Modeled Noise Levels

Field Site	Noise Level, dBA $L_{eq}(h)$		Difference in Noise Level, dBA $L_{eq}(h)$ (Modeled Minus Measured)
	Measured	Modeled	
FS-1	61.5	63.8	2.3
FS-2	73.1	72.2	-0.9
FS-3	71.1	68.1	-3.0
FS-4	69.7	69.0	-0.7

Source: HNTB Corporation, March 2013

Modeled Existing PM Peak Hour Noise Levels

Existing (2012) PM peak hour noise levels at the 16 residential locations, which represents 35 dwelling units, would range from 63.8 to 69.0 dBA $L_{eq}(h)$. The noise levels at the category C locations would range from 67.4 to 71.1 dBA $L_{eq}(h)$. The interior noise level at the category D location, N7, would be 41.1 dBA. As shown in Table 4.12, the noise levels at 25 of the 35 dwelling units are presently approaching or exceeding 67 dBA, as are the noise levels in the park and at the daycare.

4.0 ENVIRONMENTAL CONSEQUENCES

According to the Council on Environmental Quality (CEQ) guidelines (40 CFR Sections 1500-1508), "the determination of a significant impact is a function of both context and intensity." Significance of an action is analyzed within the setting of the action, or context, including regional, local, and site-specific. Intensity refers to the severity of an impact which is analyzed in terms of type, quality, and sensitivity of a particular resource. The appropriate class of environmental documentation is determined by the level of significance, which is established through impact analysis of each resource. *As stated in 40 CFR 1508.27, the analysis of significance as used in NEPA requires consideration of both the context and intensity of an action:*

(a) Context: This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

(b) Intensity: This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

- *Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.*
- *The degree to which the proposed action affects public health or safety.*
- *Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.*
- *The degree to which the effects on the quality of the human environment are likely to be highly controversial.*
- *The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.*
- *The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.*
- *Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.*
- *The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.*
- *The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.*
- *Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.*
- *Intensity durations are provided throughout the analysis for negligible, minor, moderate, and major impacts. Beneficial impacts are addressed qualitatively.*
- *Long-term and short-term durations are defined for each impact category.*

Impact thresholds are established for each environmental category to assist in classifying the level of impact as it relates to each resource. The thresholds for this EA were developed with attention to the guidance on developing impact thresholds in NPS' *Technical Assistance Manual: Compliance with the National Environmental Policy Act and 106 of the National Historic Preservation Act* (2009). These thresholds are developed using: existing literature, existing standards (e.g. state water quality standards), consultation with subject matter experts, consultation with other agencies, and scientists' best professional judgment.

4.1 Natural Resources

4.1.1 Soils

The DDOE reviews and approves all construction and grading plans for compliance with the DC Erosion and Sedimentation Control Act of 1977, as amended (D.C. Law 2-23, 24 DCR 792 (July 22, 1977)). Inspections are conducted to make sure that control devices are constructed at construction sites in accordance with approved plans. The District program also investigates erosion, drainage, and related complaints and works to resolve any issues.

Impacts to soils are assessed for each alternative based on investigations of the current conditions of the Study Area.

Impact Thresholds

Negligible: The effects to soils would be at or below the lower levels of detection. Any effects to soils would be slight.

Minor: The effects to soils would be detectable and areas of affected soil would be relatively small. Mitigation may be needed to offset adverse effects and would be relatively simple to implement and likely be successful.

Moderate: The effect on soil would be readily apparent and result in a change to the soil character over a relatively wide area. Mitigation measures would be necessary to offset adverse effects and likely be successful.

Major: The effect on soil would be readily apparent and substantially change the character of the soils over a large area. Mitigation measures to offset adverse effects would be needed, extensive, and their success could not be guaranteed.

Duration: **Short-term** – Recovers in less than three years; **Long-term** – Takes more than three years to recover.

No Build Alternative

The No Build Alternative would not include construction or disturbance to the Study Area. Therefore, there would be no short or long-term impacts to soils at the site.

Build Alternative 1 – Revised Square Alternative

Under Build Alternative 1, there would be a net increase of approximately 0.09 acres of parkland compared to the No Build Alternative. The net increase in parkland would positively impact soils and geology in the Study Area as there would be an increase in usable soils. The majority of land within the Study Area has been previously graded and paved over from the construction and maintenance of the existing roadway at the intersection, and is expected to represent completely or partially disturbed soil sequences. The soil would support grass and other landscaping materials with the Build Alternative 1 as the area does today.[58] Minimal grading and filling would be required as the area is generally flat and has limited elevation change. Adequate construction techniques would be adhered to so as to not increase the potential for soil erosion and loss of topsoil during construction. Therefore, Build Alternative 1 would have negligible long-term impacts to soils and would only present minor short-term adverse impacts resulting from soil erosion during construction. Based on the analysis summarized above, the impacts to soil do not meet the CEQ criteria for either context or intensity; therefore these impacts do not rise to a level of "significance" as defined by CEQ.

Build Alternative 2 – Conventional Intersection Alternative

Under Build Alternative 2, there is a net decrease of approximately 0.02 acres of parkland. The majority of land within the Study Area has been previously graded and paved over from the construction and maintenance of the existing roadway at the intersection. Build Alternative 2 would result in similar impacts as described for Build Alternative 1. Therefore, Build Alternative 2 would have negligible long-term impacts to soils and may only present minor short-term adverse impacts resulting from soil erosion during construction. The impacts to soil do not meet the CEQ criteria for either context or intensity; therefore these impacts do not rise to a level of "significance" as defined by CEQ.

4.1.2 Water Resources

Impact Thresholds

Negligible: Impacts are chemical, physical, or biological effects that would not be detectable, well below water quality standards or criteria, and within historical or desired water quality conditions.

Minor: Impacts (chemical, physical, or biological effects) would be detectable but well below water quality standards or criteria and within historical or desired water quality conditions.

Moderate: Impacts (chemical, physical, or biological effects) would be detectable but at or below water quality standards or criteria; however, historical baseline or desired water quality conditions would be temporally altered.

Major: Impacts (chemical, physical, or biological effects) would be detectable and frequently altered from the historical baseline or desired water quality conditions; chemical, physical, or biological water quality standards or criteria would temporarily be slightly and singularly exceeded.

Duration: **Short-term** – Following treatment, recovery would take less than 1 year; **Long-term** – Following treatment, recovery would take longer than 1 year.

No Build Alternative

Groundwater

The No Build Alternative includes no additional impervious surface, which could locally impact groundwater recharge. Therefore, there would be no impacts to groundwater volume or quality as a result of the No Build Alternative.

Water Quality

The No Build Alternative includes no construction and no change in impervious surfaces. Storm water runoff volumes would not change from existing conditions and therefore, there would be no impacts to water quality due to runoff in the vicinity of the Study Area.

Build Alternative 1 – Revised Square Alternative

Build Alternative 1 includes removing the impervious roadways which bisect the NPS-owned parcels on either side of Pennsylvania Avenue, SE. Build Alternative 1 includes recommendations to use pervious pavement and unit pavers wherever possible, including the pedestrian walkways and bus stops. Build Alternative 1 also includes planted medians between the Pennsylvania Avenue, SE roadway and the pedestrian pathways that run parallel to the roadway which will help to absorb additional rainwater and storm water runoff. Although landscape design has not been finalized, continuous tree zones would also help to absorb rainwater and storm water runoff.

The existing storm and sanitary sewer system is a municipal separate storm sewer system (MS4) in the Study Area.. As is the case currently, during storm events, rainfall runoff and surface pollutants would transport into the adjacent storm water system, and ultimately into the tributaries and storm water system that empty into the Anacostia River. The Anacostia River is under tidal influence and therefore, DDOE does not require water quantity control. Additionally, storm water quantity control would not be required because less than a 10% increase in impervious pavement area is anticipated (approximate net increase of 0.09 acres of parkland).

The proposed and existing storm sewer systems that would receive additional flows from the project site may be evaluated for pipe capacity and hydraulic grade energy with the starting backwater conditions where there are riverine or confluences with the combined system. Connections and computations to larger sewers and the combined system would be reviewed by DC Water and coordinated with the *Combined Sewer System Long Term Control Plan*.

Groundwater

Impacts to groundwater recharge are unlikely. The net increase in pervious surface would be beneficial to groundwater recharge; however, any short-term or long-term impacts to groundwater recharge are expected to be negligible due to the minimal increase in pervious surface (0.09 acres) compared to the No Build Alternative. Based on the analysis summarized above, impacts to groundwater do not meet the CEQ criteria for either context or intensity; therefore these impacts do not rise to a level of “significance” as defined by CEQ.

Water Quality

Build Alternative 1 would include the removal of existing roadways that bisect the Twining Square park land, as well as reconfiguration of the intersection. Minor short-term adverse impacts to water quality may result during construction due to soil disturbance and potential clearing of vegetation. BMPs would be used during construction in accordance with DDOE and District standards to avoid increased soil erosion. This would help to prevent an increase in storm water runoff volume that could degrade water quality in the nearby tributaries and Anacostia River. The net increase in pervious surface (0.09 acres) under Build Alternative 1 would be beneficial to surface water; however, it is anticipated to have negligible impacts to surface water in the long term given the small change in storm water runoff volumes. Storm water quality requirements will be based on providing water quality improvements for the pavement areas within the project site. This requirement will be met using a variety of BMP facilities and LID strategies such as DDOT/DC Water quality control structures and other features. Therefore, long-term impacts to water quality are expected to be negligible. Impacts to water quality do not meet the CEQ criteria for either context or intensity; therefore these impacts do not rise to a level of "significance" as defined by CEQ.

Build Alternative 2 – Conventional Intersection Alternative

The impacts to water resources from Build Alternative 2 development would be similar under both Build Alternative 1 and Build Alternative 2. The primary difference would be the slight difference in impervious surface in the Study Area. Build Alternative 2 would result in a net decrease of 0.02 acres of pervious surface compared to the No Build Alternative. There would be slightly more storm water runoff as a result.

Groundwater

Impacts to groundwater recharge are unlikely. Build Alternative 2 would result in a net decrease of approximately 0.02 acres of pervious surface in the Study Area. Any short-term or long-term impacts to groundwater recharge are expected to be negligible due to the minimal decrease in pervious surface compared to the current Study Area. Impacts to groundwater do not meet the CEQ criteria for either context or intensity; therefore these impacts do not rise to a level of "significance" as defined by CEQ.

Water Quality

Build Alternative 2 would include the removal of existing roadways that bisect the Twining Square park land, as well as reconfiguration of the intersection. Minor short-term adverse impacts to water quality may result during construction due to soil disturbance and potential clearing of vegetation. BMPs would be used during construction in accordance with DDOE and District standards to avoid increased soil erosion. This would help to prevent an increase in storm water runoff volume that could degrade water quality in the nearby tributaries and Anacostia River. The net decrease in pervious surface under Build Alternative 2 (0.02 acres) is anticipated to have negligible impacts to surface water quality in the long term given the minimal change in pervious surface. Storm water quality requirements will be based on providing water quality improvements for the pavement areas within the project site. This requirement will be met using a variety of BMP facilities and LID strategies such as DDOT/DC Water quality control structures and other features. Therefore, long-term impacts to water quality are expected to be negligible. Impacts to water quality do not meet the CEQ criteria for either context or intensity; therefore these impacts do not rise to a level of "significance" as defined by CEQ.

4.1.3 Wildlife

Impact Thresholds

Negligible: There would be no observable or measurable impacts to native species, their habitats, or the natural processes sustaining them. Impacts would be well within natural fluctuations.

Minor: Impacts would be detectable, but they would not be expected to be outside the natural range of variability of native species' populations, their habitats, or the natural processes sustaining them. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: Breeding animals of concern are present; animals are present during particularly vulnerable lifestages, such as migration or juvenile stages; mortality or interference with activities necessary for survival can be expected on an occasional basis, but is not expected to threaten the continued existence of the species in the Study Area. Impacts on native species, their habitats, or the natural processes sustaining them would be detectable, and they could be outside the natural range of variability. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.

Major: Impacts on native species, their habitats, or the natural processes sustaining them would be detectable, and they would be expected to be outside the natural range of variability. Key ecosystem processes might be disrupted. Loss of habitat might affect the viability of at least some native species. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

Duration: **Short-term** – Recovers in less than 1 year; **Long-term** – Takes more than 1 year to recover.

No Build Alternative

The No Build Alternative includes no construction. Therefore, there would be no impacts to wildlife or wildlife habitat under the No Build Alternative.

Build Alternative 1 – Revised Square Alternative

Due to the urban nature of the Study Area, and the fact that the proposed development under Build Alternative 1 would be located entirely within previously disturbed or maintained landscapes, no impacts to wildlife or wildlife habitat are anticipated. Additionally, the Study Area does not include habitat favored by migratory birds. Therefore, any short-term or long-term impacts to terrestrial organisms would be negligible as there would be no observable or measurable impacts to native species, their habitats, or the natural processes sustaining them. Impacts would be of short duration and well within natural fluctuations. Impacts to wildlife do not meet the CEQ criteria for either context or intensity; therefore these impacts do not rise to a level of "significance" as defined by CEQ.

Build Alternative 2 – Conventional Intersection Alternative

Impacts to wildlife or wildlife habitat under Build Alternative 2 would be negligible, as discussed under the Build Alternative 1 analysis. Impacts to wildlife do not meet the CEQ criteria for either context or intensity; therefore these impacts do not rise to a level of "significance" as defined by CEQ.

4.1.4 Vegetation

The project intersection right-of-way is currently owned by DDOT and NPS; the majority of the vegetative land in the Study Area is owned by NPS, known as Twining Square in the Study Area. Management of NPS lands is guided by numerous congressional acts and executive orders, including the 1916 Organic Act which created the NPS and the General Authorities Act of 1970 which established the management of the national park system.

While the NPS currently owns and operates the vegetative open space within the Study Area, the land jurisdiction could transfer to DDOT if the Proposed Action is implemented. Therefore, the impacts to the vegetation in these areas would be coordinated and discussed with NPS; however development and maintenance of the vegetated areas would be under DDOT if the transfer of jurisdiction is approved.

Impact Thresholds

Negligible: No native vegetation would be affected or some individual native plants could be affected as a result of the alternative, but there would be no effect on native species populations. The effects would be on a small scale and no species of special concern would be affected.

Minor: The alternative would affect some individual native plants and would also affect a relatively minor portion of that species' population. Mitigation to offset adverse effects, including special measures to avoid affecting species of special concern, could be required and would be effective.

Moderate: The alternative would affect some individual native plants and would also affect a sizeable segment of the species' population and over a relatively large area. Mitigation to offset adverse effects could be extensive, but would likely be successful. Some species of special concern could also be affected.

Major: The alternative would have a considerable effect on native plant populations, including species of special concern, and affect a relatively large area in and out of the park. Mitigation measures to offset the adverse effects would be required, extensive, and success of the mitigation measures would not be guaranteed.

Duration: **Short-term -** Recovers in less than three years; **Long-term** - Takes more than three years to recover.

No Build Alternative

Under the No Build Alternative, there would be no development to the Study Area and no disturbance to the existing vegetation. The intersection configuration would remain as it is, with the fragmented green spaces on both sides of Pennsylvania Avenue, SE continuing under ownership of the NPS. The No Build Alternative would not result in impacts to vegetation in the Study Area.

Build Alternative 1 – Revised Square Alternative

The reconfiguration of the intersection would include the conversion of the roadways, which fragment the currently NPS-owned reservations, into green space. The existing street trees and vegetation would be preserved where possible. Pending final design, an estimated six or seven trees may be removed to accommodate additional roadway to the north of the square, and one or two trees may need to be removed

due to the roadway configuration to the south of the square. Street trees line the roadway median to the west of the square; the proposed design of Build Alternative 1 may require removal of one or two trees near the intersection where the median width is reduced to accommodate a wider sidewalk and bus stop area across the street. Upon project implementation, DDOT would develop a landscape plan and provide the appropriate vegetation to replace any trees removed. Additionally, LID principles would be applied to the development and the existing tree canopy in the Study Area would be preserved and enhanced wherever possible to maximize pavement shading.

Short-term minor adverse impacts to vegetation may occur during construction as soils are disturbed and trees potentially impacted during the intersection development. BMPs would be used during construction to minimize soil erosion and impacts to vegetation. Although there is not a substantial amount of additional park area or vegetation being added under Build Alternative 1, the consolidation of the green space and potential for enhanced landscape design would result in minor long-term benefits under this alternative. Changes to the intersection under Build Alternative 1 would provide the opportunity to enhance the green space as usable park area for residents and visitors to this intersection. Given the analysis and use of BMPs, the impacts to vegetation do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

As discussed in *Section 4.8, Mitigation*, landscaping and replacement of trees will be conducted in accordance with the DDOT Design and Engineering Manual.

Build Alternative 2 – Conventional Intersection Alternative

Build Alternative 2 would result in similar impacts to vegetation, as described under Build Alternative 1. Depending on final design of the intersection, six or seven trees in the northern reservation may need to be removed to accommodate pedestrian pathways. Three trees in the southern reservation would be impacted by roadway development under Build Alternative 2, and three to four trees would be impacted to accommodate the pedestrian pathway in the southern reservation. As with Build Alternative 1, short-term minor adverse impacts may occur to vegetation during construction and would be mitigated by using BMPs. The overall consolidation of green space and potential for enhanced landscape design under this Alternative would result in minor long-term benefits. Given the analysis and use of BMPs, the impacts to vegetation do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

4.2 Cultural and Historic Resources

In this EA, impacts to historic structures, cultural landscapes, and archaeological resources are described in terms of intensity, duration, context, and type, which is consistent with the CEQ regulations for implementing NEPA. These impact analyses are intended to comply with the requirements of both the NEPA and Section 106 of the NHPA. In accordance with the Advisory Council on Historic Preservation's (ACHP) regulations implementing Section 106 (36 CFR Part 800, Protection of Historic Properties), impacts to historic structures, cultural landscapes, and archaeological resources were identified and evaluated by (1) determining the area of potential effects; (2) identifying cultural resources present in the area of potential effects that are either listed in or eligible to be listed in the NRHP; (3) applying the criteria of adverse effect to affected cultural resources either listed in or eligible to be listed in the NRHP; and (4) considering ways to avoid, minimize, or mitigate adverse effects. To assist in the assessment,

FHWA and DDOT consulted with the DC SHPO with regards to the APE (direct and indirect), cultural resources present, and the potential effects on historic properties.

Under the Advisory Council's regulations, a determination of either adverse effect or no adverse effect must be made for affected NRHP eligible or listed cultural resources. An adverse effect occurs whenever an impact alters, directly or indirectly, any characteristic of a cultural resource that qualifies it for inclusion in the National Register (e.g., diminishing the integrity of the resource's location, design, setting, materials, workmanship, feeling, or association). Adverse effects also include reasonably foreseeable effects of the Preferred Alternative that would occur later in time, be farther removed in distance, or be cumulative (36 CFR 800.5, Assessment of Adverse Effects).

As stated in 36 CFR §800.5(a)(1), "[A]dverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative." An alternative is considered to have the potential for *direct* effects if it alters the property or its character defining features in a manner that diminished is integrity, or its ability to convey its significance. An alternative is considered to have the potential for *indirect* effects if it may result in long-term deterioration, or if it has the potential to alter views from nearby historic resources. A detailed *Archaeological Assessment of Potential* has been prepared for the Pennsylvania and Minnesota Avenues, SE intersection (see *Appendix E*); this EA summarizes the findings of this report.

**Note that Build Alternative 1 – Revised Square Alternative is often referred to as the "Modified Square Alternative" in the cultural resources reports and correspondence.*

4.2.1 Historic Structures

Impact Thresholds

For a historic district or structure to be listed on the NRHP, it must possess significance (the meaning or value ascribed to the historic district or structure), and the features necessary to convey its significance must have integrity. For purposes of analyzing potential impacts on historic districts and structures, the thresholds of change for the intensity of an impact are defined as follows:

Negligible: 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*.

Minor: Adverse impact: Alteration of a pattern(s) or feature(s) of a historic district or structure listed on or eligible for the NRHP would not diminish the integrity of a character-defining feature(s) or the overall integrity of the historic property. For purposes of Section 106, the determination would be *no adverse effect.*

Moderate: Adverse impact: The impact would alter a character-defining feature(s) of a historic district or structure and diminish the overall integrity of that feature(s) of the historic property. For purposes of Section 106, the determination of effect would be *adverse effect*, but one that could be fairly easily avoided, minimized, or mitigated through an Agreement Document.

Major: Adverse impact: The impact would alter character-defining feature(s) of the historic district or structure and severely diminish the integrity of that feature(s) and the overall integrity of the historic property. For purposes of Section 106 the determination of effect would be *adverse effect* and would present serious difficulty to avoid, minimize, or mitigate through an Agreement Document.

Duration : **Short-term –** Impacts are equivalent to the period of construction; **Long-term** – Impacts last beyond the period of construction.

No Build Alternative

Under the No Build Alternative, there would be no reconfiguration of roadway in the Study Area and no disturbance to the existing buildings or resources. Therefore, the No Build Alternative would have no direct or indirect effects on nearby historic properties eligible for listing in the NRHP such as the Morton's Department Store Building, the Highland Theater Building, or the lot previously occupied by the Little Tavern Building; no historic structures are listed in the NHRP in the Study Area.

Build Alternative 1 – Revised Square Alternative

Build Alternative 1 would include the reconfiguration of roadway into a traffic square concept that would require all turning vehicles to go around the expanded center park area. Build Alternative 1 does not include the acquisition or use of any buildings, structures or properties; therefore there would be no direct effects on nearby historic properties eligible for listing in the NRHP.

Any changes to the view from nearby buildings would not be substantially changed from the No Build Alternative and would not impact the historic identity of those eligible buildings; therefore long-term indirect effects would be negligible. The improvements to the intersection would not diminish the integrity of the structures and would not jeopardize the eligibility of the structures for the NRHP. Any indirect effects, such as visual impacts due to construction would be short-term and negligible with the use of BMPs. Noise and vibration BMPs would be used during construction to minimize any disturbance to nearby businesses and residences during construction.

The DC SHPO reviewed the Proposed Action in accordance with Section 106 of the NHPA and issued a finding of *Conditional* No Adverse Effect for this undertaking with associated conditions to be fulfilled regarding the historic built environment:

- The alternative selected is the Revised Square Alternative, which most closely reestablishes the original configuration of the streets and reservations.

According to the DC SHPO, "Reestablishment of the square as it was originally planned when the streets were laid out is most compatible historically and would not constitute an adverse effect on the built environment." Additionally, continued consultation with the SHPO on the project is requested if there are any changes to the project footprint as the designs are finalized. Refer to *Appendix E* for the *DC SHPO Section 106 Review Form*, dated April 17, 2013.

Given the conditions in the *Section 106 Review Form* for the historic built environment are followed, the effects on historic structures do not meet the CEQ criteria for either context or intensity, and would not rise to a level of "significance" as defined by CEQ.

Build Alternative 2 – Conventional Intersection Alternative

Under Build Alternative 2, the intersection would be reconfigured into a typical, at-grade intersection. The impacts to historic structures from Build Alternative 2 would be similar to Build Alternative 1.

As discussed under Build Alternative 1, the DC SHPO issued a *Conditional* No Adverse Effect for this undertaking if Build Alternative 1 is selected as the Preferred Alternative. If Build Alternative 2 is selected as the Preferred Alternative, additional consultation with the DC SHPO would likely be necessary. Given the conditions in the *Section 106 Review Form* for the historic built environment are followed, the effects on historic structures do not meet the CEQ criteria for either context or intensity, and would not rise to a level of "significance" as defined by CEQ.

4.2.2 Cultural Landscape

Impact Thresholds

For an historic district, structure, or cultural landscape to be listed in the NRHP, it must possess significance and the features which convey its significance must have integrity. For purposes of evaluating potential impacts on historic districts and structures, the thresholds of change are defined as follows:

Negligible: The impact is at the lowest level of detection with neither adverse nor beneficial consequences. For Section 106 of the NHPA, the determination of effect would be *no adverse effect.*

Minor: Adverse Impact: - Alteration of the patterns or features of a historic district or structure would not diminish the integrity of the character-defining features or the overall integrity of the historic property. For Section 106, the determination would be *no adverse effect*.

Moderate: Adverse Impact: - The project would alter the character-defining features of the historic district or structure and diminish the integrity of the features of the historic property. The determination of effect for Section 106 would be an adverse effect, but one that could be avoided, minimized or mitigated.

Major: Adverse Impact: - The project would alter the character-defining features of the historic district or structure and severely diminish the integrity of the features and the overall integrity of the historic property. For purposes of Section 106, the determination of effect would be *adverse effect* and the effects would be difficult to avoid, minimize or mitigate.

Duration : **Short-term** – Impacts are equivalent to the period of construction; **Long-term –** Impacts last beyond the period of construction.

No Build Alternative

Under the No Build Alternative, there would be no reconfiguration of roadway in the Study Area and no disturbance to the existing cultural landscape. Therefore the No Build Alternative would have no direct or indirect effects on cultural landscapes in the Study Area vicinity.

Build Alternative 1 – Revised Square Alternative

Build Alternative 1 would result in the reconfiguration of the roadway and park area at the intersection; however the existing cultural landscape consisting of an urban mix of commercial and residential development with roadway and park area within the intersection would remain the same. Build Alternative 1 would not impact any businesses or residential uses in the area and would maintain a similar amount of park area and roadway, however the park area would be more contiguous than it is currently. Any long-term effects to the cultural landscape in the vicinity of the intersection would be negligible.

Any adverse short-term visual impacts to the cultural landscape due to construction would be or short duration and negligible. Based on the analysis summarized above, impacts to cultural landscapes do not meet the CEQ criteria for either context or intensity, and would not rise to a level of "significance" as defined by CEQ.

Build Alternative 2 – Conventional Intersection Alternative

Build Alternative 2 would also reconfigure the roadway and park area in the intersection; impacts to the cultural landscape would be negligible similar to Build Alternative 1. Any adverse short-term visual impacts to the cultural landscape due to construction would be negligible. Based on the analysis summarized above, impacts to cultural landscapes do not meet the CEQ criteria for either context or intensity, and would not rise to a level of "significance" as defined by CEQ.

4.2.3 Archaeological Resources

Based on archival research and coordination with the DC SHPO City Archaeologist, it was determined that archaeological investigations were needed for the Proposed Action. Geoarchaeological coring was conducted in November of 2012 to determine whether intact soil columns are present in the Study Area and would need subsequent archaeological testing. The associated report, *Geoarchaeological Interpretations in the Vicinity of the Intersection of Pennsylvania and Minnesota Avenues in the Anacostia Section of Washington, D.C.* and the findings of the investigation are included in *Appendix E, Cultural Resources*. Note that Build Alternative 1 – Revised Square Alternative is often referred to as the "Modified Square Alternative" in the cultural resources reports and correspondence.

Impact Thresholds

Impacts to archaeological sites occur when proposed alternatives result in complete or partial destruction of the resource, and are equivalent to a loss of integrity as defined in Section 106 of NHPA. In determining the appropriate impact threshold, both the extent to which the proposed alternative results in a loss of integrity and the degree to which losses can be compensated by mitigating activities, including preservation or data recovery, are considered. Only those resources considered significant for listing in the NRHP are protected by federal regulations. Resources are eligible for listing in the NRHP if they meet one or more eligibility criteria (for archaeological site, generally Criterion D, having the potential to provide information important to history or prehistory) and if they possess integrity.

For the analysis of impacts to archaeological resources, the determination of the intensity of an impact is based on the foreseeable loss of integrity to known or potential resources. The analysis considers only the direct impacts of construction-related activities as the facility should have no ground-disturbing activities and no additional effects upon archaeological resources under any of the alternatives under consideration upon completion of construction. However, all impacts are considered long term, in that the impact to an archaeological resource will last past the period of construction. The definition of impact thresholds used in this analysis are:

Negligible: The lowest level of detection that would have neither adverse nor beneficial impacts. The determination of effect for Section 106 of NHPA would be no adverse effect.

Minor: Disturbance of archeological resources will result in little, if any, loss of site integrity. The determination of effect for Section 106 of NHPA would be no adverse effect.

Moderate: Site disturbance will result in a loss of integrity and a partial loss of the character-defining features and information potential that form the basis of the site's NRHP eligibility. Mitigation is accomplished by a combination of archaeological data recovery and in-place preservation. The determination of effect for Section 106 of NHPA would be an adverse effect.

Major: The disturbances result in a loss of site integrity to the extent that the resource is no longer eligible for listing in the NRHP. The site's character-defining features and information potential are lost to the extent that archeological data recovery is the primary form of mitigation. The determination of effect for Section 106 of NHPA would be an adverse effect.

Beneficial: Beneficial impacts can occur when an archaeological site is stabilized in its current condition to maintain its existing level of integrity or when an archaeological site is preserved in accordance with the Secretary of Interior's Standards for the Treatment of Historic Properties. The determination of effect for Section 106 of NHPA would be *no adverse effect*.

Duration: **Short-term** – Impacts last for the duration of construction-related activities; L**ong-term-** Impacts last beyond the proposed construction activities. All impacts to archaeological sites are considered long-term impacts.

No Build Alternative

Under the No Build Alternative, there would be no ground disturbance and no impact to archaeological resources within the APE-Direct.

Build Alternative 1 – Revised Square Alternative

Project activities under Build Alternative 1 would result in ground disturbance including removal of existing pavement and sidewalks, construction of new traffic lanes and sidewalks, relocation of traffic control signals, street lights, landscaping and utilities. The northern and southern reservations, as well as the area under existing roadway would be disturbed during construction of the Revised Square.

It is not anticipated that any archaeological resources would be impacted by Build Alternative 1 in the northern reservation or in areas under existing roadbeds, as they appear to have little potential for archaeological resources. The potential for impacts to archaeology under Build Alternative 1would be to the southern reservation.

The southern reservation is considered a zone of high potential for prehistoric resources, as well as historic resources associated with nineteenth century residences. Further archaeological investigation is recommended in the southern reservation area within the APE-Direct (Figure 3-2). Therefore Phase IB/II testing of this small area is recommended prior to final design decisions and construction of the proposed improvements.

The DC SHPO has issued a finding of *Conditional* No Adverse Effect for this undertaking with the following conditions related to archaeological resources:

- Conduct Phase IB/II/ archaeological testing of an area within Res. 487 near geoarchaeological boring # 4 where an intact historic surface was identified at approximately 0.7 feet below ground surface (see Figure 3-5);

- Continued consultation with the SHPO on the project if there are any changes to the project footprint as the designs are finalized and for treatment of any NRHP eligible archaeological resources identified during Phase IB/II testing; and
- Completion of archaeological reporting requirements for the project following District and federal guidelines, curation of resulting collections, records, images, and geospatial data.

Given the conditions in the *Section 106 Review Form* for archaeology (also outlined above) are followed, the effects on archaeological resources would not rise to a level of "significance" as defined by CEQ.

Refer to *Appendix E* for the *DC SHPO Section 106 Review Form*, dated April 17, 2013.

Build Alternative 2 – Conventional Intersection Alternative

As with Build Alternative 1, the northern and southern reservations, and area under the existing roadway would all be disturbed by the construction of Build Alternative 2. Refer to Build Alternative 1 for a description of stipulations associated with the DC SHPO's finding of *Conditional* No Adverse Effect. Given the conditions in the *Section 106 Review Form* for archaeology (also outlined above) are followed, the effects on archaeological resources would not rise to a level of "significance" as defined by CEQ.

4.2.4 Cultural Resources Summary

No cultural landscapes exist in the Study Area and therefore would not be impacted by the Build or No Build Alternatives. No impacts would occur to any cultural resources with the No Build Alternative since no construction would occur.

The DC SHPO issued a finding of ***Conditional* No Adverse Effect** for this undertaking on April 17, 2013 with the following conditions (Refer to *Appendix E* for the *DC SHPO Section 106 Review Form*):

1) Per Andrew Lewis letter to FHWA/ DDOT 10/26/2011, the alternative selected is the modified/ revised square that reestablishes most closely the original configuration of the streets and reservations (see letter attached);

2) Conduct Phase IB/II/ archaeological testing of an area within Res. 487 near geoarchaeological boring # 4 where an intact historic surface was identified at approximately 0.7 feet below ground surface (see attached map);

3) Continued consultation with the SHPO on the project if there are any changes to the project footprint as the designs are finalized and for treatment of any NRHP eligible archaeological resources identified during Phase IB/II testing; and

4) Completion of archaeological reporting requirements for the project following District and federal guidelines, curation of resulting collections, records, images, and geospatial data.

In summary, no adverse impacts to the historic built environment would occur with the implementation of Build Alternative 1; however, additional consultation with the DC SHPO would likely be required if Build Alternative 2 is selected as the Preferred Alternative.

Further archaeological investigation (Phase IB/II Survey) is recommended in the southern reservation area within the APE-Direct prior to final design decisions and construction of either Build Alternative 1

or Build Alternative 2. The southern reservation area has been classified as having a high potential for prehistoric resources and historic resources associated with nineteenth century farmsteads and early twentieth century residential development of Twining City.

Given the conditions in the *Section 106 Review Form* for cultural resources are followed, the effects on cultural resources do not meet the CEQ criteria for either context or intensity, and would not rise to a level of "significance" as defined by CEQ.

4.3 Socioeconomic Resources

Impact Thresholds

The following thresholds were used to determine the magnitude of effects to the socioeconomic environment.

Negligible: Little or no noticeable change in economic activity, employment and income levels, or population migration or immigration.

Minor: Local changes in economic activity, employment and income levels, or population migration or immigration.

Moderate: Regional changes in overall economic activity, employment and income levels, or population migration or immigration.

Major: Widespread, significant changes in overall economic activity, employment and income levels, or population migration or immigration.

Duration: **Short-term –** Effects last one year or less; **Long-term** – Effects last longer than a year.

4.3.1 Land Use

The potential for impacts to land use was evaluated based on the potential for implementation of the Build Alternatives to result in changes to land use.

No Build Alternative

The No Build Alternative would result in the parcels of Twining Square located within the Study Area (U.S. Reservation 487) remaining under the ownership of the NPS and the roadway remaining under DDOT right-of-way. No short-term impacts would occur because no construction would occur at the intersection and no direct impacts to land use would occur under the No Build Alternative.

It is unknown whether the No Build Alternative (keeping the intersection as it is today) would impact any potential land use decisions by the District. However, the No Build Alternative would not improve the intersection in furtherance of the Great Streets Initiative and would not serve as a catalyst for positive land use change at the intersection in the long term. The No Build Alternative would have no impact on future land use at the intersection.

Build Alternative 1 – Revised Square Alternative

Build Alternative 1 is consistent with the District's planning documents, aligning with the *Great Streets Framework Plan – Pennsylvania Avenue, SE*, and the *Revitalization of Pennsylvania Avenue, SE for the Great Initiative Concept Design.* As a result of Build Alternative 1, the NPS land parcels (U.S. Reservation 487) would transfer to DDOT. This land transfer would facilitate the reconfiguration of the intersection to improve safety, mobility, and connectivity for pedestrians and motorists at the intersection in keeping with the District's Great Streets Initiative. No private right-of-way would be impacted or acquired by the implementation of Build Alternative 1.

The land uses in the Study Area would not change as a result of Build Alternative 1 and would be only temporarily affected during construction by road closures to reconfigure the intersection. The proposed intersection improvements would not affect any land uses directly. However, Build Alternative 1 could indirectly affect future land use in the long term by functioning as a catalyst for redevelopment. As part of the Great Streets Initiative, improvements to this intersection would work toward the project mission to revitalize the District's Great Streets, which could ultimately lead to attracting new investment in the community. Indirect impacts to land use would be minor and beneficial given the potential to generate local changes in land use and economic activity. Land use impacts in the short term would be negligible during construction. The impacts to land use do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

Build Alternative 2 – Conventional Intersection Alternative

As a result of Build Alternative 2, the NPS owned land parcels (U.S. Reservation 487) would transfer to DDOT. This land transfer would facilitate the reconfiguration of the intersection. The land uses surrounding the Study Area would not be directly impacted as a result of Build Alternative 2 and would be only temporarily affected during construction by road closures to reconfigure the intersection. Indirect impacts to land use would be negligible given the fact that the design of Build Alternative 2 maintains the current priority of moving vehicles through the intersection. Land use impacts under Build Alternative 2 would be negligible and temporary during construction. The impacts to land use do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

4.3.2 Zoning

No Build Alternative

There would be no change in zoning and therefore no impact to zoning under the No Build Alternative.

Build Alternative 1 – Revised Square Alternative

Implementation of Build Alternative 1 includes acquisition of NPS lands by DDOT to facilitate reconfiguration of the intersection; however no changes to zoning in the vicinity of the project would result due to Build Alternative 1. As with Land Use, in the long term, the proposed improvements could influence zoning decisions in the future indirectly if the intersection improvements serve as a catalyst for economic development in the Study Area. There would be no direct impacts to zoning in the short term or long term as a result of Build Alternative 1. The current zoning in most of the Study Area, Zone C-2-A, encompasses a wide range of land uses, including office employment centers, shopping centers, medium-

bulk mixed use centers, and housing. Just north of the square, lining L'Enfant Square, SE (street) is zoned R-4, which permits a range of single-family residential uses (including detached, semi-detached, row dwellings, and flats), churches and public schools. Because the existing zoning classifications are inclusive of many land use types, it is unlikely that any rezoning would be necessary in the Study Area. However, a potential benefit to Build Alternative 1 is the furtherance of economic development and local investment in the area; therefore, zoning may change over time as there is growth and changeover in local economic activity. It is anticipated that any indirect impacts to zoning as a result of Build Alternative 1 would be minor and beneficial given the potential to generate local changes in land use and economic activity. No impacts to zoning would occur in the short term. The impacts to zoning do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

Build Alternative 2 – Conventional Intersection Alternative

Implementation of Build Alternative 2 also includes acquisition of NPS lands by DDOT to facilitate reconfiguration of the intersection; however no changes to zoning in the vicinity of Build Alternative 2 would directly result from the alternative. Impacts to zoning would be negligible as a result of Build Alternative 2 in the long term. No impacts to zoning would occur in the short term. The impacts to zoning do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

4.3.3 Demography

No Build Alternative

Under the No Build Alternative, the reconfigured intersection would not be constructed and existing conditions would remain unchanged. Therefore, there would be no impact to demography in the Study Area.

Build Alternative 1 – Revised Square Alternative

Build Alternative 1 would be constructed within existing DDOT right-of-way and with the acquisition of NPS lands. Community residents and commuters through the area would be temporarily impacted by road closures during construction to reconfigure the project intersection under Build Alternative 1. Closures at the intersection could require traffic to be re-routed, bus stops to be relocated, and may require changes to on-street parking during construction; however temporary impacts due to construction is not expected to eliminate access to any residences or businesses in the Study Area. Short term impacts under Build Alternative 1 would be minor.

Build Alternative 1 would not result in any displacement or relocation of populations, nor would it affect access to residences or businesses within the Study Area in the long term. Travel patterns for residents and users of the intersection would be modified by Build Alternative 1 for motorists making a left turn from Pennsylvania Avenue heading northbound onto Minnesota Avenue. These motorists will no longer be able to make a direct left turn onto Minnesota Avenue and will have to make a right turn at L'Enfant Square, SE/ Minnesota Avenue and circumvent the "square" to travel northbound on Minnesota Avenue. The left-turn movement was eliminated to remove conflicts between vehicles and crossing pedestrians. Although this new travel pattern could increase travel time for residents and commuters traveling by car, the proposed travel patterns improve motorist *safety* by reducing left-turn conflicts and reducing

confusion at the intersection. Other pedestrian improvements will benefit the local population, such as new, shorter crosswalks to reduce the time walking in the street to enhance safety. Expanded sidewalks at the southwest and northwest corners of Pennsylvania Avenue, SE and L'Enfant Square, SE would also minimize the conflict between pedestrians waiting at the bus stop and bicyclists traveling on the sidewalk.

The L'Enfant Square, SE roadway to the north of the "square" would be increased to three lanes and will remove the one-hour on-street parking that exists today on the south side of the street. The residential (Zone 7 permit) on-street parking on the north side of the street nearest to the residences will remain. A grassed strip is proposed between the sidewalk and the on-street parking as an additional buffer between the roadway and the houses.

Three of the five WMATA bus stops in the Study Area would likely need to be permanently relocated to locations near their current locations to accommodate the proposed intersection configuration. The change would be needed to accommodate safe bus movement through the intersection. See *Section 4.4.3, Transit* for more detailed discussion of changes to transit users due to Build Alternative 1. The potential bus stop relocations will work in tandem with the revised intersection configuration to improve safety for transit riders using this intersection. Importantly, the proposed travel patterns and changes to bus stop locations are critical to improving pedestrian and bicyclist safety at this intersection, as well as the safety of transit riders and park users. Impacts to demography due to Build Alternative 1 would therefore be minor and beneficial.

Additionally, due to the proposed aesthetic enhancements under this alternative, along with improved accessibility and mobility to and through the area, Build Alternative 1 has the potential to generate investment in the community and to attract quality retail and jobs. This would result in indirect impacts to demography that would be minor and beneficial, defined by local changes in economic activity, and employment and income levels. Therefore the impact is minor in context and intensity, and does not rise to a level of "significance" as defined by CEQ.

Build Alternative 2 – Conventional Intersection Alternative

As with Build Alternative 1, during construction, Build Alternative 2 would require traffic to be re-routed, bus stops to be relocated, and may require changes to on-street parking during construction; however temporary impacts due to construction are not expected to eliminate access to any residences or businesses in the Study Area. Short term impacts under Build Alternative 2 would be minor.

Build Alternative 2 maintains the available street parking along L'Enfant Square, SE to the north of the "square" and has the potential to reduce the traffic volume adjacent to those residences, depending on which way traffic flows along this roadway stretch. Build Alternative 2 has two options for the movement of one-way traffic to the north and west of the "square" on L'Enfant Square, SE. Option 1 would maintain the traffic flow in a one-way direction to the west and south on L'Enfant Square, SE. Commuter traffic could continue to cut-through the "square" to avoid the Pennsylvania/Minnesota Avenues, SE intersection and the right-turning vehicle/pedestrian conflict to the west of the square would remain. Option 2 would change traffic flow to one-way to the north and east on this roadway. Cut-through traffic would be minimized and the vehicle/pedestrian conflict would be reduced, which would be a benefit to residents living on L'Enfant Square SE.

Pedestrian improvements are included under Build Alternative 2 as compared to the No Build Alternative. However, given the typical intersection design, traffic speeds would not be reduced with Build

Alternative 2 and the intersection would continue to favor motorists in vehicles over pedestrians as a whole.

As with Build Alternative 1, WMATA bus stops in the Study Area would likely be permanently relocated. Two of the bus stops would be relocated near their current locations. The change would be needed to accommodate safe bus movement through the intersection. See *Section 4.4.3, Transit* for more detailed discussion of changes to transit users due to Build Alternative 1. The potential bus stop relocations will work in tandem with the revised intersection configuration to improve safety for transit riders using this intersection.

Safety will be improved over the No Build Alternative under Build Alternative 2; however, overall, this alternative maintains the current priority of moving vehicles through the intersection and is unlikely to promote Great Streets principles, as defined by local changes in economic activity, employment and income levels, or population migration or immigration. Therefore, impacts to demography under Build Alternative 2 would be negligible in the long term. The impacts to demography do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

4.3.4 Environmental Justice

No Build Alternative

Under the No Build Alternative, the reconfigured intersection would not be constructed and existing conditions would remain unchanged. Therefore, the No Build Alternative would result in no impacts to low-income or minority populations.

Build Alternative 1 – Revised Square Alternative

As described in Section 3.3.4, Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations" requires federal agencies to take appropriate and necessary steps to identify and address disproportionately high and adverse human health or environmental effects of their actions on minority and low-income communities or populations, and directs federal agencies not discriminate on the basis of race, color, or national origin.

Section 3.3.4 identified a high percent of minority residents in the Study Area vicinity; Census tracts (CTs) and block groups in the vicinity of the Study Area have between 96 and 99% minority populations.

Potential construction impacts would have the greatest effect on the residential population bordering L'Enfant Square, SE and along Minnesota Avenue, SE, adjacent to construction areas. These residential areas consist of rowhouses and single-family homes. The construction impacts on nearby residents would not be considered a disproportionately high or adverse impact due to the fact that Build Alternative 1 cannot avoid construction along these streets in order to improve the project intersection, and other residents and workforce populations near the Study Area, regardless of income and race, would experience the same construction impacts. Short-term air quality and noise level impacts may occur during construction; however the impacts would be temporary and would not disproportionately affect low income or minority populations, as all alternatives involve the same percentage of minority population.

Under Build Alternative 1, there would be minor short-term adverse impacts to WMATA bus service along the Study Area corridor during some construction periods at the intersection. Three of the five bus Stops would need to be relocated to locations near their current locations to accommodate the new intersection configuration; however the proposed relocation of bus stops would be very close to the existing stops. Impacts would also be minor in the short term as adjustments to new bus stop locations are made by bus users at the intersection. However, long-term impacts after project implementation are anticipated to be negligible. The impacts on nearby residents of relocating bus stops would not be considered a disproportionately high or adverse impact on low-income or minority populations due to the fact that all residents and workforce populations in the vicinity of the Study Area would be affected by any bus stop changes needed for the implementation of Build Alternative 1.

Under Build Alternative 1, there would be many long-term improvements to the Study Area that would benefit the community, including low income and minority populations. These benefits include: improved intersection design and efficiency; increased mobility; improved safety for all modes of travel; and improved physical appearance including the availability of a larger open park space.

While Study Area residents include low-income and minority populations, these populations would not experience disproportionately high and adverse effects resulting from Build Alternative 1 or any of the associated construction activities. Therefore, short-term and long-term impacts would be negligible under Build Alternative 1. The impacts to environmental justice do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

NPS, DDOT and other cooperating agencies actively solicited public participation as part of the planning process and gave equal consideration to all input from persons regardless of age, race, income status, or other socioeconomic or demographic factors. Public scoping was initiated with a comment period via the Internet in the Fall of 2012. Additionally, information was distributed to local residents and businesses, and a presentation with project information was given at an Advisory Neighborhood Commission (ANC) 7B Meeting on May 16, 2013 to solicit citizen feedback. Prior public participation was extensive for the Great Streets Project, and is discussed in the *Scoping* section of this EA.

Build Alternative 2 – Conventional Intersection Alternative

As with Build Alternative 1, while Study Area residents include low-income and minority populations, these populations would not experience disproportionately high and adverse effects resulting from Build Alternative 2 or any of the associated construction activities. For the reasons listed under Build Alternative 1, Build Alternative 2 would also result in negligible short and long-term impacts to minority or low-income populations in the Study Area. The impacts to environmental justice do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

4.3.5 Economics and Development

No Build Alternative

Under the No Build Alternative, the reconfigured intersection would not be constructed and no acquisition of NPS lands would occur. Therefore, the No Build Alternative would not directly impact existing economics and development. However, the No Build Alternative would not help revitalize the intersection in furtherance of the Great Streets Initiative and would not serve as a catalyst for new

development and jobs at the intersection in the long term. Therefore, the No Build Alternative could indirectly have minor adverse impacts to economics and community revitalization in the long term.

Build Alternative 1 – Revised Square Alternative

The economic and social characteristics of the residential areas or businesses in and surrounding the project intersection, including the NPS-owned land could be temporarily impacted by road closures to reconfigure the project intersection under Build Alternative 1. Closures at the intersection could require traffic to be re-routed; however temporary impacts due to construction are not expected to eliminate access to any businesses, attractions, or residential areas in the Study Area. Impacts to economics and development in the short term during construction would be minor.

Build Alternative 1 is based on the Great Streets Initiative Concept Design which supports local demand for goods and services through economic revitalization. In the long term, the NPS and DDOT exchange of land jurisdiction and intersection improvements may have a positive influence in the Study Area due to a potential increase in economic activity for businesses resulting from various improvements proposed as part of the Great Streets Initiative. According to the 2008 Market Assessment in the Pennsylvania Avenue, SE Corridor Development Plan, Twining Square (L'Enfant Square) is "the natural location for the largest retail concentration…given the strong visibility and access created by the intersection of Pennsylvania and Minnesota Avenue, to the proximity to I-295, and its role as a gateway to the east side of the River neighborhoods."[59] Build Alternative 1 would enhance the appeal and quality of the area which could help attract retail and jobs. Indirect impacts to economics and development would therefore be minor and beneficial, defined by local changes in economic activity, employment and income levels, or population migration or immigration. The impacts to economics and development are minor in context and intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

Build Alternative 2 – Conventional Intersection Alternative

As with Build Alternative 1, short-term closures at the intersection could require traffic to be re-routed, however temporary impacts due to construction is not expected to eliminate access to any businesses, attractions, or residential areas adjacent to Pennsylvania and Minnesota Avenues, SE. Impacts to economics and development in the short term during construction would be minor. Build Alternative 2 maintains the current priority of moving vehicles through the intersection and is unlikely to promote Great Streets Principles at this intersection, as defined by local changes in economic activity, employment and income levels, or population migration or immigration. Therefore, impacts to economics and development under Build Alternative 2 would be negligible in the long term. The impacts to economics and development do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

4.3.6 Joint Development

No Build Alternative

There are no existing or proposed joint development projects in the Study Area; therefore, the No Build Alternative would have no impact on joint development.

Build Alternative 1 – Revised Square Alternative

Economic development plans are ongoing along the 2300 Block of Pennsylvania Avenue, SE immediately west of Twining Square. The District aims to help implement the goals of the Great Streets Initiative by redeveloping this key corridor to eliminate blight, provide quality neighborhood-serving retail and potential job creation. These economic development plans are not "joint development" projects and there are no joint development projects in the Study Area. Therefore Build Alternative 1 would have no impact on joint development in the short term or long term. The impacts to joint development do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

Build Alternative 2 – Conventional Intersection Alternative

As under Build Alternative 1, there are no existing or proposed joint development projects in the Study Area; therefore Build Alternative 2 would have no impact on joint development in the short term or long term. The impacts to joint development do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

4.3.7 Aesthetics and Visual Quality

NEPA requires the examination of environmental impacts of a Federal proposed action including those associated with visual and aesthetic quality.

No Build Alternative

Under the No Build Alternative, there would be no development to the Study Area and no changes to the existing visual quality or aesthetics in the Study Area. The intersection configuration would remain as it is, with the fragmented green spaces on both sides of Pennsylvania Avenue, SE continuing under ownership of the NPS. The No Build Alternative would not result in impacts to aesthetics or visual quality in the Study Area.

Build Alternative 1 – Revised Square Alternative

Build Alternative 1 involves primarily changes at ground level and there are no significant views or vistas in the vicinity of the Study Area. It is anticipated that indirect visual effects/changes in view in the long term would be limited to those areas directly fronting the streets involved and from the traffic lanes of the roadway in the vicinity of the intersection. The only anticipated above ground element, the relocation and improvement of traffic control lights, represents a restricted visual change. Build Alternative 1 is compatible with the existing environment and could potentially improve aesthetics and visual quality in the area in the long term. The project was designed to create a place of distinction in keeping with the goals of the Great Streets Improvement Project, and would provide more contiguous parkland and new roadway infrastructure. Therefore, impacts to aesthetic and visual quality in the immediate Study Area vicinity would be minor and beneficial in the long term as a result of Build Alternative 1. Minor short-term adverse impacts to views may occur within the intersection during construction while the area temporarily is used as a construction site, but the impacts would be of limited duration. Therefore, the impact is minor in context and intensity and does not rise to a level of "significance" as defined by CEQ.

Build Alternative 2 – Conventional Intersection Alternative

Build Alternative 2 design changes would result in a typical at-grade intersection, new grass and additional green space. Therefore as with Build Alternative 1, implementation of Build Alternative 2 would result in minor short-term adverse impacts on views during construction, but in the long term, could result in minor beneficial aesthetic and visual quality impacts. Therefore, the impact is minor in context and intensity and does not rise to a level of "significance" as defined by CEQ.

4.3.8 Health and Safety

No Build Alternative

The No Build Alternative would have no direct impact on health in the community. However, without the exchange of land jurisdiction between NPS and DDOT and implementation of design improvements and operations at the intersection, the vehicular and pedestrian safety issues would not be addressed. Therefore, the No Build Alternative would result in minor long-term negative impacts on safety of the pedestrians and motorists in the Study Area because existing safety issues would not be resolved.

Build Alternative 1 – Revised Square Alternative

Improved signage, traffic-calming measures, and relocated crosswalks with more effective crossing signals would improve visibility and operations at the Pennsylvania and Minnesota Avenues, SE intersection. Therefore Build Alternative 1 would result in safer navigation of the intersection for pedestrians and motorists. Pedestrian and bicycle safety would improve and vehicle-pedestrian conflicts would be reduced as a result of improvements under Build Alternative 1. Improvements would increase bicycle and pedestrian safety in the Study Area due to geometry upgrades and traffic management measures, including new bulb-outs, sidewalk expansion, crosswalk configuration, traffic movement restrictions and traffic signalization. For example, Build Alternative 1 would prohibit left turn movements from southbound L'Enfant Square, SE and northbound Minnesota Avenue, SE into the center of the square and would control the southbound right-turning vehicular traffic from L'Enfant Square, SE by traffic signals to minimize the existing vehicle-pedestrian conflicts. The improvements would also result in improved access to bus stops and other destinations at the intersection. For a complete list of improvements to the pedestrian and bicycle network, see Section 4.4.1

General motorists would be prohibited from making left turns from both directions on Pennsylvania and Minnesota Avenues and would be forced around the square; however, emergency response vehicles would be permitted to make all turns at this intersection. Autoturn™ simulation determined that the Build Alternative 1 design provides ample room for emergency vehicles to safely navigate the turns at the intersection.

Americans with Disabilities Act (ADA)-compliable ramps and sidewalks would be provided and/or improved in the Study Area where they do not exist currently, which would encourage pedestrians' use of these safety features. Build Alternative 1 would also consolidate park area that would be larger, more accessible and safer than the existing medians for pedestrian and visitor use

Under Build Alternative 1, the improvements to the intersection would result in minor beneficial impacts to health and safety in the long term in the local area. Short-term impacts would be negligible; motorists, pedestrians, bicyclists and transit users that frequently use the intersection may need to become familiar

with new traffic patterns; however, this period would be of short duration. Therefore, the impact is minor in context and intensity and does not rise to a level of "significance" as defined by CEQ.

Build Alternative 2 – Conventional Intersection Alternative

Build Alternative 2 does not reduce traffic speed for pedestrian use or make the intersection notably safer for pedestrians, however, it would improve the intersection operationally for motorists since visibility would likely improve and confusion would be reduced. Changes to the intersection to improve pedestrian safety include new bulb-outs, shorter crosswalks in some locations, and enhanced traffic signalization. However, the crossing distances between medians, vehicle turning movements, and the number of lanes at this intersection would not advance the pedestrian and bicycle network. In addition, the crosswalk across Pennsylvania Avenue, SE connecting Minnesota Avenue, SE to the north and south of the eastside intersection is a long crossing distance for pedestrians. Due to the design of Build Alternative 2 and the turning radius needed to make a left turn on Pennsylvania Avenue from southbound Minnesota Avenue, there is no median or refuge area breaking up the crosswalk. Therefore, the crosswalk crosses all lanes of Pennsylvania Avenue, SE without a median or refuge area.

Impacts to emergency services would be similar to Build Alternative 1. Autoturn™ was used to confirm that emergency vehicles could navigate the intersection with Build Alternative 2 design as well.

Build Alternative 2 would result in negligible impacts to health and safety in the long term because safety for motorists may improve due to operational improvements, but pedestrian safety issues would not be addressed to the extent needed and many of the existing safety conflicts would still remain. Similar to Build Alternative 1, impacts to pedestrian and motorist health and safety during construction would be negligible. The impacts to health and safety do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

4.3.9 Community Resources

No Build Alternative

Emergency Response

Under the No Build Alternative, the reconfigured intersection would not be constructed and existing conditions would remain. The No Build Alternative would have no impact on emergency response services in the Study Area.

Schools

Under the No Build Alternative, the reconfigured intersection would not be constructed and existing conditions would remain, therefore the No Build Alternative would have no direct impact on schools in the Study Area. The intersection and vehicular and pedestrian safety issues would remain unchanged.

Parks and Recreation Areas

The No Build Alternative would have no direct impact on NPS land in the Study Area; the NPS reservations would remain under NPS jurisdiction and would not transfer to DDOT as they would under the Build Alternatives. In the long-term, the No Build Alternative would result in indirect, minor adverse

impacts since the parcels would remain fragmented by the current intersection configuration and provide no recreational purpose to the community.

Places of Worship

Under the No Build Alternative, the reconfigured intersection would not be constructed and existing conditions would remain, therefore the No Build Alternative would have no direct impact on places of worship in the Study Area. The intersection and vehicular and pedestrian safety issues would remain unchanged.

Build Alternative 1 – Revised Square Alternative

Emergency Services

Under Build Alternative 1, turns for general motorists would be prohibited from making left turns from both directions on Pennsylvania and Minnesota Avenues and would be forced around the square; however emergency response vehicles would be permitted to make all turns at this intersection. Autoturn™ simulation was used in order to ensure that emergency vehicles (fire trucks) would be able to make the proposed turns (new turning radii) at the intersection. The two closest fire stations to the project site, Engine Company 19 and 8 are both operating with Seagrave 1250 gallons per minute (gpm) pumper trucks.[60] As a conservative estimate, the vehicle used to confirm the turning radii in the simulation was a Simon Duplex AS 110 Ladder Truck, which has a longer overall body length and longer wheelbase than the trucks being used by the nearby fire stations. The simulation determined that the Build Alternative 1 design provides ample room for emergency vehicles to navigate the turns at the intersection.

The roadway width for vehicles traveling westbound straight through the intersection on Pennsylvania Avenue would be reduced from 4 lanes to 3 lanes within the square, and the designated left-turn lanes traveling eastbound on Pennsylvania Avenue (turning north onto Minnesota Avenue) would be removed under Build Alternative 1. However the number of lanes and lane widths are maintained to the east and west of the intersection.

During periods of construction, emergency vehicles may be forced to take alternate routes to avoid temporary closures at this intersection; therefore minor short-term impacts for emergency services may result. DDOT would work with emergency services to inform them of any closures and to help develop maintenance of traffic routes. Impacts would be negligible in the long term.

Schools

Build Alternative 1 would have no direct impact on schools in the Study Area. The reconfigured intersection under Build Alternative 1 would improve vehicular and pedestrian safety concerns, which would benefit students and school faculty who may utilize the intersection when traveling to and from school. Minor short-term adverse impacts during construction may occur as students and faculty may be re-routed temporarily; long-term impacts would be beneficial and minor in the local area.

Parks and Recreation Areas

Under Build Alternative 1, the reconfigured intersection would include removal of the roadways which bisect the NPS-owned reservations on either side of Pennsylvania Avenue, SE. The result would be consolidated green space which would promote park area continuity. Under current conditions, the green

space is fragmented and is not sufficient for recreational use by the community. Build Alternative 1 would benefit the community by providing more contiguous green space to be used as park space for passive recreational activity. In the long term, Build Alternative 1 would result in a minor beneficial impact to park operations and management in the local area because the Study Area would be less fragmented and easier to maintain for mowing and any other maintenance functions. Additionally the new, larger areas of green space and reduced travel speeds around the "square" would improve visitors' ability to use the parks for activities. Build Alternative 1 would include minor short-term adverse impacts to the park area during construction. The impacts would be limited to the period of construction.

Places of Worship

Build Alternative 1 would have no direct impact on places of worship in the Study Area. The reconfigured intersection under Build Alternative 1 would improve vehicular and pedestrian safety concerns, which would benefit those who may utilize the intersection when traveling to and from places of worship. Minor short-term adverse impacts during construction may occur as pedestrians and motorists may be re-routed temporarily; long-term impacts would be beneficial and minor in the local area.

Summary

The impacts to community resources do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

Build Alternative 2 – Conventional Intersection Alternative

Emergency Services

Impacts to emergency services would be similar to Build Alternative 1. Autoturn™ was used to confirm that emergency vehicles could navigate the intersection with Build Alternative 2 design as well. During periods of construction, emergency vehicles may be forced to take alternate routes to avoid temporary closures at this intersection; therefore minor short-term impacts for emergency services may result. DDOT would work with emergency services to inform them of any closures and to help develop maintenance of traffic routes. Impacts would be negligible in the long term.

Schools

Build Alternative 2 would have no direct impact on schools in the Study Area. The reconfigured intersection under Build Alternative 2 would improve some traffic operations for motorists using this intersection, which would benefit students and school faculty who may utilize the intersection when walking or driving to and from school. Minor short-term adverse impacts during construction may occur as students and faculty may be re-routed temporarily; long-term impacts would be negligible.

Parks and Recreation Areas

Under Build Alternative 2, the reconfigured intersection would include removal of the roadways which bisect the NPS-owned reservations on either side of Pennsylvania Avenue, SE. The result would be consolidated green space which would promote park area continuity. Under current conditions, the green space is fragmented and is not sufficient for recreational use by the community. Build Alternative 2 would enhance the park and recreation areas by providing more contiguous green space. Vehicle speeds

would remain the same through the intersection, however, and it may be difficult for visitors to the intersection to use the park area for recreational purposes. Overall impacts to park and recreation areas under Build Alternative 2 would be minor and beneficial in the long term due to the addition of contiguous park space. Build Alternative 2 would result in minor short-term adverse impacts to the park area during construction.

Places of Worship

Build Alternative 2 would have no direct impact on places of worship in the Study Area. The reconfigured intersection under Build Alternative 2 would improve some traffic operations for motorists using this intersection, which would benefit those who may utilize the intersection when traveling to and from places of worship. Minor short-term adverse impacts during construction may occur as pedestrians and motorists may be re-routed temporarily; long-term impacts would be negligible.

Summary

The impacts to community resources do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

4.3.10 Utilities and Infrastructure

The differences in utility design between the Build Alternatives are negligible. Either design would involve the relocation of overhead facilities as the intersection is approached. It appears that the grade would be similar in either design, as would the drainage design.

No Build Alternative

Under the No Build Alternative, there would be no disturbance to the Study Area. Therefore, there would be no impacts to utilities located in the Study Area.

Build Alternative 1 – Revised Square Alternative

In Build Alternative 1, utility poles would have to be moved back to accommodate the intersection improvements. Existing overhead services from the pole lines to the buildings would have to be reworked, as well as the connection from pole to pole at the intersection corners.

Underground utility lines, including storm drains, sewer drains, electric, gas and telephone lines are located throughout the project intersection. Implementation of Build Alternative 1 would require consultation with all utility companies in order to determine the exact locations and depths to the utilities in the project intersection. There is potential for minor short-term impacts to utilities if utility lines need to be relocated due to construction or changes to the intersection layout. However, long-term impacts after project implementation are anticipated to be negligible. The impacts to utilities and infrastructure do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ. A more detailed survey, including subsurface utility locating and mapping would be performed as design development advances.

Impacts to WMATA (transit) infrastructure are addressed in *Section 4.4, Transportation*.

Build Alternative 2 – Conventional Intersection Alternative

Impacts to utilities under Build Alternative 2 would be negligible in the long term and could be minor in the short term if utility line relocation is necessary, similar to those described under Build Alternative 1. The impacts to utilities and infrastructure do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

4.4 Transportation

Impact Thresholds

The following thresholds were used to determine the magnitude of impacts on transportation.

Negligible: Any change to travel time, convenience, or benefit would not be perceptible or would be barely perceptible by roadway, bicycle and pedestrian, or transit users.

Minor: The change to travel time, convenience, or benefit would be noticeable to a small number of roadway, bicycle and pedestrian, or transit users; however, the effect would be slight.

Moderate: The resulting change in travel time, convenience, or benefit would be noticeable for a large number of roadway, bicycle and pedestrian, or transit users.

Major: There would be a substantial and highly noticeable change in travel time, convenience, or benefit for a large number of roadway, bicycle and pedestrian, or transit users.

Duration: **Short-term –** Effects would be immediate during implementation of the alternative; **Long-term –** Effects would persist, following implementation of the alternative.

4.4.1 Bicycle and Pedestrian Network

Methodology

A qualitative analysis was performed for the bicycle and pedestrian network at the subject intersection to identify deficiencies of the current configuration based on the existing field observations and discuss the improvements proposed by the Build Alternatives.

No Build Alternative

Under the No Build Alternative, no transfer of jurisdiction between NPS and DDOT would occur and no improvements would be made to the existing intersection configuration. This would result in continuation of the existing pedestrian and bicycle safety issues, inefficiencies, and dangerous interaction with vehicles at the intersection. Pedestrians and bicyclists would continue using existing sidewalks and crosswalks that are available or navigating the intersection illegally by jaywalking, for example.

The No Build Alternative would have minor short-term and long-term adverse impacts to the bicycle and pedestrian network due to continuing safety issues and inefficient bicycle and pedestrian infrastructure.

Build Alternative 1 – Revised Square Alternative

Pedestrian and bicycle safety were given high priority in Build Alternative 1 and vehicle-pedestrian conflicts were reduced as much as possible. Build Alternative 1, shown in **Figure 4-1**, would have the following pedestrian and bicyclist improvements (numbers correspond to the figure):

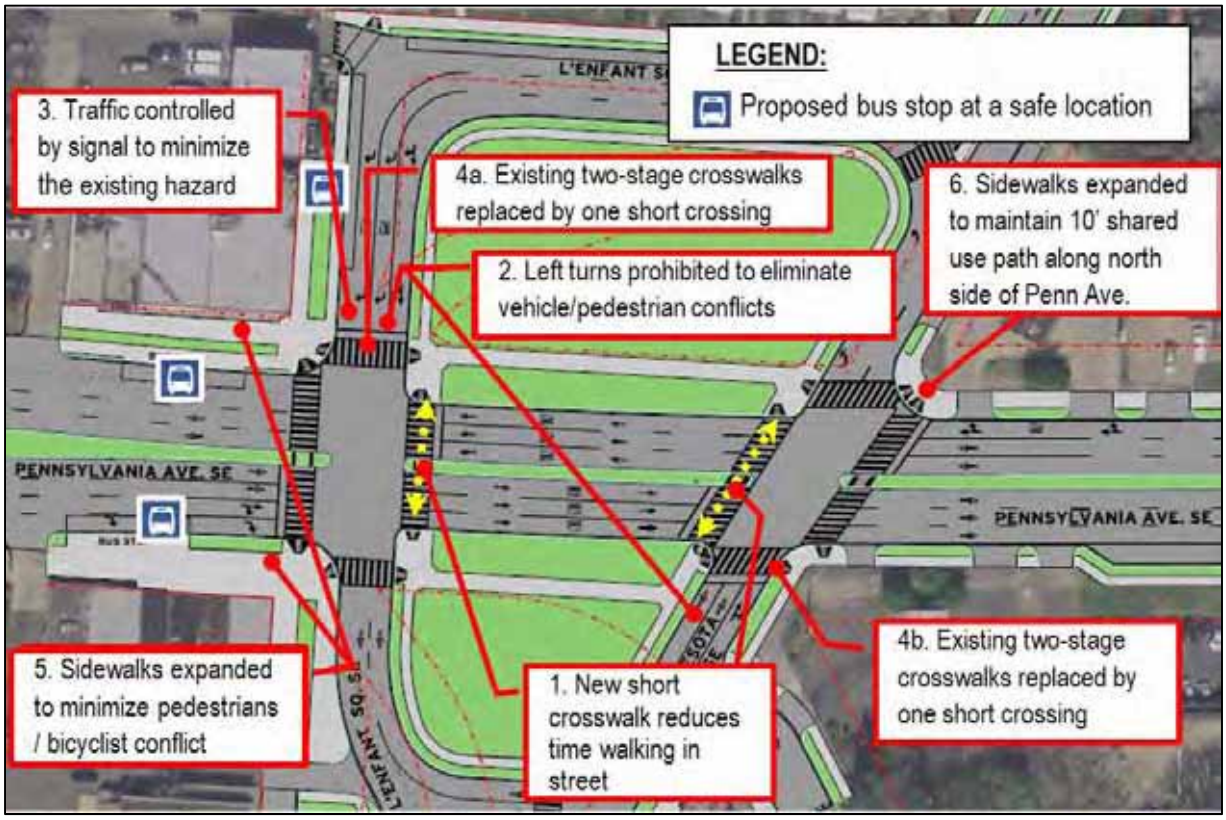
1. A new short crosswalk would be provided in the center of the square for pedestrians to cross Pennsylvania Avenue, SE;
2. Left turn movements from southbound L'Enfant Square, SE and northbound Minnesota Avenue, SE into the center of the square would be prohibited to eliminate conflicts between vehicles and crossing pedestrian;
3. The southbound right-turning vehicular traffic from L'Enfant Square, SE would be controlled by traffic signals to minimize the existing vehicle-pedestrian conflict;
4. New short crosswalks would replace the existing two-step crosswalks on northbound Minnesota Avenue, SE and southbound L'Enfant Square, SE to reduce the time walking in the street therefore enhance safety;
5. The expanded sidewalks at the southwest and northwest corners of Pennsylvania Avenue, SE and L'Enfant Square, SE would minimize the conflict between pedestrians waiting at the bus stop and bicyclists traveling on the sidewalk; and
6. Sidewalks would be expanded along the north side of Pennsylvania Avenue, SE to the northeast of the intersection to maintain 10' shared use path for bicycle and pedestrian convenience to and through the intersection.

During construction, temporary disruption would occur to users of the intersection; however, detour routes and alternate paths would be dedicated during this time. In general, the intersection would be improved with minimal disruption and ample mitigation to offset any negative effects; therefore, Build Alternative 1 would have negligible short-term impacts on the bicycle and pedestrian network.

In the long term, the Build Alternative 1 improvements would benefit the bicycle and pedestrian network in the Study Area due to geometry upgrades and traffic management measures, including new bulb-outs, sidewalk expansion, crosswalk configuration, traffic movement restrictions and traffic signalization. The improvements would also result in improved access to bus stops and other destinations at the intersection. Therefore, Build Alternative 1 would have moderate long-term beneficial impacts to the pedestrian and bicycle network both for local residents and for commuters to and through the Study Area, which would have noticeable benefits for a large number of intersection users. This includes benefits for the local community, including residents, visitors, and commuters through the Study Area. The impacts to the bicycle and pedestrian network do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

Figure 4-1

Pedestrian Improvements – Build Alternative 1



Source: HNTB Corporation, 2013.

Build Alternative 2 – Conventional Intersection Alternative

Build Alternative 2, shown in **Figure 4-2**, would improve pedestrian and bicyclist safety in the following ways (numbers correspond to figure):

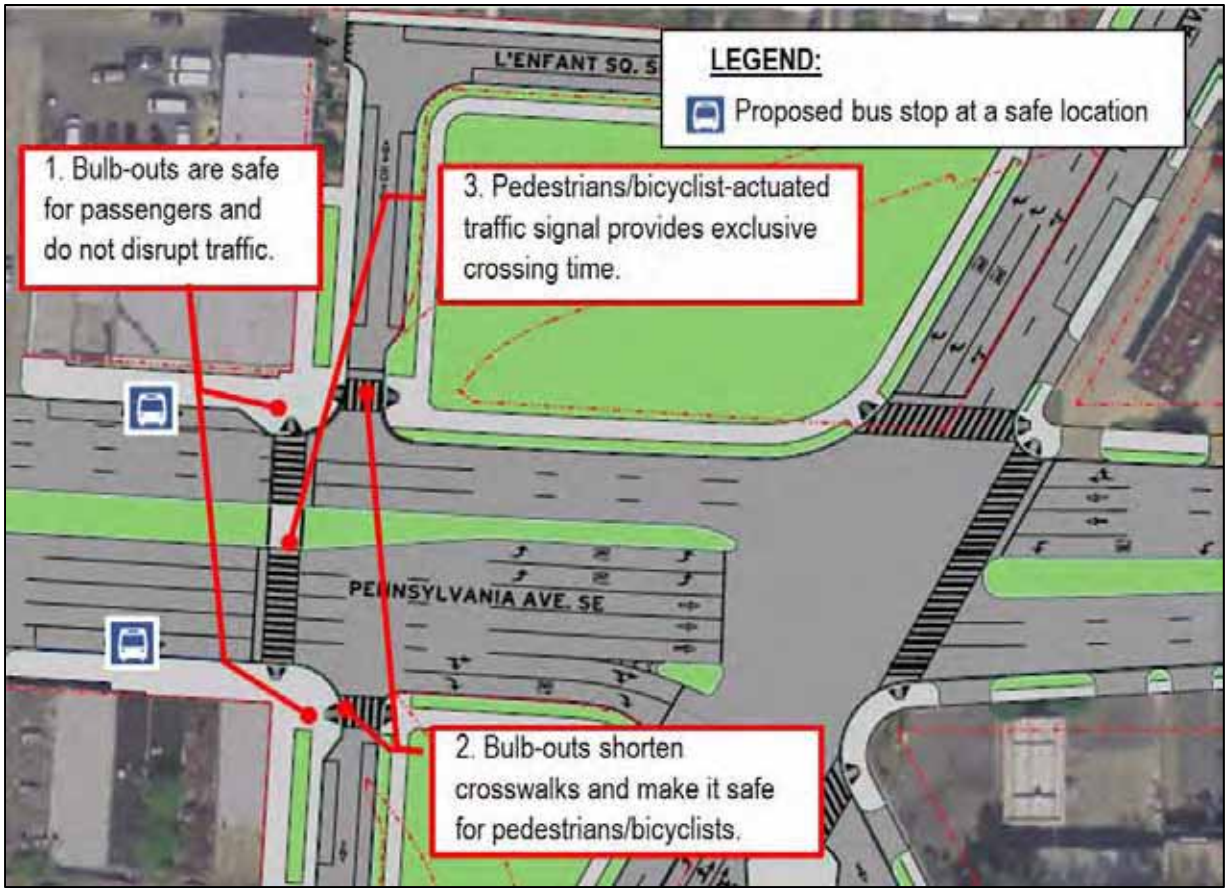
1. Proposed bulb-outs would provide exclusive bus bays that eliminate interruption to traffic on travel lanes and allow safe boarding and alighting for passengers;
2. Proposed bulb-outs will shorten the crosswalk therefore reduce the time that pedestrian walk in street; and
3. A proposed pedestrian/bicyclist activated traffic signal at the crosswalk would provide exclusive walk time for pedestrians and bicyclists to safely cross Pennsylvania Avenue without vehicular traffic conflict.

During construction, temporary disruption would occur to users of the intersection; however, detour routes and alternate paths would be dedicated during this time. In general, the intersection would be improved with minimal disruption and ample mitigation to offset any negative effects; therefore, Build Alternative 2 would have negligible short-term impacts on the bicycle and pedestrian network.

In the long term, the Build Alternative 2 improvements would provide an overall benefit to the bicycle and pedestrian network in the Study Area over the No Build Alternative. Changes to the intersection to improve the pedestrian network include new bulb-outs, shorter crosswalks in some locations, and enhanced traffic signalization. However, the crossing distances between medians, vehicle turning movements, and the number of lanes at this intersection would not advance the pedestrian and bicycle network. In addition, the crosswalk across Pennsylvania Avenue, SE connecting Minnesota Avenue, SE to the north and south of the eastside intersection is a long crossing distance for pedestrians. Due to the design of Build Alternative 2 and the turning radius needed to make a left turn on Pennsylvania Avenue from southbound Minnesota Avenue, there is no median or refuge area breaking up the crosswalk. Therefore the crosswalk crosses all lanes of Pennsylvania Avenue, SE without a median or refuge area. However, given the overall improvement for pedestrians and bicyclists over the No Build Alternative, Build Alternative 2 would have minor beneficial impacts in the long term to the pedestrian and bicycle network. The impacts to the bicycle and pedestrian network do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

Figure 4-2

Pedestrian Improvements – Build Alternative 2



Source: HNTB Corporation, 2013.

4.4.2 Roadway Network and Traffic

Methodology

This study analyzes traffic operations during AM and PM peak hours when vehicular and pedestrian traffic reach the highest levels and most accidents occur. It is important to capture these study periods, as it represents the most intense period of use for the Study Area. Based on the data and field observations, the peak hours of traffic are identified as 7:30-8:30 AM in the morning and 4:30-5:30 PM in the evening.

Per FHWA and DDOT requirements, the following years were included in the analysis for all alternatives:

- 2012 (Existing Year)
- 2015 (Opening Year)
- 2040 (Future Design Year)

Table 4.1 summarizes the scenarios included in the analysis.

Table 4.1
List of Scenarios included in the Traffic Analysis

Scenario	Analysis Year					
	2012		2015		2040	
	AM	PM	AM	PM	AM	PM
Existing Condition	X	X	-	-	-	-
No Build Alternative	-	-	X	X	X	X
Build Alternative 1 - Revised Square	-	-	X	X	X	X
Build Alternative 2 - Conventional Intersection	-	-	X	X	X	X

Notes: X : included in the analysis.
- : not included in the analysis.

Source: HNTB Corporation, 2013.

As described previously in Section 3.4.2, Intersection ID's 2 through 5 are intersections that are adjacent to the project intersection that would not be modified by any of the Build Alternatives. However, nearby impacts to these adjacent intersections due to each of the Build Alternatives were considered in the evaluation of alternatives for this EA.

To evaluate and compare the vehicular traffic operations of all alternatives, the following measures of effectiveness (MOE's) were selected for this study:

- Intersection Delay
- Intersection Level of Service (LOS)
- Approach Delay
- Approach LOS
- Queues on key approaches
- Travel times

Per FHWA guidance[61], traffic simulation was used to model, analyze and compare the traffic operations of the alternatives. Synchro software (version 8.0) was used to model and analyze the traffic signal operations including delays, LOS and queues. VISSIM software (version 5.3) was used to provide the travel time results.

For more detailed methodology, data collection methods, traffic volume development, and traffic simulation model calibration techniques, refer to *Appendix F, Traffic Analysis Report*. The peak hour turning movement volumes used in the EA are also presented in *Appendix F*.

No Build Alternative

Vehicular Delays and LOS

LOS is an estimate of the performance efficiency and quality of an intersection or roadway as established by the *Highway Capacity Manual (HCM)*[62] methodology. The HCM methodology measures the degree of delay at intersections using a letter scale from A to F, A being the free flow condition and F being the total gridlock. LOS D or better is desirable for urban corridors.

2015 AM

As shown in **Table 4.2**, the No Build Alternative would operate at an acceptable LOS for the project intersections (1A and 1B) during the 2015 AM peak hour.

The adjacent intersections (2 through 5) would operate at acceptable levels with the exception of the Pennsylvania Avenue and 27th Street (ID 3), the intersection just east of the project intersection, which would operate at LOS F due to increased traffic.

2040 AM

As shown in **Table 4.3**, the increased traffic demand in 2040 would cause the LOS to deteriorate to LOS F from LOS D in 2015 at the L'Enfant Square, SE and Pennsylvania Avenue (1A) intersection under the No Build Alternative. The No Build alternative would experience delay at nearly 158 sec/veh at LOS F. The east side intersection (1B) in the No Build Alternative would operate adequately at LOS C.

Of the adjacent intersections, Pennsylvania and 27th Street (ID 3) would continue to operate at LOS F and the Pennsylvania Avenue and northbound 295 Ramp (ID 5) to the west of the project intersection would deteriorate to LOS F as well. The other two adjacent intersections would operate at A or B.

2015 PM

In 2015, shown in **Table 4.4**, all intersections in the No Build Alternative would operate at an acceptable LOS D or better.

2040 PM

In 2040, shown in **Table 4.5**, the increased traffic volumes would cause the two signals (1A and 1B) at Pennsylvania Avenue at Minnesota Avenue and L'Enfant Square, SE to deteriorate to LOS F in the No Build Alternative.

The adjacent intersections (2 through 5) would operate at acceptable levels with the continued exception of the Pennsylvania Avenue and 27th Street (ID 3), the intersection just east of the project intersection, which would operate at LOS F with 144.6 sec/veh delay.

Vehicular Queues

Tables 4.6 and 4.7 show the queuing analysis results on key movements at the intersections for all three alternatives in the AM and PM peak hours.

AM Peak Hour

During the AM peak hour, the northwest bound Pennsylvania Avenue carries heavy commuter traffic towards the District. In the 2015 AM, the longest queue is traveling northwest with 667 feet. Queues at the intersection 2015 in the AM are slightly longer than the existing condition (2012).

PM Peak Hour

In the PM peak hour, similar queue results were found. The longest average queue length in the PM is 804 feet traveling in the southeast direction at the L'Enfant Square, SE and Pennsylvania Avenue (1A) intersection in 2015 and greater than 1,970 feet at the same intersection in the southeast direction in 2040.

Vehicular Travel Times

Travel time, the amount of time it takes for a motorist to travel from point A to point B, is a direct reflection of motorist experience. Therefore it is a critical and effective measure when comparing the traffic impact of alternatives. The AM and PM peak hour results of travel time analysis for the Build Alternatives and the existing condition are shown in **Tables 4.8 and 4.9** respectively.

AM Peak Hour

Under the No Build Alternative, travel times at the intersection would remain similar to existing conditions, ranging from 1 minute traveling from Pennsylvania Avenue and 27th Street to Minnesota Avenue and 23rd Street to 6.3 minutes traveling from Minnesota Avenue and23rd St to Pennsylvania Avenue and the I-295 northbound Ramp in the AM. Travel times increase in 2040, but show a similar pattern to 2015.

PM Peak Hour

Similar to the AM comparison, in the PM peak hour, the travel times are similar to existing conditions (2012), and range from 1.8 minutes traveling from Pennsylvania Avenue and 27th St to Minnesota Ave and 23rd St to 4.8 minutes traveling from Pennsylvania Avenue and the 295 northbound Ramp to Minnesota Avenue and 23rd St. in 2015. Travel times increase in the 2040 No Build Alternative in the PM, but show similar patterns to 2015.

Summary of No Build Alternative

Under the No Build Alternative, the roadway configuration and traffic operational characteristics would remain unchanged from the existing condition, as shown in Figure 3-12 above.

In the opening year (2015), the No Build Alternative would operate adequately (LOS D or better) at the intersections of Pennsylvania at Minnesota Avenues and L'Enfant Square, SE. In 2040, due to the increased traffic demand, the No Build Alternative would operate at an undesirable LOS F at the Pennsylvania Avenue at L'Enfant Square intersection (1A) with heavy congestion. In general, vehicular delays and queue lengths would increase due to projected increases in traffic volumes.

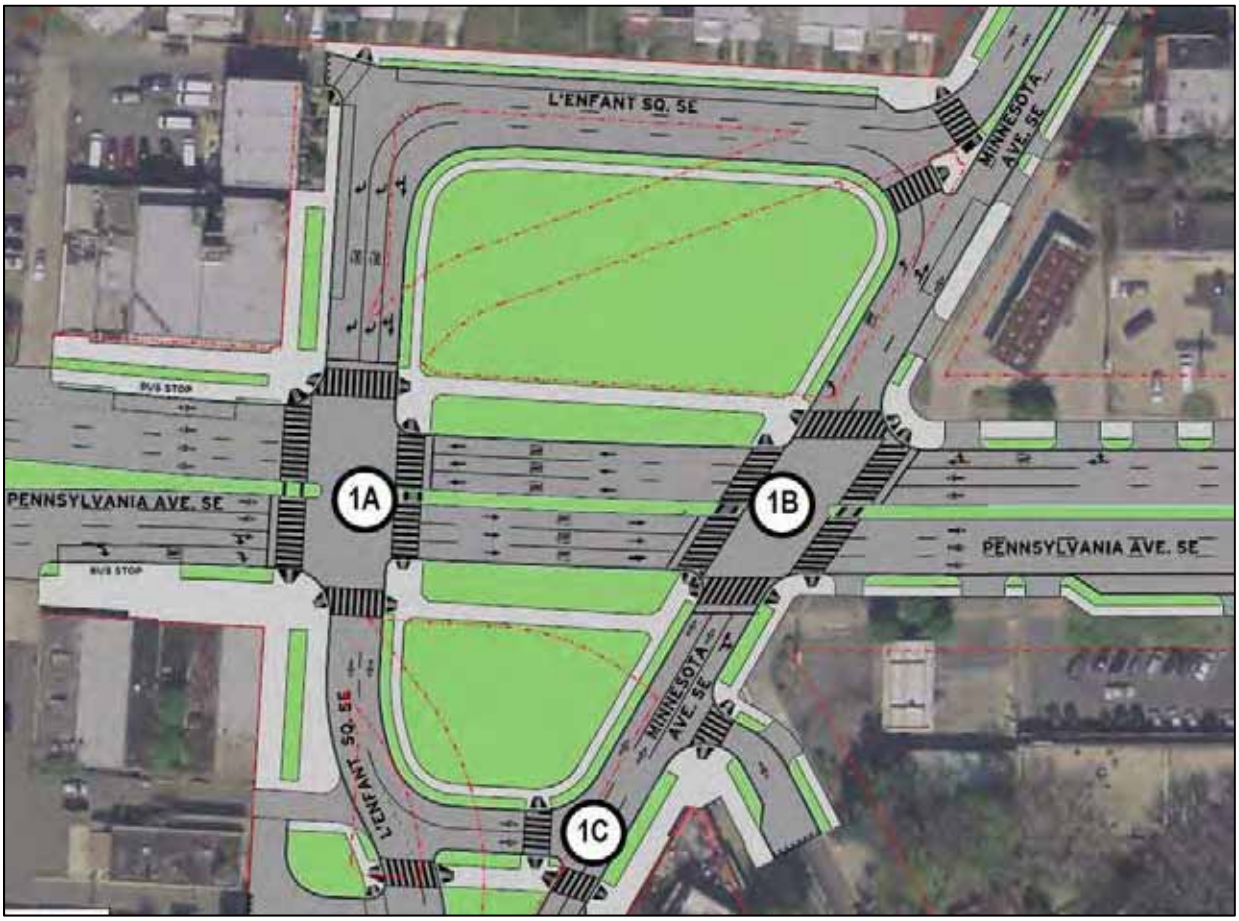
The No Build Alternative would have no short-term impacts because no construction would occur at the intersection. As traffic congestion and back-ups build in the future due to projected increases in volume, deteriorating conditions would occur on the roadway network and traffic under the No Build Alternative. As a result, the No Build Alternative would result in long-term minor adverse impacts to the roadway network and traffic; changes in travel time would be noticeable to motorists.

Build Alternative 1 – Revised Square Alternative

The intersections modeled in Build Alternative 1 are illustrated on **Figure 4-3.**

Figure 4-3

Key Traffic Intersections Analyzed – Build Alternative 1



Source: HNTB Corporation, 2013.

Vehicular Delays and LOS

2015 AM

As shown in Table 4.2, all three intersections (1A, 1B and 1C) in Build Alternative 1 would operate at an LOS B or C.

The four adjacent intersections (2 through 5) would operate similarly under all Build Alternatives; as with the No Build Alternative, Pennsylvania Avenue and 27th Street, the intersection just east of the subject intersection, would operate at LOS F due to increased traffic.

2040 AM

As shown in Table 4.3, the increased traffic demand in 2040 would cause the LOS to deteriorate to LOS F at the L'Enfant Square, SE and Pennsylvania Avenue (1A) intersection under Build Alternative 1, with a 116 sec/veh delay, which is slightly better than the 2040 No Build Alternative (158 sec/veh). The east intersection (1B) and south intersection would operate adequately at LOS D and C, respectively.

The LOS at the adjacent intersections would be the same as the No Build Alternative; Pennsylvania/27th Street (ID 3) would continue to operate at LOS F and the Pennsylvania Avenue and northbound 295 Ramp (ID 5) to the west of the subject intersection would deteriorate to LOS F as well. The other two adjacent intersections would operate at A or B.

2015 PM

In 2015, as shown in Table 4.4, all intersections in Build Alternative 1 would operate at an acceptable LOS C or better.

2040 PM

In 2040, as shown in Table 4.5, Build Alternative 1 would reduce the delays as compared to the No Build Alternative at the east signal (1B) from 105 sec/veh under the No Build in 2040 to 62 sec/veh and improve the LOS from F to E. The west intersection (1A) would operate at LOS F, as with the No Build Alternative.

The adjacent intersections (2 through 5) would operate at acceptable levels with the continued exception of the Pennsylvania Avenue and 27th Street (ID 3), the intersection just east of the subject intersection, which would operate at LOS F.

Vehicular Queues

Tables 4.6 and 4.7 compare the queuing analysis results on key movements at the intersections for all alternatives analyzed for the AM and PM peak hours, respectively.

AM Peak Hour

During the AM peak hour, the northwest bound Pennsylvania Avenue carries heavy commuter traffic towards the District. Compared to the No Build Alternative, Build Alternative 1 would have longer queues at the Pennsylvania Avenue and northbound Minnesota Avenue intersection (1B). This increase is attributed to the rerouted traffic around the square in Build Alternative 1 that would significantly increase

the volumes on the northeast bound approach. Additional green signal time would have to be taken away from the northwest bound traffic on Pennsylvania Avenue to meet the traffic demand of Minnesota Avenue. The queue on westbound Pennsylvania Avenue could be almost 760 feet long in 2015, reaching the 27th Street intersection, and would be even longer in 2040 AM.

PM Peak Hour

Similar queue results were found in the PM peak hour as the AM peak, however, the increase would not be as large as in the AM peak hour. Build Alternative 1 would have an average queue length of 64 feet in 2015, which would not reach the I-295 northbound ramp intersection. Some average queue lengths are reduced under Build Alternative 1 as compared to the No Build Alternative.

Vehicular Travel Times

The AM and PM peak hour results of travel time analysis for all alternatives analyzed and the existing condition are shown in Tables 4.8 and 4.9, respectively.

AM Peak Hour

In the AM peak hour, more than half of all approaches would take longer than the No Build Alternative because all left-turning vehicles would be required to go around the square to reach their destinations. Travel times under Build Alternative 1 range from 1.1 minutes traveling from Pennsylvania Avenue and 27th St to Minnesota Avenue and 23rd St to 7.1 minutes traveling from Minnesota Avenue and 23rd St to Pennsylvania Avenue and the I-295 northbound ramp in 2015. Travel times increase in 2040, but results show a similar pattern to 2015.

PM Peak Hour

Similar to the AM comparison, in the PM peak hour, the travel times would increase with Build Alternative 1 for most approaches, especially for northbound Minnesota Avenue traffic which could see travel times as high as 10 minutes due to the high volumes and congestion in the square. Travel times typically increase from 2015 and 204.

Summary of Build Alternative 1 – Revised Square Alternative

Under Build Alternative 1, the intersection would operate adequately (LOS D or better) in the opening year 2015. As with the No Build Alternative, due to increased traffic demand, this alternative would operate at an undesirable LOS F at the Pennsylvania and L'Enfant Square, SE intersection (1A) with heavy congestion in 2040. Compared to the No Build Alternative, Build Alternative 1 would cause longer queues on Pennsylvania at Minnesota Avenues, SE in the peak travel direction during AM and PM peak hours, and would increase travel times on most vehicular trips due to traffic being re-routed around the square.

During construction, temporary disruption could occur to vehicles using the intersection; however detour routes and alternate routes would be dedicated during this time, which help to offset impacts. It is anticipated that the intersection could be improved without major disruptions to commuters either through re-routing vehicles or by implementing the project in phases. Build Alternative 1 would have minor short-term impacts on the roadway network and traffic for short durations during construction.

Maintenance of traffic assumptions are included in *Section 4 8, Mitigation Measures*. Potential Maintenance of Traffic plans for Build Alternative 1 are included in *Appendix F, Traffic Analysis*.

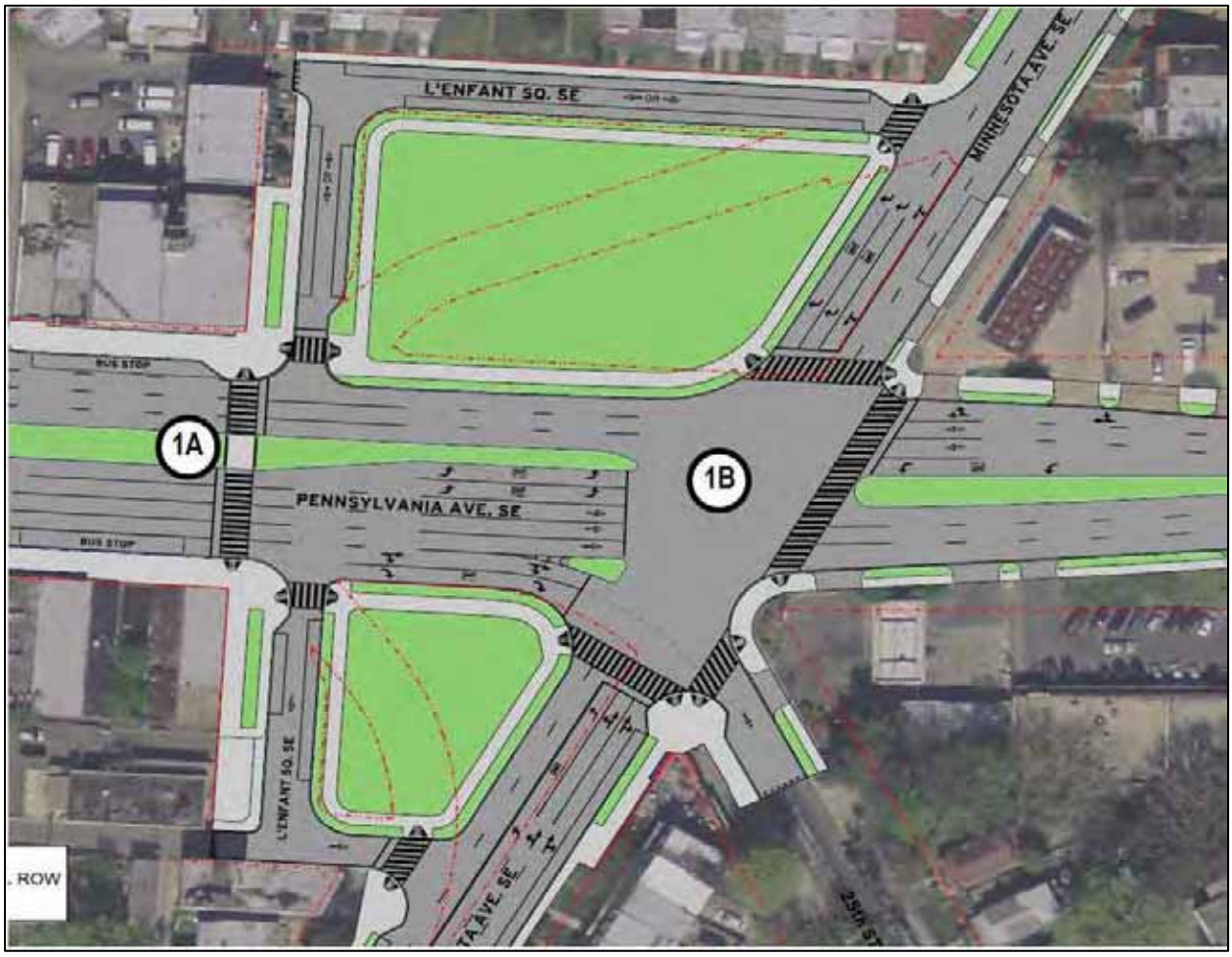
In the long term, Build Alternative 1 would result in minor adverse impacts to the roadway network and traffic due to the increase in queue length and vehicle trip time due to the design improvements and the traffic being re-routed around the square; changes in travel time would be noticeable to motorists. Build Alternative 1 is intended to slow down traffic and minimize interaction between vehicles and pedestrians. Although the technical findings of the traffic analysis show adverse impacts to the intersection by 2040 for LOS, queue lengths and travel times, the intended benefits at this intersection align with the Purpose and Need for the project. The impact to the roadway network and traffic is minor in context and intensity and therefore does not rise to a level of "significance" as defined by CEQ.

Build Alternative 2 – Conventional Intersection Alternative

The intersections modeled in Build Alternative 2 are illustrated on **Figure 4-4.**

Figure 4-4

Key Traffic Intersections Analyzed – Build Alternative 2



Source: HNTB Corporation, 2013.

Vehicular Delays and LOS

2015 AM

As shown in Table 4.2, the Pennsylvania and Minnesota Avenues, SE intersection (1B) would deteriorate to LOS F under Build Alternative 2 in the 2015 AM, as all movements would be accommodated at the reconfigured Pennsylvania Avenue and Minnesota Avenue intersection. The new pedestrian activated signal (1A) would operate at LOS A.

The four adjacent intersections (2 through 5) would operate similarly to the No Build Alternative, Pennsylvania Avenue and 27th Street, the intersection just east of the subject intersection, would operate at LOS F due to increased traffic.

2040 AM

As shown in Table 4.3, the LOS would deteriorate to an unacceptable LOS E with a 58 sec/veh delay at the L'Enfant Square, SE and Pennsylvania Avenue (1A) intersection and LOS F with a 274 sec/veh delay at the Pennsylvania and Minnesota Avenues, SE intersections (1B), which is worse than under the No Build and Build Alternative 1, which would operate at LOS D or C, respectively, at the same intersection.

LOS at the adjacent intersections would be the same as the No Build Alternative; Pennsylvania Avenue and 27th Street (ID 3) would continue to operate at LOS F and the Pennsylvania Avenue and northbound 295 Ramp (ID 5) to the west of the subject intersection would deteriorate to LOS F as well. The other two adjacent intersections would operate at A or B.

2015 PM

In 2015, shown in Table 4.4, all intersections in Build Alternative 2 would operate at an acceptable LOS D or better.

2040 PM

In the 2040 PM, as shown in Table 4.5, Build Alternative 2 would eliminate the heavy delays at the west signal (1A) by moving all vehicular traffic to the east side signal (1B). The west signal (1A) would operate at LOS A and the east signal (1B) would remain LOS F with comparable delays to the No Build Alternative; however, all four approaches at the east side signal (1B) would experience LOS F, while there is only one approach at LOS F in the No Build Alternative.

The adjacent intersections (2 through 5) would operate at acceptable levels with the continued exception of the Pennsylvania Avenue and 27th Street (ID 3), the intersection just east of the project intersection, which would operate at LOS F.

Vehicular Queues

Tables 4.6 and 4.7 compare the queuing analysis results on key movements at the intersections for all alternatives for the AM and PM peak hours, respectively.

AM Peak Hour

During the AM peak hour, the northwest bound Pennsylvania Avenue, SE carries heavy commuter traffic towards the District. Compared to the No Build Alternative, Build Alternative 2 would have longer queues at the Pennsylvania Avenue and northbound Minnesota Avenue intersection (1B). This increase can be attributed to the fact that all traffic crossing Minnesota Avenue, SE would be rerouted to one intersection (1B); this would cause higher demand on all approaches and more delays and queues in all directions. The westbound Pennsylvania Avenue queue could be over 1,000 feet long in 2015 and reach the 28th Street intersection, and would be slightly longer in 2040.

PM Peak Hour

Similar queue results were found in the PM peak hour as the AM peak hour, however, the increase would not be as large as in the AM peak hour. Build Alternative 2 would have an average queue length of 562 feet in 2015, greater than the Revised Square and No Build Alternatives, but would still not reach the I-295 northbound ramp intersection. Some average queue lengths are reduced under this alternative as compared to the No Build Alternative.

Vehicular Travel Times

The AM and PM peak hour results of travel time analysis for all alternatives and the existing condition are shown in Tables 4.8 and 4.9, respectively.

AM Peak Hour

Under Build Alternative 2 in the AM peak hour, most approaches in 2015 would experience shorter travel times than under the No Build Alternative due to simplified design configuration. Travel times range from 1.4 minutes traveling from Pennsylvania Avenue and 27th Street to Pennsylvania Avenue and I-295 northbound Ramp to 4.7 minutes traveling from Minnesota Avenue and 27th Street to Minnesota Avenue and 23rd Street in 2015. However, in 2040, over half of the travel times are longer with Build Alternative 2 than with the No Build Alternative.

PM Peak Hour

Similar to the AM comparison, in the PM peak hour, in 2015, Build Alternative 2 would reduce travel times for most approaches in 2015. However in 2040, this alternative would cause longer travel times than under the No Build Alternative for most approaches.

Summary of Build Alternative 2 – Conventional Intersection Alternative

Under Build Alternative 2, the intersection would experience heavy congestion (LOS F) in the AM peak period at the Pennsylvania and Minnesota Avenues, SE intersection (1B). By 2040, due to increased traffic demand, this alternative would continue to operate at undesirable LOS F at the east intersection (1B). Compared to the No Build Alternative, Build Alternative 2 would cause longer queues on Pennsylvania Avenue at Minnesota Avenue, SE in the peak travel direction during AM and PM peak hours. In the 2015 PM, travel times would be reduced as compared to the No Build Alternative for the majority of trips in 2015 under this alternative; however in the 2040 PM, the travel times are comparable to the No Build Alternative.

During construction, temporary disruption could occur to vehicles using the intersection; however detour routes and alternate routes would be dedicated during this time, which help to offset impacts. It is anticipated that the intersection could be improved without major disruptions to commuters either through re-routing vehicles or by implementing the project in phases. Build Alternative 2 would have minor short-term impacts on the roadway network and traffic for short durations during construction. Maintenance of Traffic assumptions are included in *Section 4.8,Mitigation Measures*.

In the long term, Build Alternative 2 would result in minor adverse impacts to the roadway network and traffic; changes in travel time would be noticeable to motorists. Queues lengths during the AM and PM peak hours in 2040 would be longer than the No Build Alternative, and by 2040, travel times would also be comparable to the No Build Alternative. The impact to the roadway network and traffic is minor in context and intensity and therefore does not rise to a level of "significance" as defined by CEQ.

Table 4.2

Traffic Delay (in Second/Vehicle) and LOS Results – 2015 AM

ID	INTERSECTION	APPROACH	2015 NO BUILD				2015 REVISED SQUARE				2015 CONV. INTERSECTION			
			APPROACH		INTERSECTION		APPROACH		INTERSECTION		APPROACH		INTERSECTION	
			DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS
1A	L'Enfant Sq. & Pennsylvania Ave	SWB	295.2	F	40.7	D	74.7	E	25.7	C	-		0.1	A
		SWR (L'Enfant Sq.)	0.4	A			-	-			-	-		
		SEB	12.7	B			14.2	B			0.1	A		
		NWB	13.1	B			4.8	A			0.2	A		
1B	Pennsylvania Ave & Minnesota Ave	SEB	18.6	B	19.1	B	4.2	A	23.4	C	46.8	D	117.5	F
		NWB	20.2	C			23.9	C			97.1	F		
		NEB	15.5	B			35.2	D			124.4	F		
		SWB	-				-				292.4	F		
1C*	L'Enfant Sq South & Minnesota Ave NB	NET	-		-		19.9	B	18.8	B	-		-	
		SEL					17.4	B						
2	Minnesota Ave & 23rd St	EB	4.6	A	10.8	B	4.6	A	10.8	B	4.6	A	10.8	B
		WB	4	A			4	A			4	A		
		NB	29.3	C			29.3	C			29.3	C		
3	Pennsylvania Ave & 27th St	WB	367	F	86.3	F	367	F	86.6	F	367	F	86.1	F
		NB	158.1	F			158.1	F			158.1	F		
		SEB	14.3	B			15.8	B			13.3	B		
		NWB	62.2	E			62.2	E			62.2	E		
4	Minnesota Ave & 27th St	NB	10.4	B	0.9	A	10.4	B	0.9	A	10.4	B	0.9	A
		NEB	0	A			0	A			0	A		
		SWB	0	A			0	A			0	A		
5	Pennsylvania Ave & NB 295 Ramp	SEB	26	C	26.6	C	26	C	29.6	C	26	C	31.1	C
		NWB	27.4	C			32.2	C			34.5	C		

Note: * Intersection 1C only exists in the Revised Square Alternative.

Source: HNTB Corporation, 2013.

Table 4.3

Traffic Delay (in Second/Vehicle) and LOS Results – 2040 AM

ID	INTERSECTION	APPROACH	2040 NO BUILD				2040 REVISED SQUARE				2040 CONV. INTERSECTION			
			APPROACH		INTERSECTION		APPROACH		INTERSECTION		APPROACH		INTERSECTION	
			DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS
1A	L'Enfant Sq. & Pennsylvania Ave	SWB	932.9	F	158.1	F	296.5	F	115.9	F	-		58.4	E
		SWR (L'Enfant Sq.)	1.3	A			-	-			-	-		
		SEB	14.2	B			19.5	B			0.1	A		
		NWB	17.6	B			18.9	B			80.4	F		
1B	Pennsylvania Ave & Minnesota Ave	SEB	29.7	C	32.7	C	4.4	A	48.6	D	47.7	D	274.1	F
		NWB	21.8	C			70.5	E			153.1	F		
		NEB	70.7	E			23.3	C			309.1	F		
		SWB	-				-				696.1	F		
1C*	L'Enfant Sq South & Minnesota Ave NB	NET	-		-		21.7	C	23.4	C	-		-	
		SEL					25.4	C						
2	Minnesota Ave & 23rd St	EB	6.2	A	12	B	6.2	A	12	B	6.2	A	12	B
		WB	5.9	A			5.9	A			5.9	A		
		NB	30.4	C			30.4	C			30.4	C		
3	Pennsylvania Ave & 27th St	WB	404.5	F	103.5	F	404.5	F	103.7	F	404.5	F	102.6	F
		NB	178.9	F			178.9	F			178.9	F		
		SEB	14.7	B			15	B			10.7	B		
		NWB	89.7	F			89.7	F			89.7	F		
4	Minnesota Ave & 27th St	NB	11.2	B	0.6	A	11.2	B	0.6	A	11.2	B	0.6	A
		NEB	0	A			0	A			0	A		
		SWB	0	A			0	A			0	A		
5	Pennsylvania Ave & NB 295 Ramp	SEB	59.1	E	101.9	F	59.1	E	109.2	F	59.1	E	106.9	F
		NWB	128.6	F			140.3	F			136.5	F		

Note: * Intersection 1C only exists in the Revised Square Alternative.

Source: HNTB Corporation, 2013.

Table 4.4

Traffic Delay (in Second/Vehicle) and LOS Results – 2015 PM

ID	INTERSECTION	APPROACH	2015 NO BUILD				2015 REVISED SQUARE				2015 CONV. INTERSECTION			
			APPROACH		INTERSECTION		APPROACH		INTERSECTION		APPROACH		INTERSECTION	
			DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS
1A	L'Enfant Sq. & Pennsylvania Ave	SWB	193.9	F	37	D	51	D	33.2	C	-		0.3	A
		SWR (L'Enfant Sq.)	0.2	A			-				-	-		
		SEB	29.6	C			36.6	D			0.4	A		
		NWB	4.2	A			1.9	A			0.1	A		
1B	Pennsylvania Ave & Minnesota Ave	SEB	3.6	A	25	C	3.6	A	24.2	C	33.1	C	45.2	D
		NWB	73.6	E			8.8	A			38.5	D		
		NEB	49.6	D			65.9	E			78.6	E		
		SWB	-				-				91.8	F		
1C*	L'Enfant Sq. South & Minnesota Ave NB	NET	-		-		39.3	D	27.7	C	-		-	
		SEL					22.3	C						
2	Minnesota Ave & 23rd St	EB	4.7	A	8.1	A	4.7	A	8.1	A	4.7	A	8.1	A
		WB	4.5	A			4.5	A			4.5	A		
		NB	29	C			29	C			29	C		
3	Pennsylvania Ave & 27th St	WB	57.1	E	17.8	B	57.1	E	19	B	57.1	E	13.1	B
		NB	52	D			52	D			52	D		
		SEB	11.5	B			13.3	B			4.4	A		
		NWB	20.1	C			20.1	C			20.1	C		
4	Minnesota Ave & 27th St	NB	14.9	B	1.1	A	14.9	B	1.1	A	14.9	B	1.1	A
		NEB	0	A			0	A			0	A		
		SWB	0	A			0	A			0	A		
5	Pennsylvania Ave & NB 295 Ramp	SEB	5.9	A	7.4	A	5.9	A	10.7	B	5.9	A	13.2	B
		NWB	12.1	B			25.3	C			35.4	D		

Note: * Intersection 1C only exists in the Revised Square Alternative.

Source: HNTB Corporation, 2013.

Table 4.5

Traffic Delay (in Second/Vehicle) and LOS Results – 2040 PM

ID	INTERSECTION	APPROACH	2040 NO BUILD				2040 REVISED SQUARE				2040 CONV. INTERSECTION			
			APPROACH		INTERSECTION		APPROACH		INTERSECTION		APPROACH		INTERSECTION	
			DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS
1A	L'Enfant Sq. & Pennsylvania Ave	SWB	160.2	F	176.3	F	53.9	D	170.4	F	-		1.4	A
		SWR (L'Enfant Sq.)	0.2	A			-	-			-	-		
		SEB	247.7	F			245.3	F			2	A		
		NWB	7.7	A			3.1	A			0	A		
1B	Pennsylvania Ave & Minnesota Ave	SEB	11.5	B	105.3	F	41.5	D	61.7	E	104.3	F	119.4	F
		NWB	328.7	F			8.6	A			151.9	F		
		NEB	46.4	D			172.2	F			179	F		
		SWB	-				-				103.2	F		
1C*	L'Enfant Sq. South & Minnesota Ave NB	NET	-		-		36.9	D	29.1	C	-		-	
		SEL					27.1	C						
2	Minnesota Ave & 23rd St	EB	4.2	A	7.6	A	4.2	A	7.6	A	4.2	A	7.6	A
		WB	5.2	A			5.2	A			5.2	A		
		NB	28.8	C			28.8	C			28.8	C		
3	Pennsylvania Ave & 27th St	WB	55.8	E	144.6	F	61.1	E	147.4	F	61.1	E	147.4	F
		NB	83.7	F			106.2	F			106.2	F		
		SEB	205.5	F			205.8	F			205.8	F		
		NWB	39.7	D			39.6	D			39.6	D		
4	Minnesota Ave & 27th St	NB	34.3	D	3.9	A	34.3	D	3.9	A	33.8	D	3.9	A
		NEB	0	A			0	A			0	A		
		SWB	0	A			0	A			0	A		
5	Pennsylvania Ave & NB 295 Ramp	SEB	14.4	B	16.6	B	14.4	B	23.1	C	14.4	B	30.1	C
		NWB	23.3	C			49.4	D			77.1	E		

Note: * Intersection 1C only exists in the Revised Square Alternative.

Source: HNTB Corporation, 2013.

Table 4.6

Queuing Analysis Results (in Feet) – AM

ID	INTERSECTION	DIRECTION	EXISTING	2015			2040		
				NO BUILD	REVISED SQ.	CONV. INT.	NO BUILD	REVISED SQ.	CONV. INT.
1A	L'Enfant Sq.	SWT	~333	~344	~328	-	~857	~1165	-
	&	SET	165	169	151	-	243	257	-
	Pennsylvania Ave	NWT	619	667	73	106	842	~113	~1538
1B		SEL	136	138	-	~176	~194	-	~216
		SET	5	6	25	99	9	29	150
	Pennsylvania Ave	NWL	-	-	-	5	-	-	4
	&	NWT	338	360	758	~1037	363	~1009	~1114
	Minnesota Ave	NEL	~102	~109	-	~316	~481	-	~559
		NET	0	1	280	191	55	323	~308
		SWL	-	-	-	128	-	-	~372
		SWT	-	-	-	127	-	-	~372
1C*	L'Enfant Sq. South &	NET	-	-	191	-	-	263	-
	Minnesota Ave NB	SEL	-	-	39	-	-	150	-

Note: * Intersection 1C only exists in the Revised Square Alternative.

~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.

Source: HNTB Corporation, 2013.

Table 4.7

Queuing Analysis Results (in Feet) – PM

ID	INTERSECTION	DIRECTION	EXISTING	2015			2040		
				NO BUILD	REVISED SQ.	CONV. INT.	NO BUILD	REVISED SQ.	CONV. INT.
1A	L'Enfant Sq	SWT	~314	~323	260	-	~279	241	-
	&	SET	775	804	845	-	~1970	~2016	-
	Pennsylvania Ave	NWT	79	80	13	0	154	38	73
1B		SEL	179	180	-	288	359	-	~579
		SET	12	13	64	562	~1149	~1179	~1298
	Pennsylvania Ave	NWL	-	-	-	4	-	-	4
	&	NWT	250	256	101	293	~733	186	~805
	Minnesota Ave	NEL	172	175	-	193	135	-	~192
		NET	170	173	~417	197	134	~624	~184
		SWL	-	-	-	~208	-	-	~265
		SWT	-	-	-	~208	-	-	~265
1C*	L'Enfant Sq South &	NET	-	-	236	-	-	180	-
	Minnesota Ave NB	SEL	-	-	420	-	-	574	-

Note: * Intersection 1C only exists in the Revised Square Alternative.

~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.

Source: HNTB Corporation, 2013.

Table 4.8
Travel Time Analysis Results (in Minutes) – AM

FROM	TO	EXISTING	2015			2040		
			NO BUILD	REVISED SQ.	CONV. INT.	NO BUILD	REVISED SQ.	CONV. INT.
Penn Ave/ 295NB Ramp	Minn Ave/ 27th St	2.6	2.6	3.0	4.3	4.5	7.5	7.1
Penn Ave/ 295NB Ramp	Penn Ave/ 27th St	1.8	1.8	1.8	1.8	3.3	4.3	3.8
Penn Ave/ 295NB Ramp	Minn Ave/ 23rd St	2.3	2.3	3.1	2.2	3.9	8.1	4.0
Penn Ave/ 295NB Ramp	Minn Ave/ 25th St	1.8	1.8	3.0	1.6	3.3	7.5	3.6
Penn Ave/ 27th St	Penn Ave/ 295NB Ramp	1.3	1.3	1.2	1.4	1.3	1.4	1.5
Penn Ave/ 27th St	Minn Ave/ 23rd St	1.0	1.0	1.1	1.5	1.1	1.1	1.4
Minn Ave/ 23rd St	Penn Ave/ 295NB Ramp	6.1	6.3	7.1	3.2	7.0	9.1	6.4
Minn Ave/ 23rd St	Minn Ave/ 27th St	3.8	4.1	4.6	2.1	4.5	5.2	4.4
Minn Ave/ 23rd St	Penn Ave/ 27th St	4.3	4.6	5.0	2.4	5.2	5.2	5.2
Minn Ave/ 23rd St	Minn Ave/ 25th St	3.7	3.8	4.0	1.8	4.0	4.0	4.3
Minn Ave/ 27th St	Minn Ave/ 25th St	4.4	4.1	3.2	4.1	5.5	5.5	3.9
Minn Ave/ 27th St	Minn Ave/ 23rd St	4.5	4.3	3.5	4.7	5.6	5.7	4.5
Minn Ave/ 27th St	Penn Ave/ 295NB Ramp	4.9	5.0	3.9	4.0	5.7	5.4	3.6

Source: HNTB Corporation, 2013.

Table 4.9
Travel Time Analysis Results (in Minutes) – PM

FROM	TO	EXISTING	2015			2040		
			NO BUILD	REVISED SQ.	CONV. INT.	NO BUILD	REVISED SQ.	CONV. INT.
Penn Ave/ 295NB Ramp	Minn Ave/ 27th St	3.4	3.9	7.9	2.9	5.2	6.7	5.2
Penn Ave/ 295NB Ramp	Penn Ave/ 27th St	3.4	3.9	5.4	2.2	5.4	4.9	5.5
Penn Ave/ 295NB Ramp	Minn Ave/ 23rd St	4.2	4.8	8.1	2.6	5.9	6.7	5.0
Penn Ave/ 295NB Ramp	Minn Ave/ 25th St	4.1	4.6	8.0	2.2	5.3	6.5	4.7
Penn Ave/ 27th St	Penn Ave/ 295NB Ramp	2.2	2.2	1.3	1.9	3.2	1.8	2.6
Penn Ave/ 27th St	Minn Ave/ 23rd St	1.8	1.8	1.2	1.4	2.6	1.2	1.8
Minn Ave/ 23rd St	Penn Ave/ 295NB Ramp	2.3	2.3	11.1	2.4	2.3	11.1	3.2
Minn Ave/ 23rd St	Minn Ave/ 27th St	2.4	2.6	10.9	1.9	2.1	10.3	2.3
Minn Ave/ 23rd St	Penn Ave/ 27th St	3.2	3.2	11.6	2.5	2.7	10.5	3.1
Minn Ave/ 23rd St	Minn Ave/ 25th St	2.4	2.3	10.4	1.7	1.6	10.1	1.9
Minn Ave/ 27th St	Minn Ave/ 25th St	3.0	3.3	1.8	2.5	2.8	2.2	4.1
Minn Ave/ 27th St	Minn Ave/ 23rd St	3.0	3.2	2.3	3.0	2.6	2.6	4.5
Minn Ave/ 27th St	Penn Ave/ 295NB Ramp	1.8	1.8	2.2	1.3	2.0	2.2	1.9

Source: HNTB Corporation, 2013.

4.4.3 Transit

No Build Alternative

The No Build Alternative would have no impact on transit operations or the public's ability to use transit in the Study Area. No changes to the configuration of the intersection or traffic movements would occur; all five bus stops and the existing bus routes would remain at their current locations. See Figure 3-14 in Section 3.4.3.

Build Alternative 1 – Revised Square Alternative

As shown in **Figure 4-5**, Bus Stop 1 and Bus Stop 5 would remain at their existing locations. Bus Stop 2, located just west of the intersection on eastbound Pennsylvania Avenue, SE, would have to be pulled back farther west of the Pennsylvania Avenue and L'Enfant Square intersection to ensure enough space for buses to change lanes and continue traveling eastbound on Pennsylvania Avenue, SE.

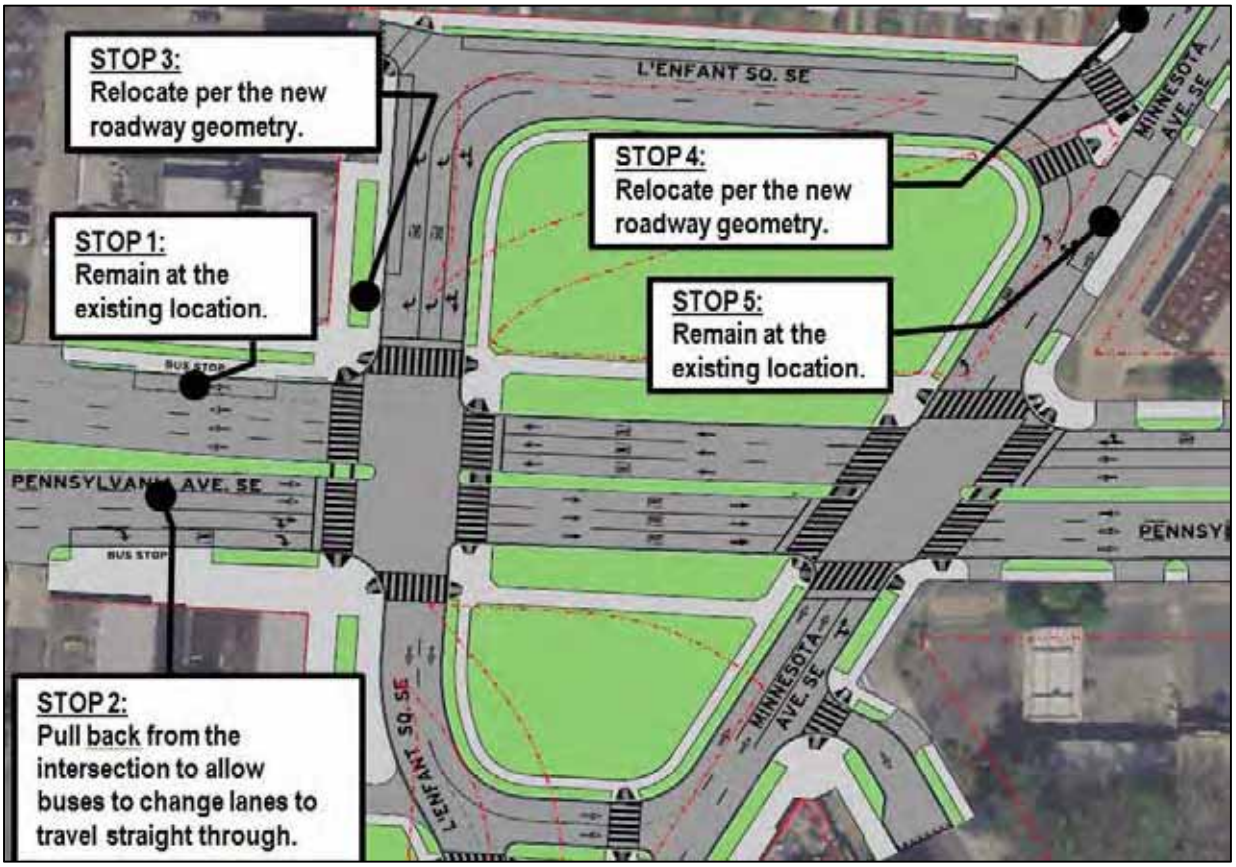
Bus Stop 3 and Bus Stop 4 would also have to be moved to new locations due to their existing location along the cut-through road north of the square (and Pennsylvania Avenue, SE), which would be removed and filled in with park land under Build Alternative 1. All three bus routes that Bus Stop 3 serves, V7, V8 and V9, use the cut-through road from Minnesota Avenue, SE to turn right at Pennsylvania Avenue, SE; therefore Bus Stop 3 could be relocated on L'Enfant Square, SE near Pennsylvania Avenue, SE headed westbound.

The only route Stop 4 serves (U2) continues southbound on Minnesota Avenue, SE through the intersection. Due to the reconfiguration with Build Alternative 1, Stop 4 could be relocated further back, just prior to entering the intersection at the corner of Minnesota Avenue, SE and L'Enfant Square, SE so that U2 buses would not have to cross two lanes in a short distance to continue straight through the intersection.

Under Build Alternative 1, there would be minor short-term impacts to WMATA bus service along the Study Area corridor as a result of construction at the intersection. Three of the five Bus Stops would need to be relocated to locations near their current locations to accommodate the new intersection configuration. WMATA would have to adjust their bus routes to accommodate these minor bus stop relocations and bus routes would have to be adjusted to account for the revised intersection design and operations. Impacts would also be minor in the short term as adjustments to bus routes and bus stop locations are being made by WMATA bus drivers and bus users at the intersection. However, long-term impacts after project implementation are anticipated to be negligible. The impacts to transit do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

Figure 4-5

Possible Bus Stop Locations – Build Alternative 1



Source: HNTB Corporation, 2013.

Build Alternative 2 – Conventional Intersection Alternative

As shown in **Figure 4-6**, Bus Stops 1, 2 and 5 would remain at their existing locations under Build Alternative 2. A bulb-out would be added to Bus Stop 1 to accommodate buses using this bus stop.

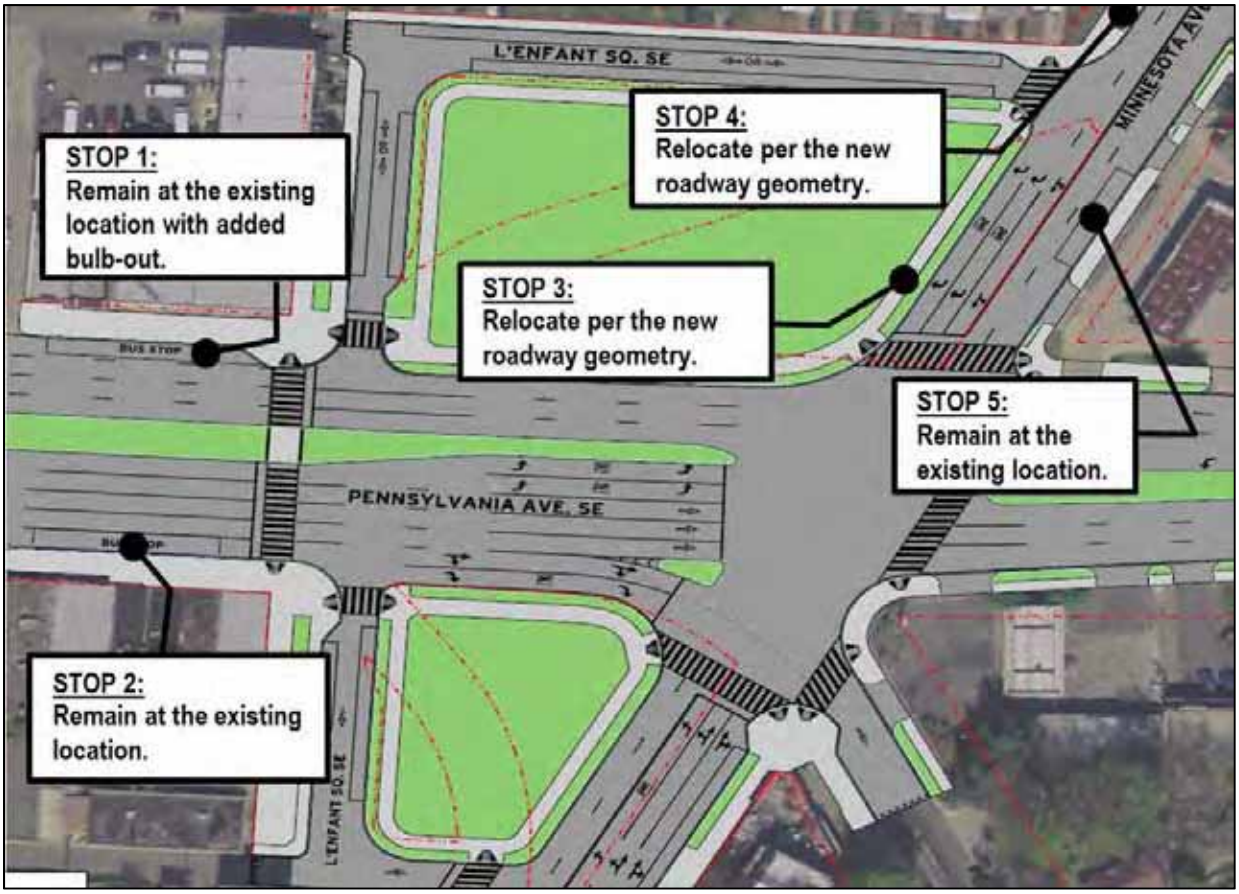
Bus Stop 3 and Bus Stop 4 would have to be moved to new locations due to their existing location along the cut-through road north of the square (and Pennsylvania Avenue, SE), which would be removed and filled in with park land under Build Alternative 2. All three bus routes that Bus Stop 3 serves, V7, V8 and V9, use the cut-through road from Minnesota Avenue, SE to turn right at Pennsylvania Avenue, SE; therefore Bus Stop 3 could be relocated to Minnesota Avenue, SE, just prior to the right-turn onto Pennsylvania Avenue, SE.

The only route Stop 4 serves (U2) continues southbound on Minnesota Avenue, SE through the intersection. Due to the reconfiguration under Build Alternative 2, Stop 4 could be relocated to Minnesota Avenue, SE, just prior to entering the north side of the intersection at the corner of Minnesota Avenue, SE and L'Enfant Square, SE and would then have to move to the far left lane to continue southbound on Minnesota Avenue.

As with Build Alternative 1, impacts to the bus routes and bus stops would be minor in the short term during construction. Impacts would also be minor in the short term as adjustments to bus routes and bus stop locations are made by WMATA bus drivers and bus users at the intersection. However, long-term impacts after project implementation are anticipated to be negligible. The impacts to transit do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

Figure 4-6

Possible Bus Stop Locations – Build Alternative 2



Source: HNTB Corporation, 2013.

4.5 Air Quality

The air quality analyses addresses the results of a CO-hot-spot analysis for the existing condition (2012) and No-Build (2015 and 2040), along with the Build Alternatives (2015 and 2040), comparing the results to the NAAQS. The proposed opening year is 2015 and the design year is 2040. The analysis also presents a discussion on ozone, $PM_{2.5}$, and Mobile Source Air Toxics (MSATs).

Refer to *Appendix G, Air Quality Report* for detailed air quality analysis and results.

Impact Thresholds

The following thresholds were used to determine the magnitude of effects to the air quality environment:

Impact: An impact would result if the alternative would contribute to a violation of the NAAQS or result in any increase in MSAT emissions.

Duration: **Short-term –** Impact would be a result of construction emissions; **Long-term –** Impact would be a result of a change in emissions due to the fully constructed alternative.

4.5.1 Regional Conformity

Regional level transportation conformity is addressed through the approval of the LRP and the TIP. *The Air Quality Conformity Update of The 2012 Constrained Long Range Plan and The Fy2013-2018 Transportation Improvement Program* for the Washington Metropolitan Region was published on March 20, 2013. The Pennsylvania Avenue/Minnesota Avenue Great Streets Improvements project is identified as TIP ID: 2743 in the Constrained LRP. The project does not appear in the *Air Quality Conformity Update* since only projects that are "regionally significant" are listed and specifically modeled.[63] However, emissions from all projects are included in the regional emissions analysis.[64]

4.5.2 Project Level Conformity

Project level conformity analysis evaluates whether there are air quality impacts on a smaller scale than an entire nonattainment or maintenance area. It relates a project to the NAAQS on a more localized basis. The project level analyses address the results of a CO hot-spot analysis for the existing condition (2012) and No Build Alternative (2015 and 2040), along with the Revised Square and Conventional Intersection Build Alternatives (2015 and 2040), comparing the results to the NAAQS. The proposed opening year is 2015 and the design year is 2040. The analysis also presents a discussion on ozone and $PM_{2.5}$.

4.5.3 CO Hot-Spot (Microscale) Analysis

CO emissions are greatest from vehicles operating at low speeds and prior to complete engine warm-up (within approximately eight minutes of starting). Congested urban roads, therefore, tend to be the principal problem areas for CO. Because the averaging times associated with the CO standards are relatively short (1 and 8 hours), CO concentrations can be modeled using simplified "worst-case" meteorological assumptions. Modeling is also simplified considerably by the stable, non-reactive nature of CO.

4.5.4 Methodology

The CO hot-spot analysis followed the modeling guidelines presented in EPA's "Guideline for Modeling Carbon Monoxide from Roadway Intersections"[65] and EPA's "Using MOVES in Project-Level Carbon Monoxide Analyses."[66] The EPA's MOVES2010b (MOVES) and EPA's approved CAL3QHC 2.0 (CAL3QHC)[67] computer models were used to analyze vehicular emissions and the hourly dispersion of CO adjacent to the intersection of Pennsylvania and Minnesota Avenues, SE. Traffic and emissions for the existing (2012) condition, No Build (2015 and 2040), and the anticipated first year of operation (2015) and design year (2040) for the two Build alternatives were modeled. EPA's MOVES2010b was used to develop vehicular emission rates. MWCOG provided District specific input variables for MOVES.[68]

CAL3QHC is a pollutant dispersion-modeling program for predicting pollutant concentrations from motor vehicles under free-flow conditions, or in the vicinity of roadway intersections. Peak traffic volumes and average operating speeds from the traffic analysis Synchro 8 Reports were used to analyze

the intersection.[69] Thirty-one (31) air quality receptors, A1 – A31, were placed 10 feet away from the edge of pavement, at the stop line paralleling the traffic lanes and at 82 foot intervals as shown in **Figures 4-7**, **4-8**, and **4-9**. Two of the 31 receptors were located at the nearest entry doors to daycare facilities along Pennsylvania Avenue, southeast of the intersection of Pennsylvania Avenue, SE and Minnesota Avenue, SE. In accordance with EPA procedure, average speeds for each link were used to develop the CO emission factors with MOVES. Worst-case meteorological variables and an urban background CO concentration obtained from U.S. EPA AirData for the monitoring site at 420 34th Street N.E. were used in the CAL3QHC model. The 1-hour and 8-hour background concentration were the highest second maximum values at the three CO monitoring sites in the District for 2012.

4.5.5 Impact Assessment

No Build Alternative

The maximum 1-hour CO concentrations were 4.4 ppm for the 2015 No Build Alternative and 5.7 ppm for the 2040 No Build Alternative. The maximum 8-hour CO concentrations were 3.6 ppm for the 2015 No Build Alternative, and 4.5 ppm for the 2040 No Build Alternative. The 1-hour concentrations include a background concentration of 2.9 ppm and the 8-hour concentrations include a background concentration of 2.5 ppm.

Under the No Build Alternative, no changes to the Study Area would occur and there would be no impacts in the short term or long term.

Build Alternative 1 – Revised Square Alternative

Under Build Alternative 1, as shown in **Table 4.10**, the maximum 1-hour CO concentrations were 5.7 ppm in 2015 and 4.9 ppm in 2040. The maximum 8-hour CO concentrations, shown in **Table 4.11**, were 4.5 ppm in 2015 and 3.9 ppm in 2040. The 1-hour concentrations include a background concentration of 2.9 ppm and the 8-hour concentrations include a background concentration of 2.5 ppm. The results of the CO microscale air quality modeling indicates that none of these concentrations at the 31 receptors modeled exceed either the 1-hour (35 ppm) or 8-hour (9 ppm) NAAQS under Build Alternative 1.

Construction of Build Alternative 1 would likely take place over two construction seasons. During each construction season there would be localized increased emissions from construction equipment and particulate emissions from construction activities. Particulate emissions, whether from construction equipment diesel exhaust or dust from the construction activities, will be controlled as well as possible. Contractors will follow all DDOT Standard Construction Specification Sections that address the control of construction equipment exhaust or dust during construction. Impacts to air quality due to construction would be temporary and localized. Even though construction mitigation measures are not required, appropriate BMPs will be used to reduce engine activity or reduce emissions per unit or operating time. See *Section 4.8, Mitigation* for additional information on air quality mitigation measures.

Based on the air quality analysis completed for Build Alternative 1, the Proposed Action would not contribute to any violation of the NAAQS and meets the project level CO conformity requirements of 40 CFR 94.

Build Alternative 2 – Conventional Intersection Alternative

Under Build Alternative 2, the maximum 1-hour CO concentrations, shown in Table 4.10, were 4.8 ppm in 2015 and 5.8 ppm in 2040. The maximum 8-hour CO concentrations, shown in Table 4.11, were 3.8 ppm in 2015 and 4.5 ppm in 2040. The 1-hour concentrations include a background concentration of 2.9 ppm and the 8-hour concentrations include a background concentration of 2.5 ppm. The results of the CO microscale air quality modeling indicate that none of these concentrations at the 31 receptors modeled exceed either the 1-hour (35 ppm) or 8-hour (9 ppm) NAAQS under Build Alternative 2.

Short-term impacts during construction under Build Alternative 2 would be similar to Build Alternative 1.

Based on the air quality analysis completed for Build Alternative 2, the Proposed Action would not contribute to any violation of the NAAQS and meets the project level CO conformity requirements of 40 CFR 94.


Minnesota Ave SE
L'Enfant Sq SE
25th St
Pennsylvania Ave SE
Pennsylvania Ave SE
Vicholson St SE
LEGEND
Air Receptor Location
Figure 4-7
CO Hot Spot Analysis – No Build Alternative
Environmental Assessment
Sources: HNTB Corporation, 2013

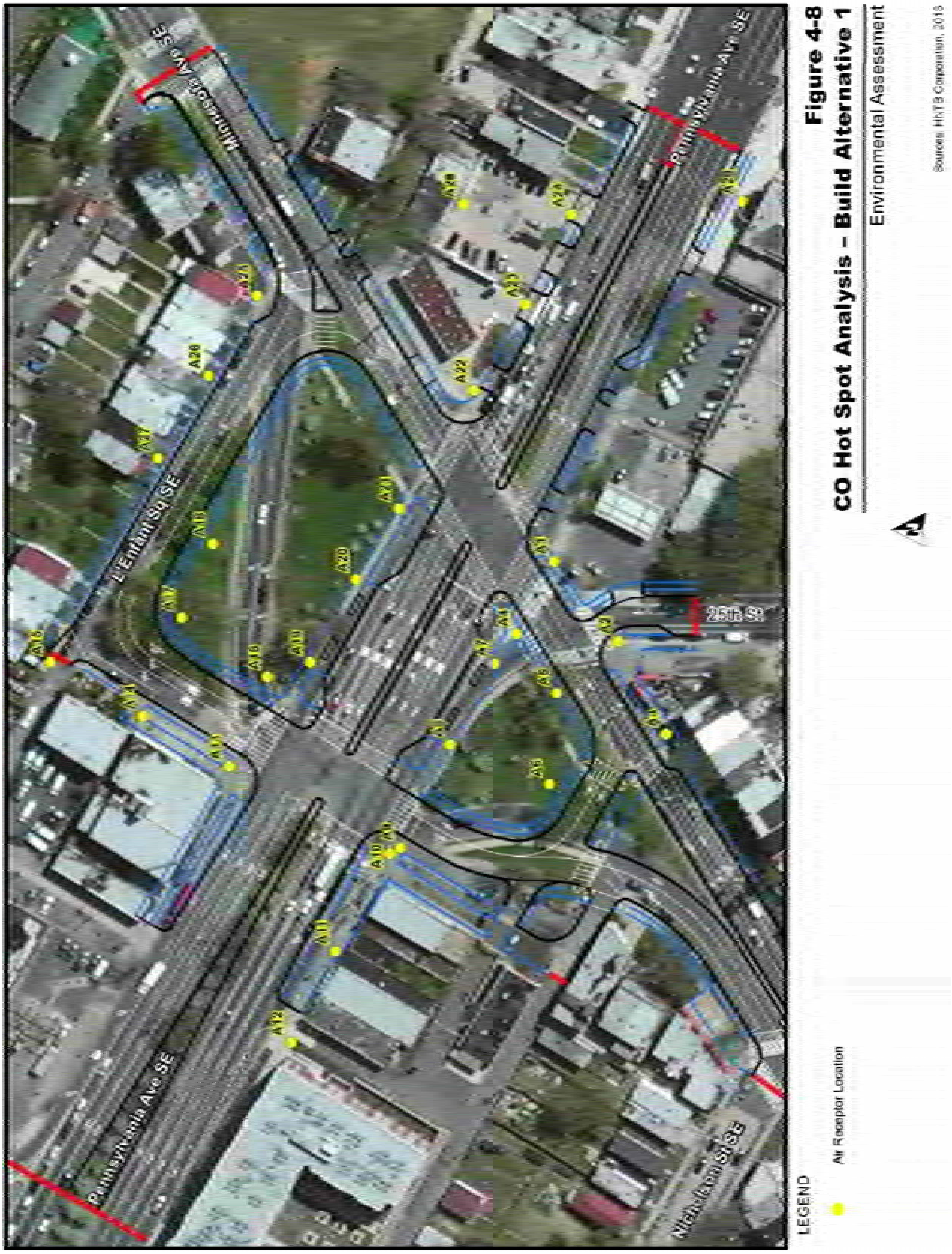


Figure 4-8
CO Hot Spot Analysis – Build Alternative 1
Environmental Assessment

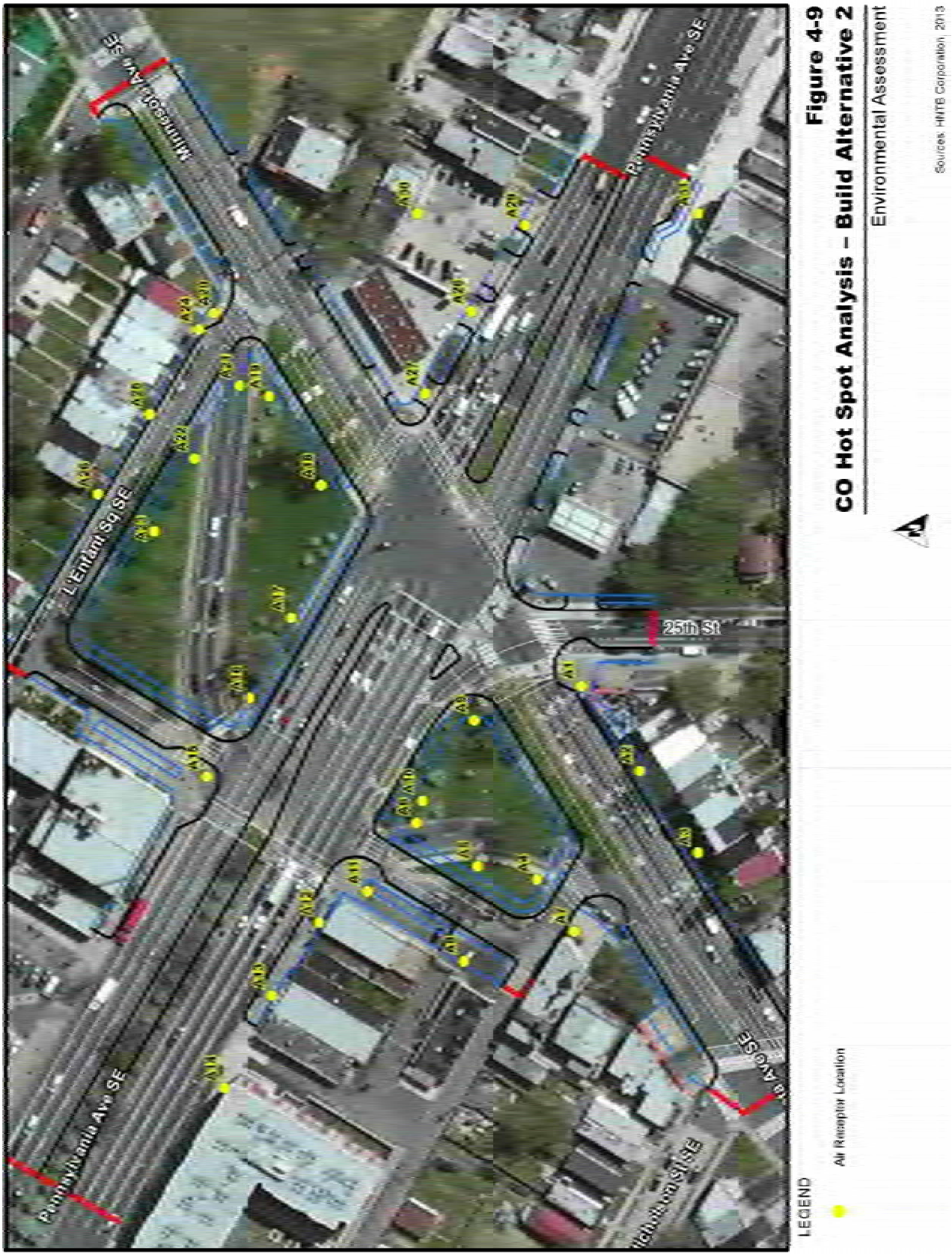


Figure 4-9
CO Hot Spot Analysis – Build Alternative 2
Environmental Assessment

Sources: HNTB Corporation, 2013

Table 4.10
Microscale Air Quality Analysis
Maximum 1-Hour CO Concentrations (ppm)*

Air Quality Receptor ID	2012	2015			2040		
	Existing	No Build	Revised Square	Conventional Intersection	No Build	Revised Square	Conventional Intersection
	1 hour	1 hour	1 hour	1 hour	1 hour	1 hour	1 hour
A1	3.9	3.6	4.0	3.9	4.1	3.6	3.9
A2	3.8	3.6	3.9	3.6	3.8	3.6	3.8
A3	3.8	3.6	3.8	3.7	3.7	3.5	3.7
A4	3.7	3.5	3.9	3.9	4.2	3.4	3.5
A5	3.8	3.6	4.0	3.6	3.7	3.4	3.6
A6	3.9	3.7	4.1	3.5	3.7	3.7	3.8
A7	4.0	3.8	4.1	4.0	4.2	3.3	3.4
A8	3.9	3.8	4.1	3.9	4.3	3.4	3.5
A9	4.0	3.7	4.1	3.9	4.6	3.7	3.9
A10	4.1	3.9	4.4	3.9	4.5	3.7	3.9
A11	3.7	3.5	3.9	3.8	4.5	3.6	3.9
A12	3.6	3.4	3.6	3.8	4.5	3.8	4.1
A13	4.3	4.1	4.3	4.1	4.9	3.8	4.1
A14	3.9	3.6	3.9	3.7	5.2	3.9	4.2
A15	4.5	4.1	4.3	3.6	4.6	4.9	5.8
A16	4.4	4.0	4.4	4.4	5.7	4.6	5.3
A17	4.5	4.1	4.6	3.9	5.2	4.4	4.9
A18	4.5	4.4	5.3	3.8	5.0	4.2	4.4
A19	4.6	4.4	5.0	4.8	5.4	4.1	4.2
A20	4.6	4.3	4.7	4.3	4.8	4.3	4.4
A21	4.8	4.4	5.7	4.2	4.4	3.9	4.1
A22	4.5	4.3	5.3	4.4	4.3	3.7	3.6
A23	4.6	4.4	5.1	4.2	4.2	3.6	3.6
A24	4.5	4.2	4.8	4.3	4.2	3.8	4.0
A25	4.3	4.0	4.4	3.9	5.5	3.5	3.6
A26	4.0	3.9	4.2	3.9	5.3	3.5	3.5
A27	4.4	4.0	4.5	3.8	5.2	4.2	4.6
A28	3.8	3.6	4.0	3.6	3.9	4.2	4.6
A29	3.7	3.5	3.7	3.7	3.8	4.4	4.7
A30	3.7	3.6	3.8	-	-	3.7	3.9
A31	3.7	3.6	3.9	-	-	3.6	3.8

*The National Ambient Air Quality Standard for CO is 35 ppm for a one hour average.

Concentrations include an ambient background level of 2.9 ppm (1 hour)

Indicates maximum concentration for each alternative and year of analysis.

Source: HNTB Corporation, May 2013

Table 4.11
Microscale Air Quality Analysis
Maximum 8-Hour CO Concentrations (ppm)*

Air Quality Receptor ID	2012	2015			2040		
	Existing	No Build	Revised Square	Conventional Intersection	No Build	Revised Square	Conventional Intersection
	8 hour	8 hour	8 hour	8 hour	8 hour	8 hour	8 hour
A1	3.2	3.0	3.3	3.2	3.3	3.0	3.2
A2	3.1	3.0	3.2	3.0	3.1	3.0	3.1
A3	3.1	3.0	3.1	3.1	3.1	2.9	3.1
A4	3.1	2.9	3.2	3.2	3.4	2.9	2.9
A5	3.1	3.0	3.3	3.0	3.1	2.9	3.0
A6	3.2	3.1	3.3	2.9	3.1	3.1	3.1
A7	3.3	3.1	3.3	3.3	3.4	2.8	2.9
A8	3.2	3.1	3.3	3.2	3.5	2.9	2.9
A9	3.3	3.1	3.3	3.2	3.7	3.1	3.2
A10	3.3	3.2	3.6	3.2	3.6	3.1	3.2
A11	3.1	2.9	3.2	3.1	3.6	3.0	3.2
A12	3.0	2.9	3.0	3.1	3.6	3.1	3.3
A13	3.5	3.3	3.5	3.3	3.9	3.1	3.3
A14	3.2	3.0	3.2	3.1	4.1	3.2	3.4
A15	3.6	3.3	3.5	3.0	3.7	3.9	4.5
A16	3.6	3.3	3.6	3.6	4.5	3.7	4.2
A17	3.6	3.3	3.7	3.2	4.1	3.6	3.9
A18	3.6	3.6	4.2	3.1	4.0	3.4	3.6
A19	3.7	3.6	4.0	3.8	4.3	3.3	3.4
A20	3.7	3.5	3.8	3.5	3.8	3.5	3.6
A21	3.8	3.6	4.5	3.4	3.6	3.2	3.3
A22	3.6	3.5	4.2	3.6	3.5	3.1	3.0
A23	3.7	3.6	4.0	3.4	3.4	3.0	3.0
A24	3.6	3.4	3.8	3.5	3.4	3.1	3.3
A25	3.5	3.3	3.6	3.2	4.3	2.9	3.0
A26	3.3	3.2	3.4	3.2	4.2	2.9	2.9
A27	3.6	3.3	3.6	3.1	4.1	3.4	3.7
A28	3.1	3.0	3.3	3.0	3.2	3.4	3.7
A29	3.1	2.9	3.1	3.1	3.1	3.6	3.8
A30	3.1	3.0	3.1	-	-	3.1	3.2
A31	3.1	3.0	3.2	-	-	3.0	3.1

*The National Ambient Air Quality Standard for CO is 35 ppm for a one hour average.

Concentrations include an ambient background level of 2.5 ppm (8 hour)

Indicates maximum concentration for each alternative and year of analysis.

Source: HNTB Corporation, May 2013

4.5.6 Ozone

Ozone project level conformity is addressed through the approval of the LRP and the TIP. As stated in Section 4.5.1 Regional Conformity, *The Air Quality Conformity Update of The 2012 Constrained Long Range Plan and The Fy2013-2018 Transportation Improvement Program* for the Washington Metropolitan Region was approved by the FHWA and FTA. Therefore, the Pennsylvania Avenue/Minnesota Avenue *Great Streets* Improvements project meets the project level conformity requirements in 40 CFR Part 93.[70]

4.5.7 $PM_{2.5}$ Determination

The Proposed Action, as stated previously, is located within a nonattainment area for $PM_{2.5}$. The transportation conformity rule, 40 CFR 93.123(b)(1) requires a PM hot-spot analysis only for projects of local air quality concern. The proposed project is an intersection improvement project at individual intersections that is being designed to improve traffic flow and operational efficiencies, does not involve any increases in idling, and the No Build and Build Alternative volumes through the intersection are the same. The project would be expected to have a neutral or positive influence on $PM_{2.5}$ emissions. Therefore, the project is not one of local air quality concern and a hot-spot analysis is not required.

4.5.8 Mobile Source Air Toxics (MSAT)

In addition to the criteria air pollutants presented in Table 3.14, EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries).

"Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (http://cfcpub.epa.gov/ncea/iris/index.cfm). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999/). These are acrolein, benzene, 1,3-butidiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules. The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity (vehicle-miles traveled, VMT) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050…"[71]

The purpose of the Proposed Action is to improve traffic flow and operating efficiencies through the intersection by redirecting traffic, improving pedestrian safety and in some cases eliminating left turn conflicts. As noted in FHWA's *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA* in reference to Exempt Projects, "This project has been determined to generate minimal air quality impacts for CAAA criteria pollutants and has not been linked with any special MSAT concerns. As such, this project will not result in changes in traffic volumes, vehicle mix, basic project location, or any other factor that would cause an increase in MSAT impacts of the project from that of the no-build alternative."[72]

The *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA* also states the following: "Moreover, EPA regulations for vehicle engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades. Based on regulations now in effect, an analysis of national trends with EPA's MOVES model forecasts a combined reduction of over 80 percent in the total annual emission rate for the priority MSAT from 2010 to 2050 while vehicle-miles of travel are projected to increase by 100 percent. This will both reduce the background level of MSAT as well as the possibility of even minor MSAT emissions from this project."[73]

4.6 Noise

Impact Thresholds

The following thresholds were used to determine the magnitude of effects to the noise environment:

Substantial Impact: A substantial impact would result if the predicted noise levels approach or exceed the Noise Abatement Criteria (NAC) value for the appropriate activity category or if noise levels increase by 10 decibels or more over existing noise levels.[74]

Duration: **Short-term –** Impact would be a result of construction noise; **Long-term –** Impact would be a result of a change in noise due to the fully constructed alternative.

4.6.1 Noise Modeling

The latest version of the FHWA's Traffic Noise Model, TNM®2.5[75], was used to model existing (2012), No Build (2040), Build Alternative 1 (2040), and Build Alternative 2 (2040) for the peak noise hour noise levels within the Study Area. Twenty-two (22) representative noise receivers (representing 35 dwelling units), numbered N1 through N18, plus the four field sites, FS-1 through FS-4, as shown on Figure 3-15 and Figure 3-16, were modeled. Modeled receivers are identical on Figure 3-15 and Figure 3-16, except for Field Site 4 (FS-4). The Revised Square Alternative alignment results in FS-4 being on the pavement. Thus, FS-4 was moved approximately 70 feet northeast for the Build Alternative 1 model. These receivers were selected to model representative noise impacts at areas consisting of residential, daycare, and recreational properties, as well as one place of worship. There are multiple commercial and retail properties throughout the Study Area that do not have areas of outdoor areas of frequent human use, so locations were not modeled. The results of the computer modeling are presented in **Table 4.12**.

Table 4.12

PM Peak Hour Noise Levels, dBA Leq(h)

Receiver Location	Land Use	Activity Category	Activity Criteria	Dwelling Units	Noise Level, L_{eq}(h) (dBA)			
			Leq (h)		Existing (2012)	No Build (2040)	Revised Square (2040)	Conventional Intersection (2040)
N1	Residential	B	67	3	69.0	**70.3**	**70.3**	**71.0**
N2	Daycare	C	67	0	67.4	**69.4**	**69.3**	**69.7**
FS-3	Retail	F	N/A	0	71.0	73.0	71.9	72.5
N3	Daycare	C	67	0	69.2	**71.3**	**70.3**	**70.6**
N4	Residential	B	67	3	67.1	**68.4**	**68.7**	**69.2**
N5	Residential	B	67	2	66.6	**67.7**	**67.8**	**68.1**
N6	Residential	B	67	3	66.1	**67.1**	**67.1**	**67.1**
N7	Place of Worship	D	52	0	41.1*	41.7*	41.6*	41.3*
N8	Residential	B	67	3	66.0	**67.2**	**67.3**	**66.8**
FS-4	Park	C	67	0	70.0	**71.5**	**73.1**	**70.2**
N9	Residential	B	67	1	65.4	**67.3**	**68.0**	**67.7**
N10	Residential	B	67	2	63.7	**65.6**	**66.3**	**66.0**
N11	Residential	B	67	2	63.9	**65.7**	**66.9**	**66.2**
FS-1	Residential	B	67	1	63.9	**65.7**	**66.9**	**66.1**
N12	Residential	B	67	2	64.7	**66.4**	**67.5**	**66.9**
N13	Residential	B	67	2	65.2	**66.8**	**67.8**	**67.3**
N14	Residential	B	67	2	65.9	**67.4**	**68.2**	**67.9**
N15	Residential	B	67	2	66.9	**68.2**	**68.9**	**68.8**
N16	Residential	B	67	1	67.3	**68.6**	**69.1**	**69.3**
N17	Residential	B	67	3	67.5	**68.6**	**68.8**	**69.6**
N18	Residential	B	67	3	67.5	**68.6**	**68.6**	**69.6**
FS-2	Park	C	67	0	71.1	**73.2**	**72.8**	**73.7**

Notes: ___ - Indicates impacted receptor. A receptor is impacted if the predicted noise level approaches or exceeds DDOT NAC, as shown on Table 3.15.

* - N7 Building Type was classified as – Masonry and Window Condition – Single Glazed. Therefore the 'Noise Reduction Due to Exterior of the Structure' is 25 dB as defined on *Table 6: Building Noise Reduction Factors* (page 30) in the "Highway Traffic Noise: Analysis and Abatement Guidance", FHWA, January 2011.

Source: HNTB Corporation, 2013.

4.6.2 Impact Assessment

No Build Alternative

Under the No Build Alternative, no transfer of jurisdiction between NPS and DDOT would occur and the roadway configuration and traffic operational characteristics would remain unchanged from the existing condition. Noise can be heard consistently throughout the day at this urban intersection. However, due to the projected increase in traffic volume in 2040, the noise at the project intersection under the No Build Alternative is expected to worsen. No Build Alternative (2040) peak hour noise is predicted to exceed the NAC at 16 residential locations and four activity category C locations. The noise levels at the 16 residential locations would range from 65.6 to 70.3 dBA L_{eq}(h) and represents 35 dwelling units. The noise levels at the category C locations would range from 69.4 to 73.2 dBA L_{eq}(h). The interior analysis at the category D location, N7, did not approach or exceed the 52 dBA L_{eq}(h) criteria.

No short-term impacts would result under the No Build Alternative, as no construction would occur.

In the long term, due to the projected increase in traffic volume at this intersection, noise levels will increase by 2040 under the No Build Alternative.

Build Alternative 1 – Revised Square Alternative

Build Alternative 1 would have a short-term adverse impact to noise levels in the Study Area during the construction phase. The major construction elements of this project are expected to be demolition, hauling, grading, and paving. Construction of the proposed improvements and local rerouting of traffic for either alternative will result in a temporary increase in the ambient noise levels for properties in the Study Area, especially along Pennsylvania Avenue and Minnesota Avenue. General construction noise impacts for passerby and those individuals living or working near the project can be expected particularly from demolition, earth moving, and paving operations. Equipment associated with construction generally includes backhoes, graders, pavers, concrete trucks, compressors, and other miscellaneous heavy equipment. **Figure 4-10** lists some typical peak operating noise levels at a distance of 15 m (50 feet), grouping construction equipment according to mobility and operating characteristics. Considering the relatively short-term nature of construction noise, impacts would be minor. The transmission loss characteristics of nearby structures are believed to be sufficient to moderate the effects of intrusive construction noise.

Construction noise is regulated by Title 20 of the DCMR. Construction is permitted from 7:00 am to 7:00 pm from Monday-Saturday, with noise levels not to exceed 80 dBA, unless granted a variance (20-2802).[76] Construction is not permitted in residential zones outside of this time frame (20-2803).[77] While some construction under Build Alternative 1 would be adjacent to residential areas, it would not be within a residential zone. Potential mitigation for the construction noise impacts could include: “work hour limits, equipment muffler requirements, location of haul roads, eliminate of “tail gate banging,” ambient sensitive back-up alarms, community rapport, and complaint mechanisms.”[78]

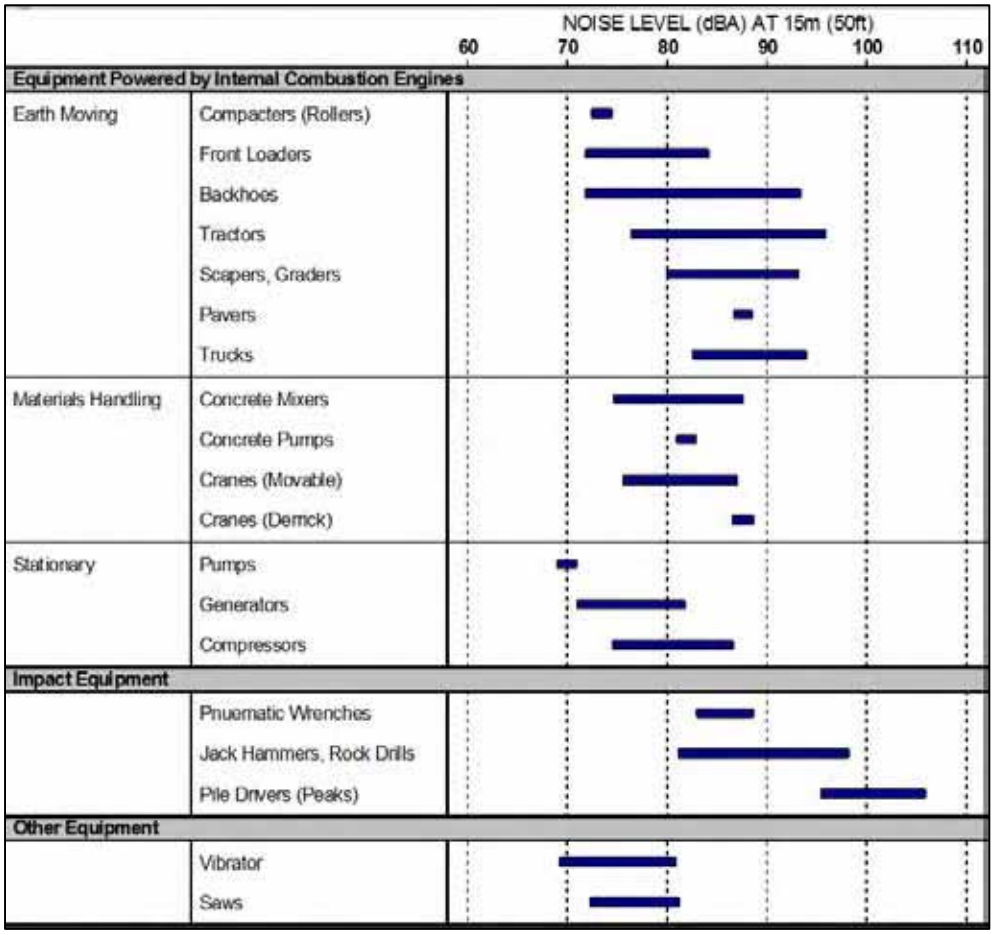
As with the No Build Alternative, predicted future (2040) noise levels for Build Alternative 1 would approach or exceed the NAC at 16 residential receivers and the same four activity category C locations identified under the No Build Alternative noise levels. The noise levels at the 16 residential locations would range from 69.3 to 73.1 dBA L_{eq}(h), representing 35 dwelling units. The noise levels at the

category C locations would range from 66.6 to 73.1 dBA $L_{eq}(h)$. None of the predicted future noise levels would substantially exceed existing noise levels (DDOT has defined an increase over existing noise levels of 10 decibels or more as being a substantial noise increase). [79] The interior analysis at the category D location, N7, did not approach or exceed the 52 dBA $L_{eq}(h)$ criteria.

Impacts under Build Alternative 1 would not be substantially different from the No Build Alternative. The impacts to noise do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

Figure 4-10

Construction Equipment Sound Levels



Source: U.S. Report to the President and Congress on Noise, February 1972.

Build Alternative 2 – Conventional Intersection Alternative

Impacts during construction would be similar to Build Alternative 1 and would be short term and minor. Potential mitigation for the construction noise impacts could include: "work hour limits, equipment muffler requirements, location of haul roads, eliminate of "tail gate banging," ambient sensitive back-up alarms, community rapport, and complaint mechanisms."[80]

As is the case with the No Build Alternative, predicted future (2040) noise levels for Build Alternative 2 would approach or exceed the NAC at 16 residential receivers and the same four activity category C locations identified under the No Build and Build Alternative 1 noise levels. The noise levels at the 16 residential locations would range from 66.0 to 71.0 dBA $L_{eq}(h)$, representing 35 dwelling units. The noise levels at the category C locations would range from 69.7 to 73.7 dBA $L_{eq}(h)$. None of the predicted future noise levels would substantially exceed existing noise levels (DDOT has defined an increase over existing noise levels of 10 decibels or more as being substantial). The interior analysis at the category D location, N7, did not approach or exceed the 52 dBA $L_{eq}(h)$ criteria.

Impacts under Build Alternative 2 would not be substantially different from the No Build Alternative. The impacts to noise do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

4.6.3 Undeveloped Lands

Traditionally, setback distances to 66 and 71 dB(A) $L_{eq}(h)$ are developed to assist local planning authorities in developing land use control over the remaining undeveloped lands along the project in order to prevent further development of incompatible land use based on predicted noise levels. However, the Study Area surrounding the Pennsylvania Avenue and Minnesota Avenue intersection is completely built out and therefore setback distances would not assist for this project.

4.6.4 Conclusion

Based on the study completed, mitigation of noise impacts for the Pennsylvania Avenue and Minnesota Avenue, SE improvements is not feasible for either of the Build Alternatives. Due to the built out nature of the Study Area and local access requirements, noise mitigation in this urban environment is not possible. If it subsequently develops during final design that these conditions have substantially changed, noise abatement measures will be reviewed. Refer to Section *4.8, Mitigation Measures*, for a complete discussion of mitigation related to noise.

4.7 Indirect and Cumulative Effects

The CEQ regulations, which implement NEPA, require assessment of cumulative impacts in the decision-making process for federally funded projects. Cumulative impacts are defined as "the impact on the environment which results 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 effects can result from individually minor, but collectively moderate or major actions taking place over a period of time." (40 CFR 1508.7).

Cumulative effects are determined by combining the impacts of the Proposed Action with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other past, ongoing, or foreseeable future projects within immediate vicinity of the Study Area and, if necessary, the surrounding region. Cumulative effects are evaluated in a regional context, which varies for each impact topic; however, in general, the regional context is Pennsylvania Avenue, SE, the Anacostia River Watershed, and the surrounding Wards and Neighborhoods including but not limited to Randle Highlands, Fairlawn, Deanwood, Fort Dupont, and Hillcrest. The Study Area for cumulative impacts differs based on resource topic. For instance, cumulative effects to water quality generally use a larger

watershed to define the Study Area; whereas, cumulative effects on aesthetics would use a Study Area defined by viewsheds. Generally, short-term impacts do not result in cumulative effects (unless specified in this section) and if there is no impact or a beneficial impact, the alternatives would not have a cumulative impact regardless of other actions in the project vicinity. As presented earlier in this EA, implementation of the alternatives would have no long-term impacts on certain resources because the resource is either not present or the Proposed Action would have negligible impacts on the resource. As a result, there would be no appreciable cumulative effect to these resources. The resources that would not have appreciable cumulative effects include: geology, soils, topography, water resources, wildlife, historic structures, cultural landscapes, paleontological resources, land use, zoning, demographics, environmental justice, economics and development, joint development, aesthetics and visual quality, health and safety, community resources, utilities, Indian Trust resources, Sacred Sites, pedestrian and bicycle network, transit, air quality, noise, hazardous waste and energy conservation.

Past, present, and future representative projects that would have the potential to add to cumulative effects are described below. Cumulative effects are considered for all alternatives and are presented in this section for each resource topic. Indirect impacts are identified in the impact analysis under each resource topic when applicable.

4.7.1 Past Actions

I-295 Ramp Interchange Improvements

As part of the ongoing 11th Street Bridges project, approximately one mile from the Study Area, a new ramp from the 11th Street Bridge to I-295 North opened in the summer of 2012. Prior to the opening of this interchange, drivers trying to reach I-295 Northbound had to get off at the Southeast Freeway, merge onto Pennsylvania Avenue headed southbound, travel under the Sousa Bridge and make a left turn just prior to Fairlawn Avenue, SE and onto the I-295 Northbound ramp.

4.7.2 Current or Future Actions

Pennsylvania Avenue, SE Great Streets Initiative

Pennsylvania Avenue, SE Great Streets Initiative is a multiple agency effort in the District to transform this corridor into thriving and inviting neighborhood center using public actions and tools as needed to leverage private investment. With planning and financial involvement from DDOT, DMPED and D.C. Office of Planning, over $200 million is being invested in new mixed use development projects, storefront improvements, transportation, streetscape, and transit improvements along these corridors. Neighborhood economic development projects that include quality local and national retailers are ongoing along the Pennsylvania Avenue, SE corridor. Redevelopment of key sites along the corridor are being planned and implemented.

2300 Block of Pennsylvania Avenue, SE

DMPED has plans to facilitate development along the 2300 Block of Pennsylvania Avenue, SE. This block is within the project Study Area and is located immediately west of Twining Square. The District aims to help implement the goals of the Great Streets Initiative by redeveloping this key corridor to eliminate blight, provide quality neighborhood-serving retail and potential job creation. DMPED has

already acquired 2337 Pennsylvania Avenue, SE.[81] The next steps in development will be to negotiate with private land owners on the 2300 Block in order to develop the properties.

Pennsylvania and Potomac Avenues, SE Intersection Improvements

As part of the District's AWI Program, DDOT is conducting an EA for proposed improvements at the Pennsylvania and Potomac Avenues, SE intersection to enhance safety at these street intersections for neighborhood pedestrians and transit users of the Potomac Avenue Metrorail Station and the numerous area bus stops. This project was originally proposed in the 2005 Middle Anacostia Crossings (MAC) Transportation Study as a mid-term improvement for enhancing the transportation network in the Middle Anacostia River region. The Pennsylvania and Potomac Avenues intersection is located approximately one mile west of the Study Area.

The current configuration of the six-legged intersection has multiple crosswalk locations making crosswalk signal timing challenging. Despite the numerous crosswalk locations, pedestrians traverse the intersection through the grassed median owned by the NPS. Proposed intersection changes will seek to reduce the number of pedestrian and vehicle conflict points and provide safer, more direct routes for the pedestrian and transit users. Concepts for the Pennsylvania and Potomac Avenue Intersection Project will focus on pedestrian safety for residents and multi-modal transit users. The EA is anticipated to be completed by the end of 2013.[82]

Barney Circle and Southeast Boulevard Transportation Planning Study

Also part of the AWI Program, DDOT is conducting an EA for proposed improvements at Barney Circle-Southeast Boulevard to evaluate updated concept alternatives that were previously developed in the 2005 MAC Transportation Study and is including new alternatives for the project to ensure that pedestrian safety and multi-modal transportation needs are included, as well as new or planned residential and economic development within the surrounding AWI Program area.

Located less than a mile west of the Study Area and across the Anacostia River, Barney Circle is located at the west end of the John Philip Sousa Bridge where the SE/SW Freeway, Pennsylvania Avenue, SE and various local neighborhood streets converge. Originally designed as part of the future Interstate 295 extension across the Anacostia River, linking DC 295 to the Southeast Freeway (I-695) and I-395, Barney Circle does not function as a true traffic circle or serve all traffic movements and has become a barrier to the Anacostia waterfront. Several alternatives are being considered at Barney Circle that would provide for the necessary movements to enable it to function as a true traffic circle and improve mobility and accessibility for the surrounding community. Concepts for the Barney Circle Project will involve transforming the former Southeast Expressway interstate roadway into a boulevard with plantings and streetscape amenities integrated with the adjacent neighborhoods between the new 11th Street bridges and Barney Circle. The EA is anticipated to be completed by the end of 2013.[83]

D.C. Streetcar

Planning and construction is underway for a D.C. Streetcar System in the District. The D.C. Streetcar is intended to connect neighborhoods, reduce short inter-city auto trips, parking demand, traffic congestion, air pollution, and encourage economic development and affordable housing options along the Streetcar corridors. Three phases are ultimately planned that will one day span all eight District Wards. Active

planning and construction is underway for the first 22 miles of an ultimate 37-Mile Streetcar System.[84] According to the *DC's Transit Future System Plan*, Minnesota Avenue, SE in the vicinity of the Study Area is included in Phase 3 of the D.C. Streetcar program. The Study Area is along the Streetcar Line proposed to run from Bolling Air Force Base (AFB) to the Benning Road area.[85] The current planned route would be an extension to the Anacostia Initial Line Segment (under construction), and would travel along Minnesota Avenue (heading north-south) and cross Pennsylvania Avenue, SE in the Study Area. D.C. Streetcar in this area would connect neighborhoods to Minnesota Avenue/Benning Road, Twining Square, and Historic Anacostia commercial nodes. It would also connect to the AWI redevelopment areas and connect economically distressed neighborhoods not well served by Metro to the Minnesota Avenue Metro Station.

Currently, Phase 2 of roadway construction along H Street/Benning Road is underway. About 80 percent of the work to make H Street/Benning streetcar-ready was completed during Phase 1 in 2011, during the Great Streets roadway reconstruction project. The H Street/Benning corridor anticipates being ready for the arrival of streetcars in Fall 2013.[86] Long range planning is ongoing for Phase 3 with a broad, 30-year Streetcar vision for the completion of the entire 37-mile system. DDOT has not provided a specific date for the implementation of Phase 3 in the vicinity of Study Area.

4.7.3 Cumulative Effects

Cumulative Effects Analysis for Road Network and Traffic

The Build Alternatives for the Pennsylvania and Minnesota Avenues, SE Intersection Improvements Project would result in minor adverse impacts compared to the No Build Alternative in the long term (2040). Compared to the No Build Alternative, the Build Alternatives would cause longer queues on Pennsylvania at Minnesota Avenues, SE in the peak travel direction during AM and PM peak hours, and would increase travel times on most vehicular trips by 2040.

The addition of the I-295 Northbound ramp connection from the 11th Street Bridge likely reduces some of the traffic on Pennsylvania Avenue, SE traveling southbound. Although the improvements are not in the Study Area, and the intersection previously affected where motorists turned left to access the I-295 Northbound ramp, spillover (indirect) effects from this traffic likely contributed to traffic congestion and illegal traffic movements in the Study Area. With the new access to I-295 Northbound from the 11th Street Bridge, cumulative effects due to the Build Alternatives would be negligible.

Development in the Study Area due to Great Streets Initiative development and the District's redevelopment plans would not be negatively impacted by the minor impacts to the roadway network due to the Build Alternatives. In fact, the Proposed Action is intended to contribute to the "place-making" ability of the Study Area and the Pennsylvania Avenue, SE corridor, in keeping with the Great Streets Initiative and the District's revitalization plans.

Alternatives development and environmental documentation are currently underway for proposed improvements at both Barney Circle and the Pennsylvania and Potomac Avenues, SE intersection. Both of these projects include roadway improvements that may impact traffic operations in the immediate vicinity of those projects. Both of these AWI projects are approximately one mile west of the Study Area along Pennsylvania Avenue and are across the Anacostia River from the Proposed Action. Neither Build Alternative is expected to result in impacts to the road network or traffic across the bridge. Queuing

analysis results are not estimated to be greater than approximately 0.30 miles in any direction from the Study Area as a result of either of the Build Alternatives in the future design year (2040). Therefore, cumulative effects due to the Build Alternatives are anticipated to be negligible.

To the extent possible, the D.C. Streetcar phasing plans are designed to coordinate with the construction of streetcar facilities with planned roadway and development projects located along the planned lines. The conceptual design of the Build Alternatives would not preclude the implementation of a Streetcar line traveling through the intersection along Minnesota Avenue. The Minnesota Avenue roadway width in the Study Area would not be reduced compared to existing conditions and the No Build Alternative. Implementation of the D.C. Streetcar in the Study Area would encourage public transit use and could ultimately lead to fewer vehicles using the intersection which could help to reduce queue lengths and travel times.

Overall the impacts to the Road Network and Traffic would be minor as described in the impact analysis in Section 4.4.2. From a regional context, the incremental impact to traffic and the roadway network in 2040 due to the Build Alternatives would be negligible and would not cause the cumulative impact to be significant.

Cumulative Effects Analysis for Archaeological Resources

Due to the fact that the southern NPS reservation in the Study Area is considered a zone of high potential for archaeological resources, a Phase IB/II testing of this small area is recommended prior to final design decisions and construction of either of the Build Alternatives. Given that the area where the potential to recover historic or prehistoric archaeological resources exists is limited to the southern reservation (approximately 0.06 acres), the past, present and foreseeable actions, when combined with the Build Alternatives, are not expected to cumulatively effect archaeological resources.

4.8 Mitigation Measures

Mitigation measures are presented as part of the Proposed Action and have been developed to lessen the effects. The following mitigation measures are recommended for implementing the Preferred Alternative:

Soils

Erosion and sediment control plans would be prepared in accordance with DDOE Standards and Specifications for Soil Erosion and Sediment Control and implemented during construction of the reconfigured intersection. The plans would include project-specific measures to avoid and/or minimize soil erosion and transport due to ground-disturbing activities, including potential vegetation clearing and minimal grading. BMPs would be used during construction, to include practices such as stabilized construction entrances, silt fences, temporary sediment traps and filtering devices and earth dikes. Use of BMPs would be detailed in the approved erosion and sediment control plans.

Water Resources

Similar to the soil mitigation plan, implementation of erosion and sediment control practices would help to avoid temporary impacts to water quality during construction. BMPs such as silt fence and sediment trapping or filtering will lessen the impacts of sediment transport that degrades water quality during

stormwater runoff periods. Stormwater management plans would also be prepared to address long-term runoff and pollutant discharge into the Anacostia River watershed.

Wildlife

The Study Area likely supports a limited population of birds, small mammals, reptiles and amphibians. Wildlife found in the Study Area are those that are able to adapt to the urban landscape. However, BMPs would be used to mitigate any potential impacts to wildlife. The tree canopy in the Study Area would be preserved and enhanced wherever possible to protect habitat for local wildlife. Erosion and sediment control plans would minimize potential impacts to water quality and thus protect impacts to aquatic habitat within the watershed.

Vegetation

Measures would be implemented, to the extent practical, to avoid impacts to larger or older tree specimens both inside and outside of the existing DDOT right-of-way. Applying LID principles to the development, the existing tree canopy in the Study Area would be preserved and enhanced wherever possible. Landscaping and replacement of trees will be conducted in accordance with the DDOT Design and Engineering Manual. New trees and vegetation would be planted in appropriate locations to maintain and enhance the tree canopy along the project corridor. Protection to tree specimens may include installation of tree protection fencing at the outer drop line of trees to be saved, staging construction equipment to avoid damage to trees and their root systems, and avoiding collision of construction equipment with trees and vegetation.

Landscaping at the project site would fulfill functional and aesthetic requirements along with those mandated by DDOT policy and Federal regulations, in coordination with NPS. Landscape plans would be developed in accordance with the NPS and DDOT's Urban Forestry Administration. Landscape plans may include planting, grading, erosion control and irrigation systems.

In addition, landscaping would be utilized where possible to improve storm water management features by following the concept of LID. Following development, the landscape would be monitored and maintained to ensure successful establishment.

Cultural Resources

If during construction, archaeological resources are discovered, all work in the immediate vicinity of the discovery would be halted until the resources can be identified and documented and an appropriate mitigation strategy developed. If necessary, consultation with the DC SHPO, NPS, and/or the NPS Regional Archeologist will be coordinated to ensure that the protection of resources are addressed. In the unlikely event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (25 USC 3001) of 1990 would be followed.

Parkland

Users of the intersection parkland would be notified of construction-related closures or changes in traffic patterns. DDOT would use public notification techniques such as posting information on the DDOT and

NPS websites to notify residents, merchants and users of the transit and commercial establishments at the intersection of detours or any other restrictions at the intersection.

Aesthetic and Visual Quality

All landscaping and site amenities would consider aesthetics. Landscape plans would be developed in coordination with the NPS and DDOT's Urban Forestry Administration and Landscaping plans and other proposed aesthetic treatments would be submitted to the DC Commission of Fine Arts (CFA), NCPC, and NPS for review and comment.

Health and Safety

During construction, active construction areas of the project site would be closed to pedestrians by using signage and fences. When necessary, areas of the construction site may also be closed off to cars which will be re-routed through or around the intersection. After construction, the intersection would be maintained in order to provide enhanced safety for pedestrians, bicyclists and vehicles using the intersection. Maintenance activities that would ensure protection of the public using the intersection include removing snow and ice during winter months, sealing cracks and filling potholes that may be hazardous to motorists and bicyclists, and policing the area to deter any illegal activities. New pavement markings and signage would be utilized as needed for motorists and pedestrians using the intersection.

Community Resources

DDOT would coordinate with the local emergency services before construction with regards to access through the project intersection during periods of construction and how the ultimate intersection design may affect emergency responders.

Utilities and Infrastructure

DDOT would consult with all utility companies to determine if and how utility poles and other above-ground utilities in the Study Area would be impacted during construction or with project implementation. Care would be taken during construction activities so as to avoid all underground utilities. This would be done through consultations with each of the respective utilities early in design to determine exactly where, and to what depth the utilities are buried. These areas would then be marked off and carefully excavated to ensure the utilities are not accidentally damaged during construction of the trail. Utilities that are determined to be damaged would be repaired prior to the construction of the intersection.

Bicycle and Pedestrian Network

Active construction areas of the project site would be closed to pedestrians and bicyclists by using signage and fencing. Signage will be provided to indicate alternate routes and detours to be used when walkways, paths, or street crossings are blocked.

Roadway Network and Traffic

Plans to maintain traffic during construction will be developed to minimize impacts to local traffic. Work schedules for construction may be adjusted to minimize impacts during peak traffic volumes. Active construction areas of the project site would be closed to motorists by using signage and blockades. Signage will be provided to indicate alternate routes and detours to be used during any road closures.

Additionally, DDOT would use public notification techniques such as posting information on the DDOT website to notify residents, commuters, merchants, etc. of temporary roadway closures or any other restrictions at the intersection.

The following maintenance of traffic (MOT) assumptions are anticipated:

- Maintain three lanes of traffic in each direction on Pennsylvania Avenue through the project area;
- Maintain two lanes of traffic in each direction on Minnesota Avenue through the project area;
- Maintain all turning movements during all phases of project construction (note, temporary, short-duration lane closures are anticipated during construction);
- Maintain pedestrian and bicycle access through the project area;
- Maintain full access to bus stops, businesses and residences during construction, and;
- Minimize impacts to the local community during construction.

MOT plans are included in *Appendix F, Traffic Analysis Report*. MOT plans were developed for Build Alternative 1 only; however the MOT for Build Alternative 2 would be comparable as they both has the same number of phases.

Transit

DDOT would continue to coordinate with WMATA during design and construction to avoid impacts to WMATA's facilities, maintain access, and allow for future access.

Air Quality

Particulate emissions during the two anticipated construction seasons, whether from construction equipment diesel exhaust or dust from the construction activities, should be controlled as well as possible. Contractors will follow all DDOT Standard Construction Specification sections that address the control of construction equipment exhaust or dust during construction. Even though construction mitigation measures are not required, there are several measures that could be considered to reduce engine activity or reduce emissions per unit of operating time. Operational agreements that reduce or redirect work or shift times to avoid community exposures can have positive benefits. Also, technological adjustments to construction equipment, such as off-road dump trucks and bulldozers, could be an appropriate strategy. The EPA recommends Best Available Diesel Retrofit Control Technology (BACT) to reduce diesel emissions. Typically, BACT requirements can be met through the retrofit of all diesel powered equipment with diesel oxidation catalysts or diesel particulate filters, and other devices that provide an after-treatment of exhaust emissions.

Noise

Within the framework of DDOT's criteria, various methods were reviewed to mitigate the noise impact of the proposed improvements. Among those considered were traffic management measures (reduction of speed limits, restriction of truck traffic to specific times of the day, a total prohibition of trucks), alteration of horizontal and vertical alignments, acquisition of real property or interests therein to serve as a buffer zone to preempt development which would be adversely impacted by traffic noise, and noise insulation of

Activity Category D land use facilities listed in Table 3.11, the construction of berms, and the construction of noise barriers.

Reductions of speed limits, although acoustically beneficial, are seldom practical unless the design speed of the proposed roadway is also reduced. Restriction or prohibition of trucks is counter to the project purpose and need. Design criteria, recommended termini and the preliminary design process leading to the preferred alternative preclude substantial horizontal and vertical alignment shifts that would produce noticeable changes in the projected acoustical environment. Acquisition of undeveloped property for buffer zones is typically neither feasible nor reasonable due to the amount of land needed to create an acoustically effective buffer zone and the desire to keep as much land as possible in the local community's tax base. There are no Activity Category D land use facilities that approach or exceed the NAC, so noise insulation was not considered.

A noise berm or barrier must be long enough and tall enough to minimize the noise coming over the top or around the ends of the barrier, such that the noise barrier, according to DDOT's Noise Policy, dated April 5, 2011, provides at least a 5 dB(A) reduction at impacted receptors to be considered feasible. In addition, the noise barrier or berm cannot restrict pedestrian or vehicular access for the mitigation to be considered feasible. The berm or barrier cannot have any holes in the barrier which would seriously degrade the noise reduction capability of the berm or barrier. The construction of noise berms along this project would not be feasible due to the limited space between the traffic and the receptors. Temporary noise impacts would be minimized during construction, however, by utilizing BMPs, as necessary, to meet the requirements of the Washington, DC Noise Control Act.

There is limited space to construct noise barriers between the traffic and receptors. However, all the receptors have access to a parking lane in front of the residences; see Figures 3-15 and 3-16. The length of the barriers would be limited by line of sight requirements at intersections. Providing pedestrian access from the residences to the parked cars would create a number of holes in each noise barrier. Therefore, it is not feasible to construct a noise barrier that would provide a 5 dB(A) reduction for the residences abutting the local streets throughout the project area.

Furthermore, *DDOT Noise Policy* states, "In order for a noise abatement option to be selected, it must be both feasible and reasonable."[87] As explained above, the proposed project does not meet the criteria for traffic noise mitigation feasibility. Additionally, in determining "reasonableness," for a noise abatement technique to be considered reasonable, all of the criteria must be met. Specifically, the proposed project does not meet Reasonableness criteria #5 in the *DDOT Noise Policy*: "Future traffic noise levels are all less than 75 dBA and less than 10 dBA higher than existing traffic noise levels."[88] None of the future (2040) alternatives exceed 75 dBA, nor do any of the alternatives cause the noise levels to increase 10 dBA compared to existing conditions.

4.9 Permits and Authorizations

- The transfer of land jurisdiction between NPS and DDOT is subject to additional review and approval by the National Capital Planning Commission and the D.C. Council. In accordance with United States Code (USC) Title 40 Section 8124(a), any transfer of jurisdiction of lands between the NPS and DDOT is subject to the review and recommendation of the NCPC, and authorization of the D.C. Council. 40 USC 8124(a) and D.C. Code 10-111 – Transfer of Jurisdiction states the following:

Federal and District of Columbia authorities administering properties in the District that are owned by the Federal Government or by the District may transfer jurisdiction over any part of the property among or between themselves for purposes of administration and maintenance under conditions the parties agree on. The National Capital Planning Commission shall recommend the transfer before it is completed.

- Preliminary correspondence from the U.S. Fish and Wildlife Service (FWS) was received on August 1, 2012 that confirmed that there are no listed species identified for the vicinity of the project. Due to the location of the Study Area and the associated USGS topographic map, official online certification was received that states, "that except for occasional transient individuals, no federally proposed or listed endangered or threatened species are known to exist within the project area. Therefore, no Biological Assessment or further Section 7 consultation with the FWS is required. Should project plans change, or if additional information on the distribution of listed or proposed species becomes available, this determination may be reconsidered.
- Section 106 of the National Historic Preservation Act (NHPA) (16 U.S.C. 470) sets forth the procedures for compliance with the NHPA. This created the President's ACHP to review and comment upon activities sponsored or licensed by the Federal Government, that may have an effect on resources listed or eligible for listing on the NRHP. Compliance through Section 106 involves a demarcation of area to be effected and may include surveys to ascertain the presence of artifacts that are eligible for NRHP listing. The DC SHPO issued a finding of *Conditional* No Adverse Effect for this undertaking, subject to conditions (Refer to *Appendix E* for the *DC SHPO Section 106 Review Form*).
- A NPS Special Use Permit was required for DDOT and its contractors to perform work on NPS property for the geoarchaeological soil borings conducted in November of 2012 to gain access to the northern and southern reservations in the Study Area/APE (signed copy of permit is included in *Appendix E, Cultural Resources*). A Special Use Permit authorizes work on NPS property and outlines conditions for which work can be performed on NPS property. The requirements for Special Use Permits and required applications are found in Director's Order 53 Special Park Uses at http://www.nps.gov/policy/DO-53draft.htm.
- Upon coordination with the DC SHPO, Phase I archaeological investigation may be needed in the Study Area. This work would require an Archaeological Resources Protection Act (ARPA) Permit for conducting archeological fieldwork on federal lands. An ARPA permit is issued under the authority of the Archaeological Resources Protection Act of 1979 (16 U.S.C. 470aa-mm; 43 CFR 7) and The Antiquities Act of 1906 (P.L. 59-209; 34 Stat. 225; 16 U.S.C. 431-433; 43 CFR 3). Issuance and use of an ARPA permit with the NPS is described in Director's Order 28A: Archeology.

4.10 Section 6(f) – Land and Water Conservation Act of 1965

The Land and Water Conservation Fund (LWCF) Program was established by the Federal government in 1965 to increase the net quantity of public, outdoor recreational space. Section 6(f) of this Act provides matching funds to states or municipalities for planning, improvements, or acquisition of outdoor recreational lands. Any property that was planned, purchased, or improved with LWCF money is

considered 6(f) property. No 6(f) properties exist at the project intersection, and therefore no Section 6(f) analysis or mitigation is required.

4.11 Irreversible and Irretrievable Commitment of Resources

Reconfiguration of the project intersection would involve the irreversible and irretrievable commitment of resources. Some of these resources include land, construction materials and manpower. Land within the right-of-way used for the construction of the reconfigured intersection is considered an irretrievable resource, however, the improvements are all within DDOT and NPS right-of-way (and presumably within all DDOT right-of-way once a transfer of land jurisdiction is approved), and DDOT as part of this project would continue to maintain the right-of-way for transportation purposes. Construction at the intersection would require that some existing infrastructure be either removed or relocated, which would also involve the commitment of resources. In the future, if a greater need for the land is identified, or if the transportation corridor is no longer necessary, it would be possible to convert the property to another use. It is not likely, however, that either of these situations would occur.

Construction of the reconfigured intersection would require the use of fossil fuels for construction vehicles, construction equipment, and construction personnel vehicles. Electrical energy would also be used onsite to power maintenance trailers (if applicable) and other equipment. Fossil fuels and electrical energy would be expended to manufacture the materials and products associated with development of the reconfigured intersection. In addition to those materials already mentioned, other materials such as asphalt, sand, aggregate, and steel would be used. These resources are not retrievable; however, the proposed project would not have an adverse effect on their continued availability. In order to minimize the usage of these resources, DDOT would consider ways to minimize resource commitments by reusing materials or by using recycled materials when possible, to construct the reconfigured intersection.

The current alignment of Pennsylvania Avenue, SE at the project site has been used as a transportation corridor since at least the 1860s. Reconfiguring the intersection would require the commitment of additional land, previously under NPS ownership, to be transferred to DDOT. However, the land exchange would not be considered an irreversible commitment of resources and would ultimately benefit the community. With the exception of this land transfer, the proposed intersection would remain within the existing transportation right-of-way. The reconfigured intersection could result in a minor loss of vegetation during construction activities, but would not affect wildlife habitat or special status species and the movement of wildlife. Land used for the intersection is considered an irreversible commitment during the time it is used for a transportation corridor and as a right-of way for several utilities. Alteration of the landscape by the proposed intersection would also be considered an irreversible change, however the urban environment in the vicinity of the intersection is not stagnant and is also subject to changes due to the fact that the commercial businesses and residences have private property owners. Additionally, the NPS owned land in the project intersection is currently not utilized as parkland. Long-term maintenance costs for the parkland would also be considered irretrievable.

The commitment of these resources is established on the premise that the local and regional residents, commuters, and business communities would benefit from the proposed reconfigured intersection. The reconfigured intersection would be beneficial to the local community by improving safety for pedestrians, bicyclists, motorists and public transit users, by enhancing mobility and connectivity in the area, and by enhancing the visual quality and aesthetics in the vicinity of the intersection. These long-term benefits are anticipated to outweigh the above-listed natural and fiscal resources.

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5.0 SECTION 4(f) EVALUATION AND APPROVAL FOR TRANSPORTATION PROJECTS THAT HAVE A NET BENEFIT TO A SECTION 4(f) PROPERTY

This section identifies the resource within the Pennsylvania and Minnesota Avenues, SE Intersection Improvements Project Study Area that qualifies for consideration under Section 4(f). The Section 4(f) resource in the Study Area consists of publicly owned National Park Service (NPS) land (U.S. Reservation 487/Twining Square). There are no recreation areas, wildlife or waterfowl refuges, or historic sites in the Study Area. The important details of the Section 4(f) resource are discussed in this evaluation as it relates to impacts, minimization of impacts, or the net benefit analysis.

5.1 Section 4(f) Historic Resources

Cultural resources listed on or eligible to be listed on the NRHP and located within the APE-Direct and APE-Indirect were identified and evaluated as part of completing the Pennsylvania and Minnesota Avenues, SE Intersection Improvement Project Environmental Assessment (EA). Section 4(f) stipulates that in order for a historic site to be granted protection, it must be considered significant. The Section 106 process is the method by which a historic site's significance is determined.[89]

Through research and coordination with the DC SHPO, it was determined that three buildings in the APE-Indirect are considered eligible for the National Register of Historic Places (NRHP) for purposes of compliance with Section 106 of the National Historic Preservation Act (NHPA) for this project. These properties include the Morton's Department Store Building at 2324 Pennsylvania Avenue, SE; the Highland Theater Building at 2523 Pennsylvania Avenue, SE; and the Little Tavern Building at 2537 Pennsylvania Avenue, SE. The Little Tavern Building was demolished in 2012 and there are currently no buildings or structures that occupy the lot. Figure 3-4 provides the locations of these structures within the APE-Indirect. See *Appendix E* for a description and photographs of the historic structures.

The DC SHPO reviewed the Proposed Action in accordance with Section 106 of the NHPA and issued a finding of *Conditional* No Adverse Effect for this undertaking with the following condition to be fulfilled regarding the historic built environment:

- The alternative selected is the Revised Square Alternative [referred to by its former name, the Modified Square Alternative], which most closely reestablishes the original configuration of the streets and reservations.

According to the DC SHPO, "Reestablishment of the square as it was originally planned when the streets were laid out is most compatible historically and would not constitute an adverse effect on the built environment." Additionally, continued consultation with the SHPO on the project is requested if there are any changes to the project footprint as the designs are finalized. Refer to *Appendix E* for the *DC SHPO Section 106 Review Form*, dated April 17, 2013.

5.2 Project Description

The Pennsylvania and Minnesota Avenues, SE Intersection Improvements EA proposes improvements at the confusing and complex intersection in order to enhance the safety, mobility and connectivity for

pedestrians and motorists. As shown on Figure 1-2 in *Section 1, Purpose and Need*, the current intersection configuration is dominated by busy lanes of traffic, rendering pedestrian circulation both difficult and dangerous. The project intersection is located on a major commuter route, Pennsylvania Avenue, SE, in an urban environment, at its crossing with the local travel route of Minnesota Avenue, SE. The project intersection carries traffic to and from the bridges that cross the Anacostia River, as well as Minnesota Avenue, SE.

This project was originally conceived as part of the *Great Streets Design Final Report*, which was developed as part of the District's Great Streets Initiative. The Great Streets Initiative was kicked off in 2005 as a multi-agency program that strategically uses public investments to improve local quality of life and attract private investments to communities in the District. Several corridors were chosen to be a part of the Great Streets Initiative, including Pennsylvania Avenue, SE.

The Study Area is located at the western end of the Pennsylvania Avenue Great Streets corridor at the intersection of Pennsylvania Avenue, SE and Minnesota Avenue, SE. The intersection includes NPS property, U.S. Reservation 487 (Twining Square), which consists of four small park parcels and the adjacent roadway medians, totaling approximately 1.4 acres. The roadways split the reservations into areas that effectively function as traffic islands for pedestrians crossing the street; the pieces of parkland are too small to function as true open space or green space as currently configured. Twining Square lacks aesthetic appeal and is underutilized urban space.

In order to implement the proposed improvements, a transfer of land jurisdiction from NPS to DDOT is necessary to facilitate reconfiguration of the roadway and U.S. Reservation 487. A transfer of land jurisdiction from NPS to DDOT may be agreed upon by covenant (with stipulations), following meetings and coordination between the agencies to facilitate the improvements. The NPS parcels are considered Section 4(f) properties and are therefore the subject of this Section 4(f) Evaluation.

5.3 Purpose and Need

The purpose of the Proposed Action is to provide transportation improvements to the Pennsylvania and Minnesota Avenues, SE intersection in keeping with the District of Columbia's Great Streets Initiative as set forth in the 2007 *Great Streets Framework Plan* and the 2007 *Revitalization of Pennsylvania Avenue, SE for the Great Streets Initiative Concepts Design Final Report (Great Streets Design Final Report)*. The project needs consist of the following:

- Improve pedestrian and vehicular safety;
- Create a consolidated, usable park space;
- Improve multimodal connectivity and access; and
- Support land use and community needs.

5.4 Proposed Action

Section 2, Proposed Action and Alternatives of the EA discusses the Proposed Action in detail. The Proposed Action includes a potential land transfer (or exchange) between NPS and DDOT in order to facilitate the reconfiguration of the Pennsylvania and Minnesota Avenues, SE intersection. The reconfiguration of the intersection is needed in order to improve safety and efficiency for all modes of

transportation, enhance quality of life for residents, commuters and visitors, and to attract private investment to the community.

5.5 Regulatory Requirements

Section 4(f) of the Department of Transportation Act of 1966, codified in federal law at 49 USC §303, declares that

> *[i]t is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites.*

Section 4(f) specifies that

> *[t]he Secretary [of Transportation] may approve a transportation program or project…requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance, or land of a historic site of national, State, or local significance (as determined by the Federal, State, or local officials having jurisdiction over the park, area, refuge, or site) only if:*
>
> *1. There is no prudent and feasible alternative to using that land; and*
>
> *2. The program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.*

In general, a Section 4(f) "use" occurs with a Department of Transportation–approved project or program when (23 CFR §771.135 [p][1] and [2]):

- Section 4(f) land is permanently incorporated into a transportation facility.
- There is a temporary occupancy of Section 4(f) land that is adverse in terms of the Section 4(f) preservationist purposes as defined by specified criteria (23 CFR §771.135[p][7]).
- Section 4(f) land is not incorporated into the transportation project, but the nearby impacts of the projects are so severe that the protected activities, features, or attributes that qualify a resource for protection under Section 4(f) are substantially impaired (constructive use).

5.5.1 Definition of the Net Benefits 4(f) Programmatic Evaluation

A nationwide programmatic Section 4(f) evaluation may be prepared for certain federally assisted transportation improvement projects on existing alignment that will use property of a Section 4(f) park, recreation area, wildlife or waterfowl refuge, or historic property, which in the view of the FHWA and official(s) with jurisdiction over the Section 4(f) property, the use of the Section 4(f) property will result in a net benefit to the Section 4(f) property. This programmatic evaluation can be applied to any project regardless of class of action under the National Environmental Policy Act. A "net benefit" is achieved when the transportation use, the measures to minimize harm, and the mitigation incorporated into the project results in an overall enhancement of the Section 4(f) property when compared to both the future do-nothing or avoidance alternatives and the present condition of the Section 4(f) property, considering the activities, features, and attributes that qualify the property for Section 4(f) protection. Conversely, a

project does not achieve a "net benefit" if it will result in a substantial diminishment of the function or value that made the property eligible for Section 4(f) protection.

5.5.2 Applicability of the Net Benefits 4(f) Programmatic Evaluation

The applicability criteria for a Net Benefits 4(f) Programmatic Evaluation include the following:

1. The proposed transportation project uses a Section 4(f) park, recreation area, wildlife or waterfowl refuge, or historic site.
2. The proposed project includes all appropriate measures to minimize harm and subsequent mitigation necessary to preserve and enhance those features and values of the property that originally qualified the property for Section 4(f) protection.
3. For historic properties, the project does not require the major alteration of the characteristics that qualify the property for the National Register of Historic Places (NRHP) such that the property would no longer retain sufficient integrity to be considered eligible for listing. For archeological properties, the project does not require the disturbance or removal of the archaeological resources that have been determined important for preservation in-place rather than for the information that can be obtained through data recovery. The determination of a major alteration or the importance to preserve in-place will be based on consultation consistent with 36 CFR part 800.
4. For historic properties, consistent with 36 CFR part 800, there must be agreement reached amongst the SHPO and/or THPO, as appropriate, the FHWA and the Applicant on measures to minimize harm when there is a use of Section 4(f) property. Such measures must be incorporated into the project.
5. The official(s) with jurisdiction over the Section 4(f) property agree in writing with the assessment of the impacts; the proposed measures to minimize harm; and the mitigation necessary to preserve, rehabilitate and enhance those features and values of the Section 4(f) property; and that such measures will result in a net benefit to the Section 4(f) property.
6. The Administration determines that the project facts match those set forth in the Applicability, Alternatives, Findings, Mitigation and Measures to Minimize Harm, Coordination, and Public Involvement sections of this programmatic evaluation.

Any project that satisfies these criteria may make use of the Net Benefits 4(f) Programmatic Evaluation and will not require the preparation of an individual Section 4(f) Evaluation.

5.6 Section 4(f) Properties

One Section 4(f) property, NPS-owned U.S. Reservation 487 (Twining Square) would be impacted by the Proposed Action if either of the Build Alternatives is selected.

5.6.1 U.S. Reservation 487 (Twining Square)

Public Park

U.S. Reservation 487 in the Study Area is one of the Capitol Hill Parks, a collection of 59 triangles and squares owned by the NPS.[90]

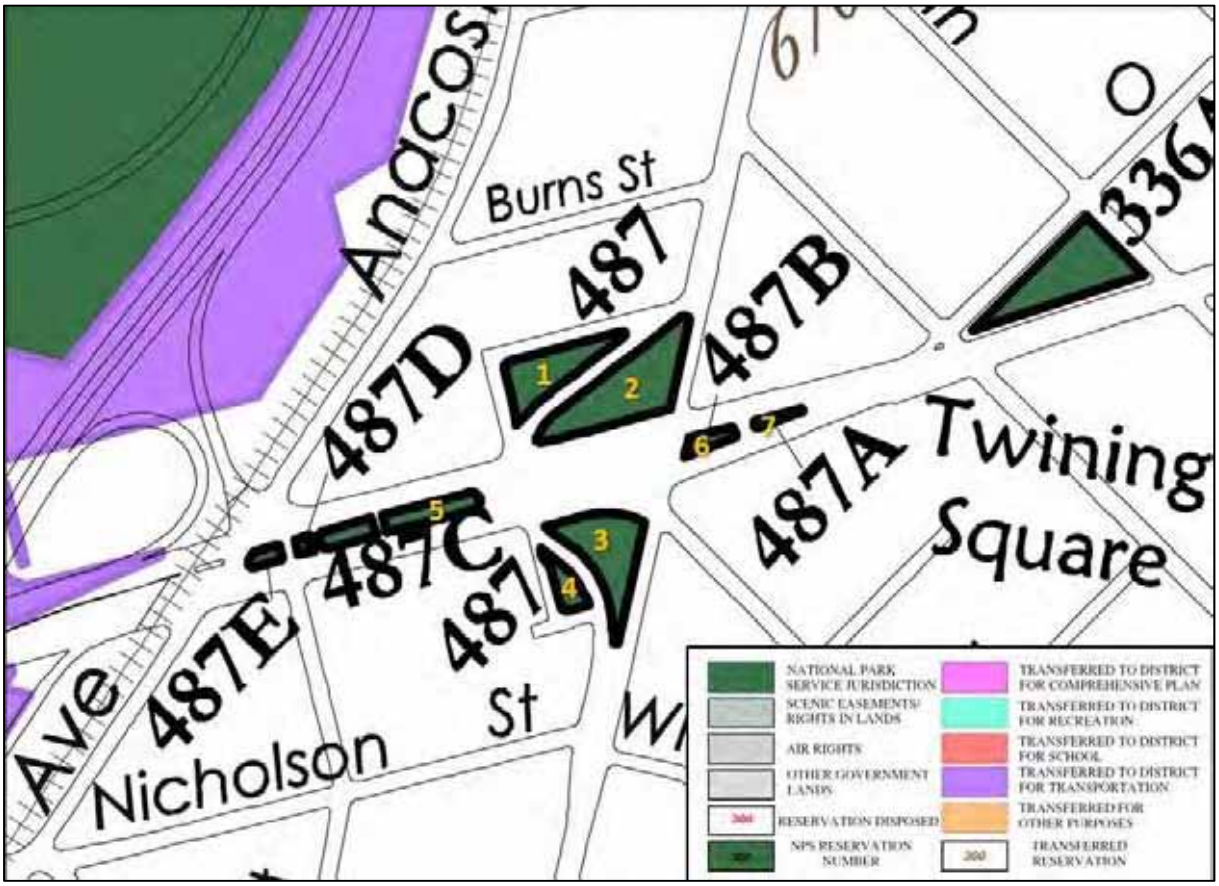
Many of the avenues and streets east of the Anacostia River, including Pennsylvania Avenue, did not exist as of the 1901 City of Washington Southeast Quadrant map. During the 1920s and early 1930s, Twining Square was known as L'Enfant Square. In 1929, the Office of Public Buildings and Public Parks of the National Capital assumed jurisdiction over Reservation 487 (Twining Square and the adjacent medians) at the intersection of Pennsylvania and Minnesota Avenues, SE via the March 29, 1929 request of the Commissioners of the District. In 1933, in accordance with the recommendation of the National Capital Park and Planning Commissions, U.S. Reservation 487 officially became "Twining Square" instead of "L'Enfant Square." The name Twining Square was selected to honor the first military member of the District Commissioners, Major William Johnson Twining who served from 1878-1882. The street along the northeast side of Twining Square is still known as L'Enfant Square, SE even though the park's name was officially changed to Twining Square in 1933. The neighborhood to the north of Pennsylvania Avenue at the intersection is referred to as "Twining." The park reservation has been modified since its development by bisection, and its area was reduced in the late 1940s and subsequently as Pennsylvania Avenue continued to expand. Refer to *Appendix E* for a more detailed history of the reservation.

U.S. Reservation 487 is not a significant historic resource, which has been confirmed through the Section 106 process. Although the reservation was previously known as L'Enfant Square, the reservation is not within the bounds of the L'Enfant Plan of the City of Washington, D.C., nor is it associated with the Fort Circle Parks. Although the reservation has history associated with it, through the Section 106 process, it has been confirmed that park is not historically "significant."

Due to the intersection configuration, the four park parcels of U.S. Reservation 487 (Twining Square) effectively function as traffic islands for pedestrians while crossing the street; the pieces of parkland are too small to function as true open space or green space as currently configured. The grassed medians that bisect the Pennsylvania Avenue, SE roadway in the Study Area to the east and west of the intersection are also NPS property and are considered part of U.S. Reservation 487. The medians are functional, as they separate opposing traffic along Pennsylvania Avenue, SE and serve as refuge areas for pedestrians crossing the street.

Figure 5-1 provides an illustration of the NPS reservations in the Study Area. Identification numbers 1, 2, 3 and 4 on the figure are identified as Reservation 487; the medians to the west and east of the intersection in the Study Area are identified as Reservation 487C (west of Twining Square) and Reservations 487A and 487B (east of Twining Square). **Table 5.1** provides the approximate acreages of each of the reservation parcels in table format, which equates to approximately 1.4 acres of NPS property (Section 4(f) property) in the Study Area that would be impacted by the Proposed Action. Note that acreages for Reservations 487D and 487E are not included, as they would not be impacted by the Proposed Action.

Figure 5-1
NPS Reservation Map



Source: National Park Service, 2008.

Table 5.1
Impacted U.S. Reservation 487 (Twining Square) Property Acreages

ID No. (Fig. 5-1)	NPS Reservation	Approx. Acres
1	487	0.27
2	487	0.49
3	487	0.34
4	487*	0.06
5	487C	0.18
6	487B*	0.04
7	487A*	0.02
Total NPS Acres (Approx.)		***1.4***

Note: Acreage calculations are preliminary and based on aerial photo and MicroStation estimating tools unless marked by an asterisk (*).
*Based on DDOT GIS data.

Source: HNTB Analysis, 2013.

5.7 Alternatives Considered

The project alternatives, including the No Build Alternative and two Build Alternatives, are described in detail in *Section 2, Proposed Action and Alternatives*, of the EA.

5.7.1 No Build Alternative

Consideration of the No Build Alternative is required by NEPA per CEQ Regulations. This alternative serves as a basis of comparison with other alternatives considered for detailed analysis. Under the No Build Alternative, no land jurisdiction exchange between NPS and DDOT would occur. The intersection would continue to function as it does today. Existing traffic patterns, crosswalks, signalization, and sidewalks would remain unimproved. See **Figure 5-2** for an illustration of the No Build Alternative with existing reservation and median acreages.

While the No Build Alternative does not meet the purpose and need of the Proposed Action, it provides a basis for comparing the environmental consequences of the Build Alternatives.

5.7.2 Build Alternative 1 – Revised Square Alternative

Detailed discussion of Build Alternative 1 is contained in Section 2.2.1 of the EA. Build Alternative 1 would improve the intersection to create a "traffic square" concept that would require all vehicles, with the exception of through-movements on Pennsylvania Avenue, SE, to go around the center "squares." The reconfigured intersection would include removal of the roadways which bisect the NPS-owned reservations on either side of Pennsylvania Avenue, SE and the consolidation of green space to the north and south of Pennsylvania Avenue.

Build Alternative 1 would require a jurisdictional land transfer from NPS to DDOT of approximately 1.4 acres to enable the proposed modifications to the intersection (See Table 5.1). Build Alternative 1 would consolidate the two park parcels to the north of Pennsylvania Avenue and the two park parcels to the south of Pennsylvania Avenue in order to provide more contiguous park area for residents and visitors to use as green space. Build Alternative 1 would result in two larger park areas to the north and south of Pennsylvania Avenue than exist today, consisting of approximately 1.5 acres total (one acre to the north of Pennsylvania Avenue and 0.5 acres to the south). The traffic medians to the east and west of the intersection currently owned by NPS would also transfer to DDOT in order to accommodate proposed improvements (approximately 0.2 acres); however the size, usability, and function of the medians will not noticeably differ from current conditions. **Figure 5-3** provides an illustration of Build Alternative 1-Revised Square Alternative with acreage calculations of the two contiguous park areas that would result from the proposed modifications.

Figure 5-2
Approximate Park Area Acreage (No Build Alternative)
Net Benefits Section 4(f) Programmatic Evaluation

Figure 5-3
Build Alternative 1 - Revised Square (Consolidated Park Area)
Net Benefits Section 4(f) Programmatic Evaluation

5.7.3 Build Alternative 2 – Conventional Intersection Alternative

Detailed discussion of Build Alternative 2 is contained in Section 2.2.2 of the EA. Build Alternative 2 would reconfigure the intersection into a typical at-grade intersection with all vehicle turning movements permitted for all approaches, with the exception of 25th Street, which would remain a one-way street going southbound. The reconfigured intersection would include removal of the roadways which bisect the NPS-owned reservations on either side of Pennsylvania Avenue, SE and the consolidation of green space to the north and south of Pennsylvania Avenue.

As with Build Alternative 1, Build Alternative 2 is expected to require a jurisdictional land transfer from NPS to DDOT of approximately 1.4 acres to enable the proposed modifications to the intersection (See Table 5.1). Build Alternative 2 would consolidate the two park parcels to the north of Pennsylvania Avenue and the two park parcels to the south of Pennsylvania Avenue in order to provide more contiguous park area. Build Alternative 2 maintains a priority for motorists through the intersection; however, it would result in two larger park areas to the north and south of Pennsylvania Avenue than exist today, consisting of approximately 1.4 acres total (one acre to the north of Pennsylvania Avenue and 0.4 acres to the south). The traffic medians to the east and west of the intersection currently owned by NPS would also transfer to DDOT in order to accommodate proposed improvements (approximately 0.2 acres); however, the size, usability, and function of the medians will not noticeably differ from current conditions. **Figure 5-4** provides an illustration of Build Alternative 2- Conventional Intersection Alternative with acreage calculations of the two contiguous park areas that would result from the proposed modifications.

5.7.4 Summary of Build Alternatives 1 and 2

Although the Build Alternatives are different operationally and from a visual standpoint, the changes to the park configuration would be similar. Both alternatives would remove the roadways that bisect the park area to the north and south of Pennsylvania Avenue, SE and replace them with green space that would consolidate the park area to the north of Pennsylvania Avenue and to the south of Pennsylvania Avenue, resulting in usable green space for the community.

Table 5.2 provides a summary of approximate park area acreage associated with the No Build and Build Alternatives.

5.8 Impacts on Section 4(f) Properties

The two Build Alternatives evaluated in the Pennsylvania and Minnesota Avenues, SE Intersection Improvements EA would both impact U.S. Reservation 487 (Twining Square) park land in the Study Area intersection. No other Section 4(f) resources would be affected by the Build Alternatives. A detailed discussion of environmental impacts due to the proposed improvements is discussed in *Section 4, Environmental Consequences.* A complete summary of impacts is provided in the *Executive Summary*, Table ES.1.

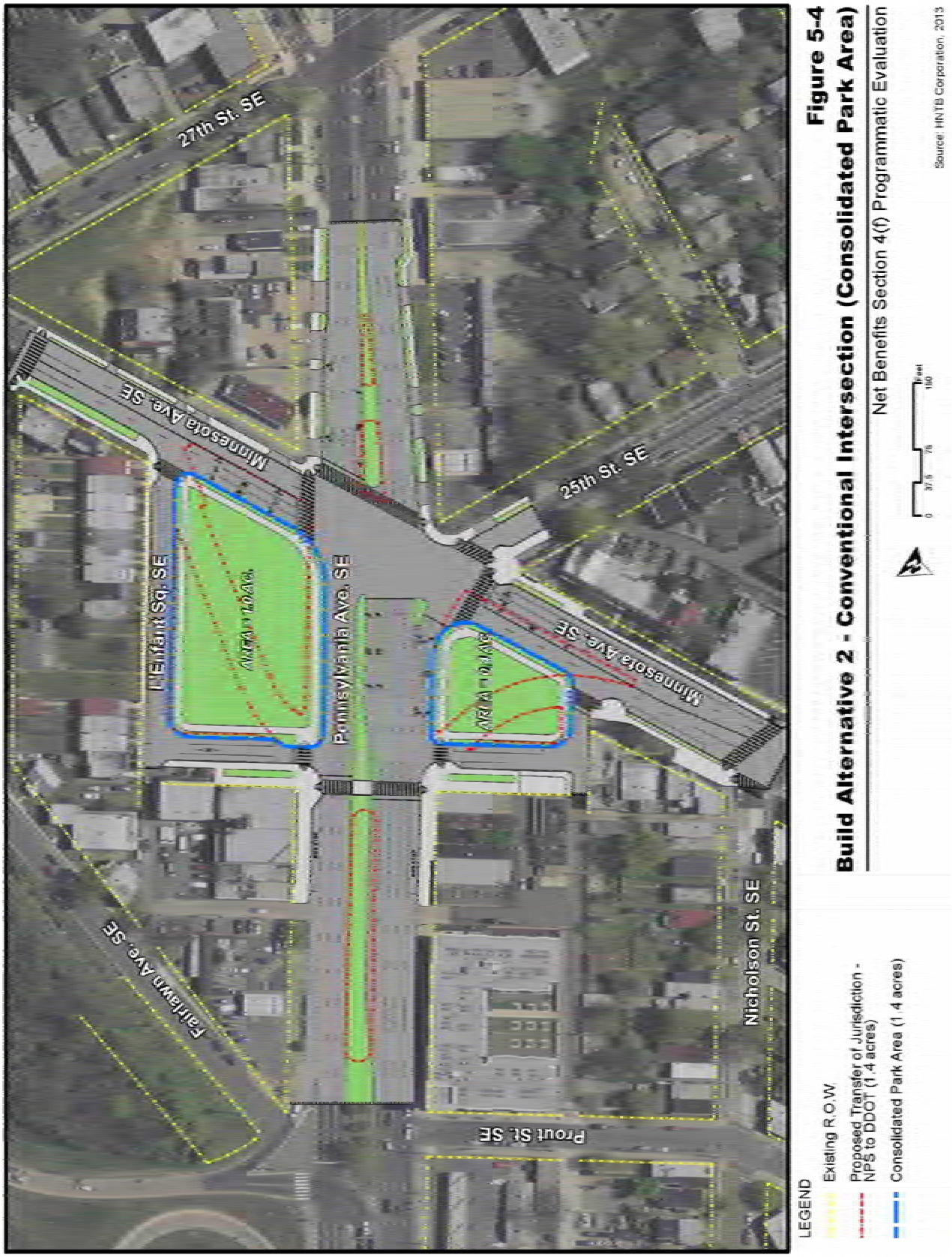


Figure 5-4
Build Alternative 2 - Conventional Intersection (Consolidated Park Area)
Net Benefits Section 4(f) Programmatic Evaluation

Table 5.2
Comparison of Park Acreage (Contiguous Park Area)

	No Build Alternative	Build Alternative 1	Build Alternative 2
North of Pennsylvania Ave. SE	0.8 (divided)	1.0	1.0
South of Pennsylvania Ave. SE	0.4 (divided)	0.5	0.4
Total Acres (approx.)*	***1.2 acres***	***1.5 acres***	***1.4 acres***

Note: Acreage calculations are preliminary and based on aerial photo and MicroStation estimating tools.

*Total acreage does not include the traffic medians to the west and east of the intersection or the grassed buffers in the Study Area.

Source: HNTB Analysis, 2013.

5.8.1 Build Alternative 1 – Revised Square Alternative

Soils

Under Build Alternative 1, there would be a minor net increase of green space compared to the No Build Alternative. The net increase in parkland would positively impact soils and geology in the Study Area as there would be an increase in usable soils. The majority of land within the Study Area has been previously graded and paved over from the construction and maintenance of the existing roadway at the intersection, and is expected to represent completely or partially disturbed soil sequences. The soil would support grass and other landscaping materials with Build Alternative 1 as the area does today.[91] Minimal grading and filling would be required as the area is generally flat and has limited elevation change. Adequate construction techniques would be adhered to so as to not increase the potential for soil erosion and loss of topsoil during construction. Therefore, Build Alternative 1 would have negligible long-term impacts to soils and would only present minor short-term adverse impacts resulting from soil erosion during construction. Based on the analysis summarized above, the impacts to soil do not meet the CEQ criteria for either context or intensity; therefore these impacts do not rise to a level of "significance" as defined by CEQ.

Water Resources

Groundwater

Impacts to groundwater recharge are unlikely. The net increase in pervious surface would be beneficial to groundwater recharge; however, any short-term or long-term impacts to groundwater recharge are expected to be negligible due to the minimal increase in pervious surface (0.09 acres) compared to the No Build Alternative. Based on the analysis summarized above, impacts to groundwater do not meet the CEQ criteria for either context or intensity; therefore these impacts do not rise to a level of "significance" as defined by CEQ.

Water Quality

Build Alternative 1 would include the removal of existing roadways that bisect the Twining Square park land, as well as reconfiguration of the intersection. Minor short-term adverse impacts to water quality may result during construction due to soil disturbance and potential clearing of vegetation. BMPs would

be used during construction in accordance with DDOE and District standards to avoid increased soil erosion. This would help to prevent an increase in storm water runoff volume that could degrade water quality in the nearby tributaries and Anacostia River. The net increase in pervious surface (0.09 acres) under Build Alternative 1 would be beneficial to surface water; however, it is anticipated to have negligible impacts to surface water in the long term given the small change in storm water runoff volumes. Storm water quality requirements will be based on providing water quality improvements for the pavement areas within the project site. This requirement will be met using a variety of BMP facilities and LID strategies such as DDOT/DC Water quality control structures and other features. Therefore, long-term impacts to water quality are expected to be negligible. Impacts to water quality do not meet the CEQ criteria for either context or intensity; therefore these impacts do not rise to a level of "significance" as defined by CEQ.

Vegetation

The reconfiguration of the intersection would include the conversion of the roadways, which fragment the currently NPS-owned reservations, into green space. The existing street trees and vegetation would be preserved where possible. Pending final design, six or seven trees may be removed to accommodate additional roadway to the north of the square, and one to two trees may need to be removed due to the roadway configuration to the south of the square. Street trees line the roadway median to the west of the square; the proposed design of Build Alternative 1 may require removal of one or two trees near the intersection where the median width is reduced to accommodate a wider sidewalk and bus stop area across the street. Upon project implementation, DDOT would develop a landscape plan and provide the appropriate vegetation to replace any trees removed. Additionally, LID principles would be applied to the development and the existing tree canopy in the Study Area would be preserved and enhanced wherever possible to maximize pavement shading.

Although there is not a substantial amount of additional park area or vegetation being added under Build Alternative 1, the consolidation of the green space and potential for enhanced landscape design would result in minor long-term benefits under this Alternative. Changes to the intersection under Build Alternative 1would provide the opportunity to enhance the green space as usable park area for residents and visitors to this intersection. As discussed in *Section 4.8, Mitigation*, landscaping and replacement of trees will be conducted in accordance with the DDOT Design and Engineering Manual.

Short-term minor adverse impacts to vegetation may occur during construction as soils are disturbed and trees potentially impacted during the intersection development. BMPs would be used during construction to minimize soil erosion and impacts to vegetation. Given the analysis and use of BMPs, the impacts to vegetation do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

Cultural Resources

Historic Structures

The DC SHPO reviewed the Proposed Action in accordance with Section 106 of the NHPA and issued a finding of *Conditional* No Adverse Effect for this undertaking with associated conditions to be fulfilled regarding the historic built environment:

- The alternative selected is the Revised Square Alternative, which most closely reestablishes the original configuration of the streets and reservations.

According to the DC SHPO, "Reestablishment of the square as it was originally planned when the streets were laid out is most compatible historically and would not constitute an adverse effect on the built environment." Additionally, continued consultation with the SHPO on the project is requested if there are any changes to the project footprint as the designs are finalized. Refer to *Appendix E* for the *DC SHPO Section 106 Review Form*, dated April 17, 2013.

Given the conditions in the *Section 106 Review Form* for the historic built environment are followed, the effects on historic structures do not meet the CEQ criteria for either context or intensity, and would not rise to a level of "significance" as defined by CEQ.

Archaeological Resources

The DC SHPO has issued a finding of *Conditional* No Adverse Effect for this undertaking with the following conditions related to archaeological resources:

- Conduct Phase IB/II/ archaeological testing of an area within Res. 487 near geoarchaeological boring # 4 where an intact historic surface was identified at approximately 0.7 feet below ground surface (see Figure 3-5);
- Continued consultation with the SHPO on the project if there are any changes to the project footprint as the designs are finalized and for treatment of any NRHP eligible archaeological resources identified during Phase IB/II testing; and
- Completion of archaeological reporting requirements for the project following District and federal guidelines, curation of resulting collections, records, images, and geospatial data.

Given the conditions in the *Section 106 Review Form* for archaeology (also outlined above) are followed, the effects on archaeological resources would not rise to a level of "significance" as defined by CEQ. Refer to *Appendix E* for the *DC SHPO Section 106 Review Form*, dated April 17, 2013.

Cultural Landscapes

There are no significant cultural landscapes associated with the Study Area. However, any long-term effects to the general landscape in the vicinity of the intersection would be negligible. Any indirect effects, such as visual impacts to the landscape due to construction would be short-term and negligible with the use of BMPs. Based on the analysis summarized above, impacts to cultural landscapes do not meet the CEQ criteria for either context or intensity, and would not rise to a level of "significance" as defined by CEQ.

Land Use and Zoning

Build Alternative 1 is consistent with the District's planning documents, aligning with the *Great Streets Framework Plan – Pennsylvania Avenue, SE*, and the *Revitalization of Pennsylvania Avenue, SE for the Great Initiative Concept Design.* As a result of Build Alternative 1, the NPS land parcels (U.S. Reservation 487) would transfer to DDOT. This land transfer would facilitate the reconfiguration of the intersection to improve safety, mobility, and connectivity for pedestrians and motorists at the intersection

in keeping with the District's Great Streets Initiative. No private right-of-way would be impacted or acquired by the implementation of Build Alternative 1.

The land use and zoning in the Study Area would not change as a result of Build Alternative 1 and land use would only be temporarily affected during construction by road closures to reconfigure the intersection. The proposed intersection improvements would not affect any land use or zoning directly. However, Build Alternative 1 could indirectly affect future land use and zoning in the long term by functioning as a catalyst for redevelopment. As part of the Great Streets Initiative, improvements to this intersection would work toward the project mission to revitalize the District's Great Streets, which could ultimately lead to attracting new investment in the community. Indirect impacts to land use would be minor and beneficial given the potential to generate local changes in land use and economic activity. Land use impacts in the short term would be negligible during construction. No zoning impacts would occur in the short term. The impacts to land use and zoning do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ

Aesthetics and Visual Quality

Build Alternative 1 involves primarily changes at ground level and there are no significant views or vistas in the vicinity of the Study Area. It is anticipated that indirect visual effects/changes in view in the long term would be limited to those areas directly fronting the streets involved and from the traffic lanes of the roadway in the vicinity of the intersection. The only anticipated above ground element, the relocation and improvement of traffic control lights, represents a restricted visual change.

Build Alternative 1 is compatible with the existing environment and could potentially improve aesthetics and visual quality in the area in the long term. The project was designed to create a place of distinction in keeping with the goals of the Great Streets Improvement Project, and would provide more contiguous parkland and new roadway infrastructure. Therefore, impacts to aesthetic and visual quality in the immediate Study Area vicinity would be minor and beneficial in the long term as a result of Build Alternative 1.

Minor short-term adverse impacts to views may occur within the intersection during construction while the area is temporarily used as a construction site, but the impacts would be of limited duration. Therefore, the impact is minor in context and intensity and does not rise to a level of "significance" as defined by CEQ.

Community Resources

Parks and Recreation Areas

Under Build Alternative 1, the reconfigured intersection would include removal of the roadways which bisect the NPS-owned reservations on either side of Pennsylvania Avenue, SE. The result would be consolidated green space which would promote park area continuity. Under current conditions, the green space is fragmented and is not sufficient for recreational use by the community. Build Alternative 1 would benefit the community by providing more contiguous green space to be used as park space for passive recreational activity. In the long term, Build Alternative 1 would result in a minor beneficial impact to park operations and management in the local area because the Study Area would be less fragmented and easier to maintain for mowing and any other maintenance functions. Additionally the

new, larger areas of green space and reduced travel speeds around the "square" would improve visitors' ability to use the parks for activities.

Build Alternative 1 would include minor short-term adverse impacts to the park area during construction. The impacts would be limited to the period of construction. The impacts to parks and recreation areas do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

Transportation

Pedestrian and Bicycle Network

Pedestrian and bicycle safety were given high priority in Build Alternative 1 and vehicle-pedestrian conflicts were reduced as much as possible. Build Alternative 1would have the following pedestrian and bicyclist improvements (numbers correspond to Figure 4-1):

1. A new short crosswalk would be provided in the center of the square for pedestrians to cross Pennsylvania Avenue, SE;
2. Left turn movements from southbound L'Enfant Square, SE and northbound Minnesota Avenue, SE into the center of the square would be prohibited to eliminate conflicts between vehicles and crossing pedestrian;
3. The southbound right-turning vehicular traffic from L'Enfant Square, SE would be controlled by traffic signals to minimize the existing vehicle-pedestrian conflict;
4. New short crosswalks would replace the existing two-step crosswalks on northbound Minnesota Avenue, SE and southbound L'Enfant Square, SE to reduce the time walking in the street therefore enhance safety;
5. The expanded sidewalks at the southwest and northwest corners of Pennsylvania Avenue, SE and L'Enfant Square, SE would minimize the conflict between pedestrians waiting at the bus stop and bicyclists traveling on the sidewalk.
6. Sidewalks would be expanded along the north side of Pennsylvania Avenue, SE to the northeast of the intersection to maintain 10' shared use path for bicycle and pedestrian convenience to and through the intersection.

During construction, temporary disruption would occur to users of the intersection; however detour routes and alternate paths would be dedicated during this time. In general, the intersection would be improved with minimal disruption and ample mitigation to offset any negative effects; therefore, Build Alternative 1 would have negligible short-term impacts on the bicycle and pedestrian network.

In the long term, the Build Alternative 1 improvements would benefit the bicycle and pedestrian network in the Study Area due to geometry upgrades and traffic management measures, including new bulb-outs, sidewalk expansion, crosswalk configuration, traffic movement restrictions and traffic signalization. The improvements would also result in improved access to bus stops and other destinations at the intersection. Therefore, Build Alternative 1 would have moderate long-term beneficial impacts to the pedestrian and bicycle network both for local residents and for commuters to and through the Study Area, which would have noticeable benefits for a large number of intersection users. This includes benefits for the local

community, including residents, visitors, and commuters through the Study Area. The impacts to the bicycle and pedestrian network do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

Air Quality

Construction of Build Alternative 1 would likely take place over two construction seasons. During each construction season there would be localized increased emissions from construction equipment and particulate emissions from construction activities. Particulate emissions, whether from construction equipment diesel exhaust or dust from the construction activities, will be controlled as well as possible. Contractors will follow all DDOT Standard Construction Specification Sections that address the control of construction equipment exhaust or dust during construction. Impacts to air quality due to construction would be temporary and localized. Even though construction mitigation measures are not required, appropriate BMPs will be used to reduce engine activity or reduce emissions per unit or operating time. See *Section 4.8, Mitigation* for additional information on air quality mitigation measures.

Based on the air quality analysis completed for Build Alternative 1, the Proposed Action would not contribute to any violation of the NAAQS and meets the project level CO conformity requirements of 40 CFR 94.

Noise

Build Alternative 1 would have a short-term adverse impact to noise levels in the Study Area during the construction phase. The major construction elements of this project are expected to be demolition, hauling, grading, and paving. Construction of the proposed improvements and local rerouting of traffic for either alternative will result in a temporary increase in the ambient noise levels for properties in the Study Area, especially along Pennsylvania Avenue and Minnesota Avenue. Considering the relatively short-term nature of construction noise, impacts would be minor. The transmission loss characteristics of nearby structures are believed to be sufficient to moderate the effects of intrusive construction noise. None of the predicted future noise levels would substantially exceed existing noise levels (DDOT has defined an increase over existing noise levels of 10 decibels or more as being substantial).[92] The interior analysis at the category D location, N7, did not approach or exceed the 52 dBA $L_{eq}(h)$ criteria.

Impacts under Build Alternative 1 would not be substantially different from the No Build Alternative. The impacts to noise do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

Summary of Build Alternative 1 Impacts

Build Alternative 1 would benefit the community by providing more contiguous green space for community use and enjoyment. Build Alternative 1 would result in benefits to park operations and management in the local area because the Study Area would be less fragmented and easier to maintain for mowing and any other maintenance functions. Additionally, the new, larger areas of green space and slower traffic would improve visitors' ability to use the parks for activities. The bicycle and pedestrian network in and around the park area would be greatly improved under Build Alternative 1 as well. Access to U.S. Reservation 487 would be periodically disrupted during construction of the proposed improvements. The impacts would be limited to the period of construction.

5.8.2 Build Alternative 2 – Conventional Intersection Alternative

Soils

Under Build Alternative 2, there is a minor net decrease of green space as compared to the No Build Alternative. This net change includes peripheral grassed sidewalk buffers and areas outside of NPS property, but still within the Study Area. The majority of land within the Study Area has been previously graded and paved over from the construction and maintenance of the existing roadway at the intersection. Build Alternative 2 would result in similar impacts as described for Build Alternative 1. Therefore, Build Alternative 2 would have negligible long-term impacts to soils and may only present minor short-term adverse impacts resulting from soil erosion during construction. The impacts to soil do not meet the CEQ criteria for either context or intensity; therefore these impacts do not rise to a level of "significance" as defined by CEQ.

Water Quality

Groundwater

Impacts to groundwater recharge are unlikely. Build Alternative 2 would result in a net decrease of approximately 0.02 acres of pervious surface in the Study Area. This net change includes peripheral grassed sidewalk buffers and areas outside of NPS property, but still within the Study Area. Any short-term or long-term impacts to groundwater recharge are expected to be negligible due to the minimal decrease in pervious surface compared to the current Study Area. Impacts to groundwater do not meet the CEQ criteria for either context or intensity; therefore these impacts do not rise to a level of "significance" as defined by CEQ.

Water Quality

Build Alternative 2 would include the removal of existing roadways that bisect the Twining Square park land, as well as reconfiguration of the intersection. Minor short-term adverse impacts to water quality may result during construction due to soil disturbance and potential clearing of vegetation. BMPs would be used during construction in accordance with DDOE and District standards to avoid increased soil erosion. This would help to prevent an increase in storm water runoff volume that could degrade water quality in the nearby tributaries and Anacostia River. The net decrease in pervious surface under Build Alternative 2 (0.02 acres) is anticipated to have negligible impacts to surface water quality in the long term given the minimal change in pervious surface. Storm water quality requirements will be based on providing water quality improvements for the pavement areas within the project site. This requirement will be met using a variety of BMP facilities and LID strategies such as DDOT/DC Water quality control structures and other features. Therefore, long-term impacts to water quality are expected to be negligible. Impacts to water quality do not meet the CEQ criteria for either context or intensity; therefore these impacts do not rise to a level of "significance" as defined by CEQ.

Vegetation

Build Alternative 2 would result in similar impacts to vegetation, as described under Build Alternative 1. Depending on final design of the intersection, six or seven trees in the northern reservation may need to be removed to accommodate pedestrian pathways. Three trees in the southern reservation would be impacted by roadway development under Build Alternative 2, and three to four trees would be impacted

to accommodate the pedestrian pathway in the southern reservation. As with Build Alternative 1, short-term minor adverse impacts may occur to vegetation during construction and would be mitigated by using BMPs. The overall consolidation of green space and potential for enhanced landscape design under this Alternative would result in minor long-term benefits. Given the analysis and use of BMPs, the impacts to vegetation do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

Cultural Resources

Historic Structures

The impacts to historic structures from Build Alternative 2 would be similar to Build Alternative 1.

As discussed under Build Alternative 1, the DC SHPO issued a *Conditional* No Adverse Effect for this undertaking if Build Alternative 1 is selected as the Preferred Alternative. If Build Alternative 2 is selected as the Preferred Alternative, additional consultation with the DC SHPO would likely be necessary. Given the conditions in the *Section 106 Review Form* for the historic built environment are followed, the effects on historic structures do not meet the CEQ criteria for either context or intensity, and would not rise to a level of "significance" as defined by CEQ.

Archaeological Resources

As with Build Alternative 1, the northern and southern reservations, and area under the existing roadway would all be disturbed by the construction of Build Alternative 2. Refer to Build Alternative 1 for a description of stipulations associated with the DC SHPO's finding of *Conditional* No Adverse Effect. Given the conditions in the *Section 106 Review Form* for archaeology (also outlined above) are followed, the effects on archaeological resources would not rise to a level of "significance" as defined by CEQ.

Cultural Landscapes

There are no significant cultural landscapes associated with the Study Area. However, any long-term effects to the landscape in the vicinity of the intersection would be negligible. Any indirect effects, such as visual impacts to the landscape due to construction would be short-term and negligible with the use of BMPs. Based on the analysis summarized above, impacts to cultural landscapes do not meet the CEQ criteria for either context or intensity, and would not rise to a level of "significance" as defined by CEQ.

Land Use and Zoning

As a result of Build Alternative 2, the NPS owned land parcels (U.S. Reservation 487) would transfer to DDOT. This land transfer would facilitate the reconfiguration of the intersection. The land use and zoning in the the Study Area would not be directly impacted as a result of Build Alternative 2 and would be only temporarily affected during construction by road closures to reconfigure the intersection. Indirect impacts to land use and zoning would be negligible given the fact that the design of Build Alternative 2 maintains the current priority of moving vehicles through the intersection. Land use impacts under Build Alternative 2 would be negligible and temporary during construction. No zoning impacts would occur in the short term. The impacts to land use and zoning do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

Aesthetics and Visual Quality

Build Alternative 2 design changes would result in a typical at-grade intersection, new grass and additional green space. Therefore as with Build Alternative 1, implementation of Build Alternative 2 would result in short-term negative impacts on views during construction, but in the long term, could result in minor beneficial aesthetic and visual quality impacts. Therefore, the impact is minor in context and intensity and does not rise to a level of "significance" as defined by CEQ.

Community Resources

Parks and Recreation Areas

Under Build Alternative 2, the reconfigured intersection would include removal of the roadways which bisect the NPS-owned reservations on either side of Pennsylvania Avenue, SE. The result would be consolidated green space which would promote park area continuity. Under current conditions, the green space is fragmented and is not sufficient for recreational use by the community. Build Alternative 2 would enhance the park and recreation areas by providing more contiguous green space. Vehicle speeds would remain the same through the intersection, however, and it may be difficult for visitors to the intersection to use the park area for recreational purposes. Overall impacts to park and recreation areas under Build Alternative 2 would also be minor and beneficial in the long term due to the addition of contiguous park space.

Build Alternative 2 would include minor short-term adverse impacts to the park area during construction. The impacts to parks and recreation areas do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

Transportation

Pedestrian and Bicycle Network

Build Alternative 2, would improve pedestrian and bicyclist safety in the following ways (numbers correspond to Figure 4-2):

1. Proposed bulb-outs would provide exclusive bus bays that eliminate interruption to traffic on travel lanes and allow safe boarding and alighting for passengers;
2. Proposed bulb-outs will shorten the crosswalk therefore reduce the time that pedestrian walk in street; and
3. A proposed pedestrian/bicyclist activated traffic signal at the crosswalk would provide exclusive walk time for pedestrians and bicyclists to safely cross Pennsylvania Avenue without vehicular traffic conflict.

During construction, temporary disruption would occur to users of the intersection; however detour routes and alternate paths would be dedicated during this time. In general, the intersection would be improved with minimal disruption and ample mitigation to offset any negative effects; therefore, Build Alternative 2 would have negligible short-term impacts on the bicycle and pedestrian network.

In the long term, the Build Alternative 2 improvements would provide an overall benefit to the bicycle and pedestrian network in the Study Area over the No Build Alternative. Changes to the intersection to improve the pedestrian network include new bulb-outs, shorter crosswalks in some locations, and enhanced traffic signalization. However, the crossing distances between medians, vehicle turning movements, and the number of lanes at this intersection would not advance the pedestrian and bicycle network. In addition, the crosswalk across Pennsylvania Avenue, SE connecting Minnesota Avenue, SE to the north and south of the eastside intersection is a long crossing distance for pedestrians. Due to the design of Build Alternative 2 and the turning radius needed to make a left turn on Pennsylvania Avenue from southbound Minnesota Avenue, there is no median or refuge area breaking up the crosswalk. Therefore the crosswalk crosses all lanes of Pennsylvania Avenue, SE without a median or refuge area. However, given the overall improvement for pedestrians and bicyclists over the No Build Alternative, Build Alternative 2 would have minor beneficial impacts in the long term to the pedestrian and bicycle network. The impacts to the bicycle and pedestrian network do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

Air Quality

Based on the air quality analysis completed for Build Alternative 1, the Proposed Action would not contribute to any violation of the NAAQS and meets the project level CO conformity requirements of 40 CFR 94.

Noise

Impacts under Build Alternative 2 would not be substantially different from the No Build Alternative. The impacts to noise do not meet the CEQ criteria for either context or intensity; therefore, these impacts do not rise to a level of "significance" as defined by CEQ.

Summary of Build Alternative 2 Impacts

Build Alternative 2 would enhance the community by providing more contiguous green space for community use and enjoyment. Build Alternative 2 would result in benefits to park operations and management in the local area because the Study Area would be less fragmented and easier to maintain for mowing and any other maintenance functions. Access to U.S. Reservation 487 would be periodically disrupted during construction of the proposed improvements. The impacts would be limited to the period of construction.

Summary of Impacts Relevant to Section 4(f) Property

A summary of the impacts associated with the environmental impact categories most relevant to the Section 4(f) property for the No Build Alternative and both of the Build Alternatives are provided in **Table 5.3**. Refer to *Section 4, Environmental Consequences* for definitions of impact thresholds and duration.

Table 5.3

Impacts Relevant to Section 4(f) Property

Resource	No Build Alternative	Build Alternative 1	Build Alternative 2
Natural Resources			
Soils	No impact.	Negligible long-term impacts; minor short-term adverse impacts from soil erosion during construction.	
Ground Water	No impact to groundwater volume or quality.	Negligible short-term and long-term impacts; minimal net increase of pervious surface.	Negligible short-term and long-term impacts; minimal net decrease of pervious surface.
Surface Water	No impact.	No impact; no surface waters within Study Area.	
Water Quality	No impact.	Minor short-term adverse impacts during construction due to potential release of sediments into stormwater runoff from soil disturbance. Negligible long-term impacts due to minimal net change in impervious surface area and distance to Anacostia River.	
Vegetation	No impact.	Minor short-term adverse impacts during construction due to earth disturbance and potential impacts to several trees to accommodate design changes. Minor long-term benefit due to enhanced landscape and additional grass and tree cover.	
Cultural Resources			
Historic Structures	No impact.	Conditional No Adverse Effect.	Conditional No Adverse Effect.
Archaeology	No impact.	Conditional No Adverse Effect. Phase IB/II archaeological testing of an area in the southern reservation of intersection needed prior to final design and construction where an intact historic surface was identified during geoarchaeological survey.	
Cultural Landscapes	No impact.	Any indirect effects, such as visual impacts to the landscape due to construction would be short-term and negligible with the use of BMPs. Long-term indirect effects would be negligible.	
Socioeconomic Resources			
Land Use and Zoning	No impact.	Negligible short-term impacts may result from road closures during construction to land use. Minor indirect long-term benefits to future land use and zoning.	Negligible short-term impacts may result from road closures during construction to land use. Negligible long-term impacts to land use and zoning.
Aesthetics and Visual Quality	No impact.	Minor short-term adverse visual impacts during construction. Long-term minor benefit to visual quality with more contiguous park area/ green space and new roadway infrastructure.	
Parks and Recreation Areas	No direct impact. Minor long-term indirect impact as park area would remain fragmented and unusable as park or recreation area.	Minor short-term adverse impacts during construction. Long-term minor benefit due to providing more contiguous parkland to be used for passive recreational activity.	

Table 5.3
Impacts Relevant to Section 4(f) Property

Resource	No Build Alternative	Build Alternative 1	Build Alternative 2
Transportation			
Bicycle and Pedestrian Network	No impact.	Minor short-term adverse impacts due to temporary detours during construction. Moderate long-term beneficial impacts to local users and commuters through the area.	Minor short-term adverse impacts due to temporary detours during construction. Minor long-term beneficial impacts to local users and commuters through the area.
Air Quality	No impact.	Short-term adverse impacts to air quality due to construction would be temporary and localized; BMPs will be used. Build Alternatives would not contribute to any violation of the NAAQS and meets the project level CO conformity requirements of 40 CFR 94.	
Noise	No short-term impacts. In the long term, due to the projected increase in traffic volume at this intersection, noise levels will increase by 2040 under the No Build Alternative.	Minor short-term adverse impacts during construction. 2040 design year build PM peak hour traffic would raise noise levels 0.2 to 3.1 dB. The same residences, park and daycare that would be exposed to noise levels that approach or exceed the NAC with the No Build, would also approach or exceed the NAC with either build alternative. It has been determined that noise mitigation is not feasible for this project.	
Cost	--	**$10,971,254**	**$9,009,853**

Source: HNTB Corporation, 2013.

5.9 Avoidance Alternatives

The Section 4(f) regulations refer to an alternative that would not require the use of any Section 4(f) property as an avoidance alternative. To demonstrate that there are no feasible and prudent alternatives to the use of Section 4(f) property, the following alternatives must be considered that would avoid the use of the Section 4(f) property:

(1) Do nothing;

(2) Improve the transportation facility in a manner that addresses the project's purpose and need without a use of the Section 4(f) property; and

(3) Build the transportation facility at a location that does not require use of the Section 4(f) property.

5.9.1 Do Nothing Alternative

The *Do Nothing Alternative* is to not improve the intersection in keeping with the principles of the District's Great Streets Initiative. The Do Nothing Alternative would require no land jurisdiction exchange between NPS and DDOT. The intersection would continue to function as it does today; existing traffic patterns, crosswalks, signalization, and sidewalks would remain unimproved. See Figure 2-1 for an illustration of the existing condition of the intersection, which is the same as the Do Nothing Alternative.

The Do-Nothing Alternative is not feasible and prudent because it would neither address nor correct the transportation need cited as the NEPA purpose and need, which necessitated the proposed project.

5.9.2 Improve the Transportation Facility in a Manner that Addresses the Project's Purpose and Need without a Use of the Section 4(f) Property

Through multiple planning and design studies, a range of concepts have been developed and analyzed to improve the intersection in keeping with the project purpose and need. In order to meet the project purpose and need, which includes the need to create consolidated, usable park space, all of the concepts that have been developed would require the use of the Section 4(f) property. This is due to the existing land use constraints in the Study Area:

- Pennsylvania Avenue, SE is bordered by U.S. Reservation 487 within the intersection and by commercial properties on both sides of the street immediately east and west of the intersection;
- Minnesota Avenue, SE is bordered by U.S. Reservation 487 to the west and commercial properties (including two gas stations) and residences to the east in the Study Area; and
- L'Enfant Square, SE is lined with residential and commercial development to the north and west and U.S. Reservation 487 to the south and east in the Study Area.

The communities in the Study Area are considered low income and minority populations; therefore any impacts or use of private property in the Study Area has the potential to result in Environmental Justice concerns. Furthermore, if the gas stations at the northeast and southeast corners of the intersection are impacted, environmental site assessments would be needed to investigate the underground storage tanks and other possible contaminants associated with the gas station activities. Should there be any leakage from these tanks, there could be significant remediation measures that would be required if impacted.

The avoidance of the Section 4(f) property would necessitate the use of other private property in the Study Area in order to meet the purpose and need. In considering any potential avoidance alternatives, it is important to note that the proposed improvements, including the use of the Section 4(f) property, would actually *enhance* the Section 4(f) property.

To illustrate this issue, two alternatives that could potentially avoid impacts to U.S. Reservation 487 and may still meet the project purpose and need were considered and dismissed below.

Roadway Bridge Alternative

One of the original proposed designs for improvements to the Pennsylvania and Minnesota Avenues, SE intersection called for bridging one road over the other and the construction of on and off ramps, most likely with the creation of a single point urban interchange (SPUI). Such a design may have been able to avoid impacting any Section 4(f) properties while meeting some of the purpose and need principles. While this alternative would not meet all of the components of the purpose and need, it would likely improve safety and efficiency at the intersection for motorists. While this modification would have increased the capacity of the intersection and enhanced circulation, there would have been visual impact due to the elevated road, which would have also divided the community, causing potential social impacts and environmental justice concerns. Due to the amount of construction and type of construction associated with a roadway bridge, this plan was ultimately determined to be cost prohibitive.[93] Due to

significant costs and the potential environmental and social impacts associated with this design, this avoidance alternative is not considered feasible or prudent.

Pedestrian Bridge Alternative

An alternative to construct a pedestrian bridge over the intersection that would avoid impacting Section 4(f) property has been considered. While this alternative would not meet all of the components of the purpose and need, it would separate pedestrians and bicyclists from vehicle traffic, which would likely improve safety and efficiency at the intersection. As with the original proposal of bridging the roads, this alternative would cause visual impact and divide the community due to the elevated road, causing social impacts and potential environmental justice concerns. Given the considerable space requirements for constructing pedestrian bridges and the land use constraints in the Study Area, the height requirements that would be necessary to allow vehicles to traverse Pennsylvania and Minnesota Avenues, SE safely, and the significant costs associated with constructing a pedestrian bridge, this avoidance alternative is not considered feasible or prudent.

5.9.3 Alternative at a Location Not Requiring the Use of Section 4(f) Property

There is not an alternative at another location that would satisfy the project purpose and need. *Section 1.2, Needs for the Proposed Action,* in the EA explains in detail the deficiencies and operational problems associated with the existing location, primarily the complex and congested intersection used heavily by motorists, bicyclists and pedestrians. A new location would not address or correct the problems cited as the NEPA purpose and need, which necessitated the proposed project. The project is intended to improve the intersection of Pennsylvania and Minnesota Avenues, SE in a way that realizes the Great Streets Initiative principles. This intersection cannot be improved in accordance with Great Streets Principles by using any alternative locations.

5.9.4 Summary of Avoidance Alternatives

The avoidance alternatives considered were not feasible or prudent; therefore all reasonable alternatives satisfying the project purpose and need require the use of the Section 4(f) property (U.S. Reservation 487). Consequently, all of the design concepts that have been carried forward for consideration necessitate the use of Section 4(f) property.

Furthermore, the avoidance alternatives considered would not adequately meet the project purpose and need. Specifically, the avoidance alternatives would not consolidate park space to create a consolidated, usable open space for the community.

5.10 Feasibility and Prudence Test

A feasible and prudent avoidance alternative avoids using Section 4(f) property and does not cause other severe problems of a magnitude that substantially outweighs the importance of protecting the Section 4(f) property. The avoidance alternatives were evaluated to determine whether they were feasible and prudent:

1) An alternative is not feasible if it cannot be built as a matter of sound engineering judgment.

2) An alternative is not prudent if:

   a. It compromises the project to a degree that it is unreasonable to proceed with the project in light of its stated purpose and need;

   b. It results in unacceptable safety or operational problems;

   c. After reasonable mitigation, it still causes:

      i. Severe social, economic, or environmental impacts;

      ii. Severe disruption to established communities;

      iii. Severe disproportionate impacts to minority or low income populations; or

      iv. Severe impacts to environmental resources protected under other Federal statutes;

   d. It results in additional construction, maintenance, or operational costs of an extraordinary magnitude;

   e. It causes other unique problems or unusual factors; or

   f. It involves multiple factors in paragraphs (3)(i) through (3)(v) of this definition, that while individually minor, cumulatively cause unique problems or impacts of extraordinary magnitude.

5.10.1 Do Nothing Alternative

As discussed in Section 5.9.1, the Do-Nothing Alternative is not feasible and prudent because it would neither address nor correct the transportation need cited as the NEPA purpose and need, which necessitated the proposed project.

5.10.2 Improve the Transportation Facility in a Manner that Addresses Purpose and Need without Use of the Section 4(f) Property

As discussed in Section 5.9.2, due to the constraints in the Study Area, any avoidance alternatives that would meet the purpose and need for this project would necessitate the use of other private property in the in order to meet the purpose and need. In considering any potential avoidance alternatives, it is important to note that the proposed improvements would actually *enhance* the Section 4(f) property.

It is not feasible and prudent to avoid the Section 4(f) property by using engineering design or transportation system management techniques, such as minor location shifts, changes in engineering design standards, use of retaining walls and/or other structures and traffic diversions or other traffic management measures if implementing such measures would result in any of the following:

(1) Substantial adverse community impacts to adjacent homes, businesses or other improved properties; or

(2) Substantially increased transportation facility or structure cost; or

(3) Unique engineering, traffic, maintenance or safety problems; or

(4) Substantial adverse social, economic or environmental impacts; or

(5) A substantial missed opportunity to benefit a Section 4(f) property; or

(6) Identified transportation needs not being met; and

(7) Impacts, costs or problems would be truly unusual, unique or of extraordinary magnitude when compared with the proposed use of Section 4(f) property after taking into account measures to minimize harm and mitigate for adverse uses, and enhance the functions and value of the Section 4(f) property.

Given the potential economic and social impacts associated with displacing existing businesses and residents (including low-income and minority population), the potential environmental impacts associated with impacting the existing gas station contaminants, and the high costs associated with relocation impacts, eminent domain, and environmental remediation, this avoidance alternative is not feasible and prudent. In accordance with the above criteria, it is not feasible and prudent because *Improving the intersection in a manner that addresses the purpose and need without use of the Section 4(f) property* would result in: (5) a substantial missed opportunity to benefit a Section 4(f) property; and could potentially also result in (1) a substantial adverse community impacts to adjacent homes, businesses or other improved properties; and/or (4) substantial adverse social, economic or environmental impacts.

5.10.3 Build the Transportation Facility at a Location that Does Not Require Use of the Section 4(f) Property

As discussed in Section 5.9.3, the project is intended to improve the intersection of Pennsylvania and Minnesota Avenues, SE in a way that realizes the Great Streets Initiative principles. This intersection cannot be improved in accordance with Great Streets Principles by using any alternative locations.

It is not feasible and prudent to avoid Section 4(f) property by constructing at a new location if:

(1) The new location would not address or correct the problems cited as the NEPA purpose and need, which necessitated the proposed project; or

(2) The new location would result in substantial adverse social, economic or environmental impacts (including such impacts as extensive severing of productive farmlands, displacement of a substantial number of families or businesses, serious disruption of community cohesion, jeopardize the continued existence of any endangered or threatened species or resulting in the destruction or adverse modification of their designated critical habitat, substantial damage to wetlands or other sensitive natural areas, or greater impacts to other Section 4(f) properties); or

(3) The new location would substantially increase costs or cause substantial engineering difficulties (such as an inability to achieve minimum design standards or to meet the requirements of various permitting agencies such as those involved with navigation, pollution, or the environment); and

(4) Such problems, impacts, costs, or difficulties would be truly unusual or unique or of extraordinary magnitude when compared with the proposed use of the Section 4(f) property after taking into account proposed measures to minimize harm, mitigation for adverse use, and the enhancement of the Section 4(f) property's functions and value.

To construct the project in a new location that does not require the use of the Section 4(f) property is not feasible and prudent because it (1) would not address or correct the problems cited as the NEPA purpose and need, which necessitated the proposed project.

5.11 Alternatives with Least Overall Harm

Due to the fact that total avoidance of Section 4(f) properties in the Study Area is not feasible and prudent, an analysis of the remaining options is required to determine which results in least overall harm.

23 CFR 774.3(c) includes a list of factors to consider in making a determination of least overall harm. The least overall harm is determined by balancing the following factors:

> (i) The ability to mitigate adverse impacts to each Section 4(f) property (including any measures that result in benefits to the property);
>
> (ii) The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection;
>
> (iii) The relative significance of each Section 4(f) property;
>
> (iv) The views of the official(s) with jurisdiction over each Section 4(f) property;
>
> (v) The degree to which each alternative meets the purpose and need for the project;
>
> (vi) After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f); and
>
> (vii) Substantial differences in costs among the alternatives.

The ability of both **Build Alternative 1** *and* **Build Alternative 2** to achieve the balance listed above is discussed below:

(i) Build Alternative 1 and Build Alternative 2 would both result in "substantially equal" least overall harm to U.S. Reservation 487 (Twining Square). As illustrated by this EA, both of the Build Alternatives would mitigate any adverse impacts to the Section 4(f) property. Any adverse impacts to the property would be short-term and temporary during construction, and would be mitigated (or minimized) as discussed in *Section 4.8, Mitigation Measures* and *Section 5.12, Planning and Measures to Minimize Harm*. Both Build Alternatives would result in a benefit to the Section 4(f) property as they would both increase the amount of total park area, and more importantly, would consolidate the park area into two substantial green spaces that would be usable to the community and park visitors.

(ii) Considering the mitigation for any short-term impacts, the relative severity of the remaining harm to the protected activities, attributes, or features that qualify the Section 4(f) property for protection will be essentially non-existent. Both of the Build Alternatives will provide *more* contiguous green space than currently exists. Measures would be implemented, to the extent practical, to avoid impacts to larger or older tree specimens; however landscaping and replacement of trees will be conducted in accordance with the DDOT Design and Engineering Manual when avoidance is not feasible. New trees and vegetation would be planted in appropriate locations to maintain and enhance the tree canopy along the project corridor.

(iii) Currently the reservation qualifies as a Section 4(f) property only because it is a publicly-owned park. Although there is a documented history of the park's development, there is no significance association with this park, as it has been altered over time and was not originally part of *L'Enfant's Plan for the City*.

(iv) Coordination with NPS (the official with jurisdiction over the Section 4(f) property) has been ongoing regarding the Pennsylvania and Minnesota Avenue intersection since 2006, during the development of the *Great Streets Framework Plan: Pennsylvania Avenue SE* (2007) and the *Revitalization of Pennsylvania Avenue, SE for the Great Streets Initiative Concepts Design Final Report (Great Streets Concept Design Report)* (2007) . DDOT, NPS and FHWA have met several times throughout the EA planning process to discuss the alternatives and the resource impact categories. Although NPS is willing to transfer land jurisdiction to DDOT to facilitate the project, this transfer may be agreed upon by covenant with stipulations following multiple meetings and coordination.

(v) Build Alternative 1 would meet the purpose and need for the Proposed Action in promoting the principles set forth in the District's Great Streets Initiative. Build Alternative 1 would improve pedestrian and vehicular safety, create a usable park space, improve multimodal connectivity and access, and support land use and community needs.

Build Alternative 2 would improve vehicle operations and reduce confusion at the complex intersection compared to the No Build Alternative. The improvements would create more consolidated park space for visitors and residents to the area and the intersection would be less confusing to navigate for motorists and pedestrians. Because this alternative maintains the intersection as a typical intersection, the focus remains on moving vehicles through the intersection to their destinations.

(vi) As discussed in *Section 4, Environmental Consequences* of this EA, and summarized in Table ES.1, there are no moderate or major long-term adverse impacts due to either of the Build Alternatives. The only long-term minor adverse impact for either Build Alternative is to the Roadway Network and Traffic. However, there are also long-term minor adverse impacts under the No Build Alternative. Refer to Section 4.4.2 for detailed discussion of impacts.

(vii) The estimated cost for Build Alternative 1 is almost $11 million and the estimated cost for Build Alternative 2 is approximately $9 million. The costs are not substantially different enough to influence which alternative will be carried forward.

Build Alternative 1 *and* **Build Alternative 2** both achieve the balance the factors listed in 23 CFR 774.3(c), and are therefore both the *Alternative with Least Overall Harm*.

Importantly, both of the Build Alternatives will provide a net benefit to the park, given the additional park acreage, the ability to *use* the added contiguous park area, the potential community use of the park space, and the potential for attractive redevelopment. Build Alternative 1 better meets the project purpose and need in terms of improving pedestrian safety and supporting land use and community needs since the Revised Square design is intended to function as a traffic-calming mechanism to reduce vehicle speeds. However the alternatives would cause similar amounts of *least overall harm* to the Section 4(f) property.

FHWA Section 4(f) guidance explains that "If alternatives are determined to cause 'substantially equal' harm to Section 4(f) property, then FHWA may choose any one."[94]

5.12 Planning to Minimize Harm

The alternatives selected include all possible planning, as defined in §774.17, to minimize harm to the Section 4(f) property. Minimization entails planning and developing measures to reduce the impact to Section 4(f) properties.

DDOT is committed to minimizing the impacts of the project to the extent possible. The impacts reported in the EA reflect the best estimates available based on the current conceptual design. Both of the Build Alternatives require the reconfiguration of the roadway and U.S. Reservation 487 park area at the intersection. The roadways that bisect the northern reservation and the southern reservation of the intersection would be replaced or filled in with green space/park area. A substantial amount of existing park area and trees in U.S. Reservation 487 are not required for roadway improvements and will remain in place to the extent possible throughout construction and following project implementation.

5.12.1 Mitigation, Enhancement, and Beneficial Measures

Coordination among NPS and DDOT is ongoing regarding the assessment of impacts, the proposed measures to minimize harm, and the mitigation necessary to preserve the values of the Section 4(f) resource. The mitigation measures below all improve existing conditions at U.S. Reservation 487 (Twining Square). There is flexibility in providing these facilities based on input and recommendations from NPS. Access will remain, and be enhanced where possible, to and through the park. Below is a summary of the major mitigation elements proposed:

Maintenance of U.S. Reservation 487 (Twining Square)

DDOT has committed to maintaining the park area within Twining Square if the proposed transfer of jurisdiction is approved. The green space of the park areas will be routinely maintained, mowed, and landscaped. Irrigation will be provided to maintain the health of plantings in the square.

Enhancement of U.S. Reservation 487 (Twining Square)

DDOT will promote a *quality* green space that is visually appealing and inviting to the community, park visitors, and commuters through the intersection.

The project would consolidate the Twining Square parcels, returning the park area to its originally planned configuration. A consolidated park area would be most compatible historically and would result in a more attractive space encouraging community usage.

Bicycle/Pedestrian Network

Both of the Build Alternatives include improvements to the bicycle and pedestrian network to and through the Twining Square park area. The shared use path to the north of Pennsylvania Avenue, SE will be widened to 10 feet for the convenience of bicycle and pedestrian commuters crossing to and through the intersection. Walkways or shared-use paths will be provided around the perimeters of each of the park areas to enhance accessibility and convenience for pedestrians.

The intersection improvements should result in a more efficient, faster flow of traffic through the intersection. Adverse impacts as they relate to pedestrian safety would be mitigated through the improvements to the bicycle/pedestrian network at the intersection. The improved network would provide safer access to the intersection and a more usable park area. Custom colored concrete paving patterns are recommended to emphasize comfortable and safe movement through the park area. Americans with Disabilities Act (ADA) accessible guidelines will be followed to ensure safety and comfort for all park users.

Replacement of Trees and Landscaping

DDOT has committed to replacing any trees and landscaping that must be removed due to the Build Alternatives with specimens agreed upon by the NPS.

5.13 Coordination

Discussion of the public involvement activities and coordination with NPS, the federal agency with jurisdiction over the Section 4(f) properties, are provided in the following sections.

5.13.1 Public Involvement

Beginning with the District's Great Streets Initiative, kicked off in 2005, a substantial effort was made to include the public in the concept design development at the Pennsylvania and Minnesota Avenues, SE intersection. A four-day design charrette held in July 2006 resulted in the development of several concepts, which were then evaluated and subsequently condensed down to three viable options which ultimately led to the Build Alternatives carried forward in the EA. At the initiation of the EA process for the project in 2012, public outreach efforts were again conducted via project information dissemination and solicitation for public input in the fall of 2012. In the spring of 2013, DDOT distributed brochures to residents and businesses in the community and advertised a project presentation at the Advisory Neighborhood Commission (ANC) 7B Monthly Meeting on May 16, 2013. More details of public involvement are included in the EA and a summary of comments from the public is presented in *Appendix C, Agency Coordination and Public Involvement* of the EA.

5.13.2 Agency Coordination

This section focuses on coordination with the NPS, the administrator of the Section 4(f) property affected by the Pennsylvania and Minnesota Avenues, SE Intersection Improvements Project. Coordination between DDOT, FHWA and NPS has been consistent throughout the EA process and will continue through any design and construction. It is important to note that a request for NCPC to become a cooperating agency in the development of the EA was submitted September 27, 2012 with request for response within 30 days. No response was received from NCPC in response to this request.

Because of the size, condition, and location of the affected Section 4(f) properties, DDOT proposes the use of the Net Benefits 4(f) Programmatic Evaluation as the appropriate level of Section 4(f) evaluation. Specifically, it is the appropriate approach to achieve a net benefit to the parks while at the same time recognizing the potential impacts from the transportation improvements. Coordination is ongoing regarding the assessment of impacts, the proposed measures to minimize harm, and the mitigation necessary to preserve the values of the Section 4(f) resource.

5.13.3 Coordination with NPS

NPS owns and administers U.S. Reservation 487 (Twining Square). Twining Square is one of the Capitol Hill Parks, a collection of 59 triangles and squares owned by the NPS. Consequently, the reconfiguration of the Pennsylvania and Minnesota Avenues, SE intersection and Twining Square is significant to NPS.

Initial discussions with the NPS regarding the improvements at Twining Square and the project intersection took place in 2006 with the development of the Pennsylvania Avenue Great Streets Program. NPS and FHWA were both involved during the concept design phase in 2006 and 2007 throughout the Great Streets Concept Design Report. Coordination continued throughout the concept development phase with periodic meetings and updates.

At the commencement of the EA planning process, DDOT, NPS and FHWA attended a kick-off meeting in August of 2010 to re-introduce the project to NPS and FHWA, and to discuss agency roles for the development of the EA. Following the initial kick-off meeting, the agencies met several times throughout the duration of the project to discuss a range of alternatives and the resource impact categories. Following the Inter-Agency Scoping Meeting in September of 2012, NPS and FHWA determined that FHWA would be the lead federal agency because they would be contributing funds to the project, and NPS would be a cooperating agency due to the transfer of land jurisdiction between NPS and DDOT.

During alternatives development, the NPS had input in which Build Alternatives should be considered for further evaluation and which alternatives would be dismissed. NPS was supportive of moving forward with the Revised Square Alternative (Build Alternative 1) and the Conventional Intersection Alternative (Build Alternative 2). Even though the alternative designs are operationally different, the changes to the park configuration would be similar. Both alternatives would remove the cut-through roadways to the north and south of Pennsylvania Avenue and replace them with park land that would consolidate the park area to the north and the south of Pennsylvania Avenue. Although NPS is willing to transfer land jurisdiction to DDOT to facilitate the project, the transfer may be agreed upon by covenant with stipulations following multiple meetings and coordination.

Letters were submitted to NPS and the NCPC on September 27, 2012 with an invitation for these agencies to become cooperating agencies in the development of the EA.

5.14 Conclusion

Due to the location of the Section 4(f) properties within the needed roadway improvements, there are no feasible and prudent build alternatives that could avoid use of these properties. Therefore, this project is being developed in a way that will enhance (i.e., provide a net benefit to) the affected Section 4(f) resources.

The No Build Alternative is the only alternative that avoids use of the Section 4(f) resource but it is not feasible and prudent because it would neither address nor correct the needs cited in the project's purpose and need. The complete Purpose and Need discussion is contained in *Section 1, Purpose and Need,* of the EA.

The avoidance alternatives discussed in Section 5.9 include potential roadway bridge and pedestrian bridge designs that could avoid impacts to U.S. Reservation 487. The avoidance alternatives would be

cost prohibitive, and would result in visual impacts and division of the neighborhood. Due to the amount of space needed to implement the avoidance alternatives, potential environmental and social impacts to homes and businesses in a low-income, minority neighborhood would be anticipated. The avoidance alternatives are not considered prudent or feasible for these reasons.

Furthermore, FHWA's *Net Benefit 4(f) Programmatic Evaluation* states the following in the *Findings* section (#2) regarding the consideration of improving the transportation facility in a manner that addresses the purpose and need without use of the Section 4(f) property (avoidance alternatives):

> It is not feasible and prudent to avoid Section 4(f) property by using engineering design or transportation system management techniques, such as minor location shifts, changes in engineering design standards, use of retaining walls and/or other structures and traffic diversions or other traffic management measures if implementing such measures would result in any of the following:
>
> - Substantial adverse community impacts to adjacent homes, businesses or other improved properties; or
> - Substantially increased transportation facility or structure cost; or
> - Unique engineering, traffic, maintenance or safety problems; or
> - Substantial adverse social, economic or environmental impacts; or
> - A substantial missed opportunity to benefit a Section 4(f) property; or
> - Identified transportation needs not being met; and
> - Impacts, costs or problems would be truly unusual, unique or of extraordinary magnitude when compared with the proposed use of Section 4(f) property after taking into account measures to minimize harm and mitigate for adverse uses, and enhance the functions and value of the Section 4(f) property. [95]

Essentially, this language encourages a win-win solution by determining that it is not feasible and prudent to avoid a Section 4(f) property if doing so foregoes the opportunity to provide a net benefit to that property (fifth bullet). This is further reinforced by the first and fourth bullet that discusses substantial adverse community impacts to adjacent homes, businesses or other improve properties, or substantial adverse social, economic, or environmental impacts.

Based upon the above considerations, the following are concluded:

(1) There is no feasible and prudent alternative to the use of land from U.S. Reservation 487 (Twining Square), and

(2) Build Alternative 1 and Build Alternative 2 both include all possible planning to minimize harm resulting from such use; and

(3) This project will comply with any other related laws applicable to this resource.

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6.0 AGENCY COORDINATION AND PUBLIC INVOLVEMENT

6.1 Agency Coordination

DDOT conducted agency coordination as part of the planning process for the Pennsylvania and Minnesota Avenues, SE EA. Agency coordination included project scoping, consultation with resource agencies in accordance with Section 7 of the Endangered Species Act (ESA), consultation with the DC SHPO and NPS in accordance with Section 106 of the NHPA, and individual scoping meetings. Agency correspondence is included in *Appendix C, Agency Coordination and Public Involvement*. Coordination with the DC SHPO is included in *Appendix E, Section 106 Consultation and Cultural Resources Information.*

Agency Scoping

FHWA, NPS and DDOT held an inter-agency meeting on September 6, 2012 at the DDOT headquarters in Southeast D.C.

The following agencies were sent initial project information and were invited to the interagency meeting at DDOT headquarters:

- Federal Highway Administration (FHWA)
- National Park Service (NPS)
- US Fish and Wildlife Service (FWS)
- US Army Corps of Engineers (USACE)
- National Capital Planning Commission (NCPC)
- DC State Historic Preservation Office (DC SHPO)
- Washington Metropolitan and Transit Administration (WMATA)
- Commission of Fine Arts (CFA)
- DC Water and Sewer Authority (DC Water)
- DC Office of Planning (DC OP)

Agencies in attendance included DC SHPO, WMATA, EPA, and CFA. The purpose of this scoping meeting was to solicit feedback from the agencies that could potentially affect the scope or content of the EA and to analyze the potential environmental impacts of the improvements to be made at the intersection of Pennsylvania Avenue and Minnesota Avenue, SE.

The NCPC provided scoping comments on October 15, 2012 stating that a request that the EA analyze all potential action alternatives for consistency with applicable planning policies of the Comprehensive Plan for the National Capital: Federal Elements, and also noting that any transfer of jurisdiction of lands between NPS and DDOT is subject to review and approval of NCPC. NCPC was invited to be a cooperating agency on the EA and as a consulting party under Section 106 in a letter dated September 27, 2012.

NPS and FHWA Meetings

Initial discussions with the NPS regarding the project intersection took place in 2006 with the development of the Pennsylvania Avenue Great Streets Program given that NPS owns some of the land at this intersection.

At the commencement of the EA planning process, DDOT, NPS and FHWA attended a kick-off meeting in August of 2010 to re-introduce the project to NPS and FHWA and to discuss agency roles for the development of the EA. NPS and FHWA were both involved during the concept design phase in 2006 and 2007 throughout the Great Streets Concept Design Report. Following the initial kick-off meeting, the agencies met several times throughout the EA planning process to discuss the alternatives and the resource impact categories. Following the Agency Scoping Meeting in September of 2012, NPS and FHWA determined that FHWA would be the lead federal agency because they would be contributing funds to the project, and NPS would be a cooperating agency due to the transfer of land jurisdiction between NPS and DDOT.

Letters were submitted to NPS and the National Capital Planning Commission (NCPC) on September 27, 2012 with an invitation for these agencies to become cooperating agencies in the development of the EA.

DC SHPO

Coordination with the D.C. SHPO commenced about the project intersection originally began in 2006 with the development of the Pennsylvania Avenue Great Streets Program when tasked with considering the environmental constraints. When DDOT began refining the project alternatives at the start of the EA process, DDOT submitted a letter to the D.C. SHPO on December 17, 2010 to formally initiate the Section 106 process in accordance with the NHPA. DDOT held a meeting to re-introduce DC SHPO staff to the project on February 2, 2011 to discuss the project status, any cultural resources in the project vicinity, the potential APE, and any necessary consulting parties. In March of 2011, DDOT requested DC SHPO's concurrence with the project APE. The DC SHPO responded with their concurrence on April 8, 2011.

In July of 2011, DDOT submitted an *Archaeological Assessment of Potential* to the DC SHPO with recommendations for archaeological survey.

On October 26, 2011 the DC SHPO provided additional Section 106 comments on the project with response that no previously identified historic properties are located in the APE and that if the Build 1 Alternative – Revised Square Alternative (referred to as Modified Square Alternative in the letter), the project would likely have no adverse effect on historic properties. Geoarchaeological coring was requested to further investigate the potential for archaeological resources. A Special Use Permit was obtained from NPS and the testing was conducted in November of 2012 (signed copy of Special Use Permit is included in *Appendix E, Cultural Resources*). The *Geoarchaeological Interpretations in the Vicinity of the Intersection of Pennsylvania and Minnesota Avenues in the Anacostia Section of Washington, D.C.* provides the results of the preliminary testing.

NCPC was invited to be a cooperating agency on the EA and as a consulting party under Section 106 in a letter dated September 27, 2012.

Coordination with the DC SHPO and cultural reports submitted are provided in *Appendix E, Cultural Resources.*

6.2 Public Involvement

Public Scoping

DDOT sent scoping notices to the public to solicit comments on environmental, historical, cultural and other issues relevant to the proposed project. Scoping notices, scoping letters and project brochures were distributed to the public in September 2012. DDOT provided a project website in the fall of 2012 that detailed the project history and proposed improvements. The public was asked to send comments by mail to DDOT or to leave comments on the project website by October 15, 2012. A summary of comments from the public is presented in *Appendix C, Agency Coordination and Public Involvement.*

Public Meetings

DDOT hand-delivered brochures in the project Study Area in April of 2013 that contained project information and notice of a project presentation at the ANC 7B Monthly Meeting held on May 16, 2013. There were approximately 50 attendees at the meeting. DDOT presented the project purpose and need, proposed action and alternatives being carried forward in the EA. Handouts were provided for attendees, along with optional comment cards that could be left at the meeting or mailed to DDOT. The public had an opportunity to ask questions and comment on the information provided. The majority of comments were questions regarding the traffic operations of the alternatives and concerns regarding bicycle and pedestrian movement through the intersection.

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7.0 LIST OF PREPARERS

DISTRICT DEPARTMENT OF TRANSPORTATION

Project Development and Environment Division
Infrastructure Project Management Administration
55 M Street, SE, Suite 500, Washington, DC 20003

Austina Casey

Faisal Hameed, PhD

Keith Foxx, PE

Dawit Muluneh, PE

FEDERAL HIGHWAY ADMINISTRATION

District of Columbia Division
1990 K Street, N.W. Suite 510
Washington, DC 20006

Michael Hicks

NATIONAL PARK SERVICE

1100 Ohio Drive Southwest
Washington, DC 20242

Joel Gorder

National Capital Parks-East
1900 Anacostia Drive, S.E.
Washington, D.C. 20020

Stephen Syphax

Jamese Hemsley

HNTB CORPORATION

2900 South Quincy Street, Suite 200
Arlington, VA 22206

Name	Primary Responsibilities / Role
Caroline E. Pinegar, AICP	EA Project Manager and Section 4(f) Evaluation
Kim Hughes, PE	Quality Control/Oversight of EA and Section 4(f) Evaluation
Jon G. Whitney, PE	Task Manager – Alternatives Development and Preliminary Engineering; QA/QC
Neelima Ghanta, PE	Traffic Operations Analysis
Alan McDonald, EIT	Traffic Analysis and Noise Monitor Data Collection
Ryan Carey, EIT	Affected Environment, Environmental Consequences, and EA development
Royce Bassarab	Noise Analysis
Dara Soum	Preliminary Engineering/ Roadway Engineer
Kent Miller	GIS Analysis and Graphic Development
John Jaeckel, PE	Task Manager - Air and Noise Analysis; QA/QC
Michael Zabel	Air and Noise Analysis

EAC/ARCHAEOLOGY

4303 North Charles Street
Baltimore, MD 21218-1054

Name	Primary Responsibilities / Role
Elizabeth Comer	Project Manager for Archaeology and Historic Architecture.
Tery Harris	Principal Investigator- Archaeology.

8.0 ENVIRONMENTAL ASSESSMENT DISTRIBUTION

Various federal and District agencies, as well as many other organizations and groups representing project stakeholders, were provided with copies of the Final EA. The Final EA is also available for review on the DDOT and NPS websites.

8.1 Federal/Regional Agencies

Federal Highway Administration
National Park Service
U.S. Army Corps of Engineers
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
Commission of Fine Arts
National Capital Planning Commission
Metropolitan Washington Council of Governments
Washington Metropolitan Area Transit Authority
District of Columbia Water and Sewer Authority

8.2 District Agencies

District Department of Transportation
DC State Historic Preservation Office
District Department of the Environment
DC Department of Parks and Recreation

8.3 District Elected Officials

The Honorable Vincent Gray
Mayor, District of Columbia
Executive Office of the Mayor
1350 Pennsylvania Avenue, NW, Suite 316
Washington, DC 20004

The Honorable Marion Berry
Ward 8 Councilmember
1350 Pennsylvania Avenue, NW, Suite 102
Washington, DC 20004

The Honorable Yvette Alexander
Ward 7 Councilmember
1350 Pennsylvania Avenue, NW, Suite 400
Washington, DC 20004

8.4 Advisory Neighborhood Commissions

Gary Butler
ANC 7B03
3200 S Street, SE
Washington, DC 20020

Holly Muhammad
ANC 8A01
2100-D Martin Luther King Jr. Avenue, SE
Washington, DC 20020

Robert Richards, Chair
ANC 7B07
3200 S Street, SE
Washington, DC 20020

Robin Marlin, Vice Chair
ANC 7B05
3200 S Street, SE
Washington, DC 20020

8.5 Utilities

PEPCO

DC Water and Sewer

8.6 Neighborhood Associations

Hillcrest Community Civic Association

Randle Highlands Citizen Civic Association

Penn- Branch Citizens/Civic Association

8.7 Public Review Copies

National Capital Planning Commission Library
401 9th Street, NW
Suite 500 – North Lobby

Federal Highway Administration
District of Columbia Division
1990 K St. NW, Suite 510
Washington, DC 20006

District Department of Transportation
Project Development and Environment Division
Infrastructure Project Management Administration
55 M Street, SE, Suite 500
Washington, DC 20003

Francis A. Gregory Library
3660 Alabama Ave. SE
Washington, DC 20020
202-698-6373

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AUSTINA CASEY
Project Manager
District Department of Transportation
55 M Street, S.E., Suite 500, Washington, DC 20003

http://ddot.dc.gov/PennMinnAvesProject