WASHINGTON UNION STATION
STATION EXPANSION

Supplemental Draft Environmental Impact Statement for
Washington Union Station Expansion Project

Appendix C3S – Supplemental Environmental Consequences Technical Report

U.S. Department of Transportation
Federal Railroad Administration

May 2023

Contents

List of Tables

Table No. Description **Page**

List of Figures

Figure No. Description **Page**

Acronyms and Abbreviations

ACS	American Community Survey
ADA	Americans with Disabilities Act
AM	Morning
Amtrak	National Railroad Passenger Corporation
ANC	Advisory Neighborhood Commission
ANSI	American National Standards Institute
AOC	Architect of the Capitol
APD	Amtrak Police Department
APE	Area of Potential Effects
ARPA	Archaeological Resources Protection Act
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
BID	Business Improvement District
Blue Plains	Blue Plains Advanced Wastewater Treatment Plant
BTU	British Thermal Unit
CBRNE	Chemical, Biological, Radiological, Nuclear and Explosive
CCC	Community Communications Committee
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFA	Commission of Fine Arts
CFR	Code of Federal Regulation
CNN	Cable News Network
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
CSO	Combined Sewer Overflow

CTR	Comprehensive Transportation Review
dBA	A-weighted Decibel
DC	District of Columbia
DCMR	District of Columbia Municipal Regulations
DCOP	District of Columbia Office of Planning
DDOT	District Department of Transportation
DEIS	Draft Environmental Impact Statement
DHCD	District of Columbia Department of Housing and Community Development
DOEE	Department of Energy and Environment
ECC	Energy Conservation Code
EERE	Office of Energy Efficiency and Renewable Energy
EIA	United States Energy Information Administration
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act
EJ	Environmental Justice
EMCS	Amtrak Emergency Management and Corporate Security
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
EUI	Energy Use Intensity
EV	Electric Vehicle
FEIS	Final Environmental Impact Statement
FEMP	Federal Energy Management Program
FLUM	Future Land Use Map
FPS	Federal Protective Service
FR	Federal Register
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
FY	Fiscal Year

GAR	Green Area Ratio
GBA	Green Building Act
GCC	District of Columbia Green Construction Code
GHG	Greenhouse gas
gpd	Gallons per day
GPO	Government Printing Office
gpm	Gallons per minute
ICC	International Code Council
In/s	Inch per second
ITE	Institute of Transportation Engineers
JDAC	Joint Development and Adjacent Construction
kBTU	Kilo British Thermal Unit
kg	Kilogram
lbs	Pounds
Ldn	Day-night Average Sound Level
LEED	Leadership in Energy and Environmental Design
Leq	Equivalent Sound Level
Lmax	Maximum A-weighted Level LOS Level of Service
LWCA	Land and Water Conservation Act
MARC	Maryland Area Regional Commuter
MOCRS	Mayor's Office of Community Relations and Services
MOE	Measure of Effectiveness
MPD	Metropolitan Police Department
MSAT	Mobil Source Air Toxics
MTA	Maryland Transit Administration
MWCOG	Metropolitan Washington Council of Governments
MWh	Megawatts Hours
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards

NB	Northbound
NCPC	National Capital Planning Commission
NEPA	National Environmental Policy Act
NIHL	Noise-Induced Hearing Loss
NRHP	National Register of Historic Places
NoMA	North of Massachusetts Avenue
NO_x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NPR	National Public Radio
NPS	National Park Service
O_3	Ozone
OPA	Oil Pollution Act
ORE	Office of Racial Equality
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement
PDR	Production, Distribution, Repair
PBS	Public Buildings Service
PCB	Polychlorinated Biphenyl
PM	Evening
$PM_{2.5}$	Particulate matter sized 2.5 micrometers or less
PM_{10}	Particulate matter sized 10 micrometers or less
PPV	Peak-particle Velocity
RCRA	Resource Conservation and Recovery Act
REA	Railway Express Agency
SAOE	Supplemental Assessment of Effects
SB	Southbound
SDEIS	Supplemental Draft Environmental Impact Statement
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan

SO_2	Sulfur Dioxide
SOE	Support of Excavation
SPCC	Spill Prevention, Control, and Countermeasure
SWPPP	Stormwater Pollution Prevention Plan
SWRv	Stormwater Retention Volume
The District	Washington, DC
The Project	Washington Union Station Expansion Project
TNC	Transportation Networking Companies
TPH-DRO	Total Petroleum Hydrocarbons, Diesel Range Organics
TSA	Transportation Security Administration
TSCA	Toxic Substances Control Act
TVRA	Threat, Vulnerability, and Risk Assessment
TWA	Time-Weighted Average
UDC	University of the District of Columbia
U.S.	United States
USC	United States Code
USN	Union Station North Zoning District
USRC	Union Station Redevelopment Corporation
UST	Underground Storage Tank
VBIED	Vehicle-Borne Improvised Explosive Device
VdB	Unit of measure for vibration velocity level in decibels
VMT	Vehicle-Miles Traveled
VOC	Volatile Organic Compound
VOR	Vehicle Occupancy Ratio
VRE	Virginia Railway Express
WMATA	Washington Metropolitan Area Transit Authority
WUS	Washington Union Station

1 Analysis Framework

1.1 Introduction

The Federal Railroad Administration (FRA) is preparing a Supplemental Draft Impact Environmental Impact Statement (SDEIS) to supplement the Draft Environmental Impact Statement for the Washington Union Station (WUS) Expansion Project (the Project) published in June 2020 (2020 DEIS).[1] FRA prepared these documents in accordance with the National Environmental Policy Act of 1969 (NEPA) (42 United States Code [USC] 4321 et seq.), the Council on Environmental Quality (CEQ) Implementing Regulations for NEPA (40 Code of Federal Regulations [CFR] 1500-1508), and FRA's *Procedures for Considering Environmental Impacts* (64 Federal Register [FR] 28545, May 26, 1999, as updated by 78 FR 2713, January 14, 2013).

Specifically, the SDEIS is being prepared in accordance with Paragraph 13 Section (e), *Changes and Supplements*, of FRA's *Procedures for Considering Environmental Impacts* to assess the potential impacts of a new alternative, Alternative F, developed after the publication of the 2020 DEIS in light of the comments received from agencies and the public. FRA has identified this new alternative as the Preferred Alternative in instead of Alternative A-C, which was identified as the Preferred Alternative in the 2020 DEIS.

This *Supplemental Draft Environmental Consequences Technical Report* describes and characterizes the potential direct, indirect, and cumulative impacts of the Preferred Alternative. It is intended to supplement the *Draft Environmental Consequences Technical Report* included as Appendix C3 in the 2020 DEIS.[2] With the exceptions listed below, the sections of Appendix C3 that have not been substantially changed or updated are not repeated. Instead, the reader is referred to the relevant sections of Appendix C3. In general, this includes sections pertaining to the regulatory environment; study area; and methodology.[3]

Exceptions include sections describing avoidance, minimization, and mitigation measures and sections identifying permitting requirements, which have been repeated regardless of whether they differ from those in Appendix C3. The reason for this exception is to provide a comprehensive list of the commitments and regulatory requirements potentially associated with the Preferred Alternative in one place. **Sections 1.2 through 1.5** below are another exception, as they define the general framework within the potential impacts of the Preferred Alternative are assessed.

[1] The 2020 DEIS is available at the following location: https://railroads.dot.gov/environmental-reviews/washington-union-station-expansion-project/draft-environmental-impact.

[2] Appendix C3 of the 2020 DEIS is available at the following location: https://railroads.dot.gov/elibrary/washington-union-station-expansion-project-draft-eis-appendix-c3-environmental.

[3] See **Section 1.5**, *Analysis Methodology*, for more information.

This report is not intended to address the comments received on the 2020 DEIS, including Appendix C3. Where appropriate, relevant comments were considered when applying impact assessment methodologies to the Preferred Alternative. Responses to comments will be provided in the Final Environmental Impact Statement.

1.2 Project Overview

Union Station Redevelopment Corporation (USRC) and the National Railroad Passenger Corporation (Amtrak) (collectively, the Project Proponents or Proponents) are jointly proposing the Project. Under a long-term lease with FRA, USRC is responsible for the rehabilitation, redevelopment, and ongoing management and operations of WUS. Amtrak owns the tracks and platforms at WUS. The Project includes expanding and modernizing the multimodal transportation facilities at WUS to meet current and future needs, while preserving the historic station building.

1.2.1 Purpose and Need

The purpose of the Project is to support current and future long-term growth in rail service and operational needs; achieve compliance with the Americans with Disabilities Act of 1990 (ADA) and emergency egress requirements; facilitate intermodal travel; provide a positive customer experience; enhance integration with the adjacent neighborhoods, businesses, and planned land uses; sustain WUS's economic viability; and support continued preservation and use of the historic station building.

The Project is needed to improve rail capacity, reliability, safety, efficiency, accessibility, and security, for both current and future long-term railroad operations at this historic station.

1.2.2 Project Elements

The Project includes the following program elements:

- Historic Station – The historic station building is listed in the National Register of Historic Places and is an important part of the urban fabric of Washington, DC (the District). The Project would preserve the historic station and sensitively integrate it with the other elements. The historic station building would continue to be the primary entrance to WUS and a grand welcoming space worthy of the nation's capital.
- Tracks and Platforms – The tracks and platforms provide space for trains and their passengers and serve a core function of WUS. The Project would implement a new track and platform plan providing 19 revenue tracks and 30-foot wide platforms.
- Bus Facility – Intercity, transit, and charter buses are parts of the WUS programming identified in the Union Station Redevelopment Act of 1981 (USRA) and long-established transportation modes at WUS. The Project includes a bus facility with new parking/loading bays and platforms for intercity and charter bus services.

- Train Hall – A monumental train hall is an architectural feature that adds air and light to the main train concourse and train platforms. It enhances passengers experience and is a common feature at large train stations across the world.
- Parking – Parking has been a component of WUS since USRA. The Project includes new parking facilities.
- Concourses and Retail – Concourses provide circulation space for passengers and retail that contributes revenue for WUS maintenance and operations. Circulation space and retail opportunities in concourses enhance passenger experience. The Project includes the construction of four new concourses.
- For-Hire Vehicles[4] – For-hire vehicle facilities provide WUS users and visitors with a range of transportation options. The Project provides enhanced for-hire vehicle facilities, including pick-up and drop-off areas at the front of the historic station building; in a below-ground facility; on the same level as H Street NE; and on First and Second Streets NE.
- Bicycle and Pedestrian Access – Quality bicycle and pedestrian access is essential for a multimodal facility in an urban environment. The Project enhances pedestrian and bicycle facilities at WUS.

1.2.3 Project Sponsor

USRC is the Project Sponsor. USRC will be responsible for implementing the Project through final design and construction, in coordination with Amtrak. As Project Sponsor, USRC will also be responsible for implementing the measures proposed in the report to avoid, minimize, or mitigate the adverse impacts of the Project.

1.2.4 Timeframe

The planning horizon year for the Project is 2040. This is the year when the Project would be complete and operational. Construction of the Preferred Alternative would take approximately 13 years.

1.3 Definitions

The CEQ Implementing Regulations and *Forty Most Asked Questions*[5] concerning CEQ's NEPA Regulations provide the following key definitions:

- **Major Actions** include actions with effects that may be major and are potentially subject to Federal control and responsibility. Actions include new and continuing activities including projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by Federal

[4] "For-hire vehicle" refers to taxis and transportation networking companies like Uber and Lyft.

[5] Council on Environmental Quality. 1981. *Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations*. Accessed from https://www.energy.gov/nepa/downloads/forty-most-asked-questions-concerning-ceqs-national-environmental-policy-act. Accessed on November 17, 2022.

agencies. Actions also include new or revised agency rules, regulations, plans, policies, procedures, and legislative proposals.

- **No-Action Alternative** is the state in which the proposed activity or action would not take place.
- **Direct impacts** result from the action and occur at the same time and place.[6]
- **Indirect impacts** result from the action and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems. Indirect impacts assessed in this document include the impacts of the potential transfer and development of the Federally owned air rights above the rail terminal not needed for Project elements (see **Table 1-4** below).
- **Cumulative impacts** are the impacts on the environment which result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.

Impacts may vary with regard to their duration, significance, and outcome:

- **Duration:** The duration of an impact is the amount of time the impact is expected to last. Long-term, permanent, or operational impacts are those that would occur over the lifetime of a project. Short-term or temporary impacts are those that would occur during a specific phase of the project, such as construction.
- **Context and Intensity:** As defined in the CEQ's *Implementing Regulations*, significance requires consideration of both context and intensity. Depending on the nature of the topic, relevant contexts include society as a whole (human, national), the affected region, the affected interests, or the locality. Intensity refers to the severity of impact and includes consideration of beneficial and adverse impacts. Intensity can be assessed using a wide range of criteria. Among these criteria are public health and safety, unique characteristics of the geographic locale, the level of public controversy, whether the action would fail to comply with applicable laws and regulations, and other considerations. Unless specified otherwise, impacts are generally assessed using the following scale:
  - **Negligible impacts** would occur at the lowest level of detection.
  - **Minor impacts** would be noticeable but would not affect the function or integrity of the resource.
  - **Moderate impacts** would be readily apparent and would influence the function or integrity of the resource.

[6] Effects and impacts, as used in the CEQ Implementing Regulations and this report, are synonymous.

- **Major impacts** would be substantial and would result in severely adverse or exceptionally beneficial changes to the resource.

- **Outcome:** Impacts may be beneficial or adverse:
  - **Beneficial impacts** would result in positive outcomes to the natural or human environment.
  - **Adverse impacts** would result in unfavorable or undesirable outcomes to the natural or human environment.

1.4 Framework for Evaluating Impacts

This report provides the full results of the technical impacts analyses FRA conducted for the Preferred Alternative, which are condensed in the *Environmental Consequences* chapter of the SDEIS.

The report considers impacts on the following resource categories:

- Natural Ecological Systems
- Water Resources and Water Quality
- Solid Waste Disposal and Hazardous Materials
- Transportation
- Air Quality
- Greenhouse Gas Emissions and Resilience
- Energy Resources
- Land Use, Land Planning, and Property
- Noise and Vibration
- Aesthetics and Visual Quality
- Cultural Resources
- Parks and Recreation Areas
- Social and Economic Conditions
- Public Safety and Security
- Public Health, Elderly, and Persons with Disabilities
- Environmental Justice

The assessment was conducted relative to two baselines (see **Table 1-1**):

- The operational impacts of the No-Action Alternative in the 2040 planning horizon year were assessed relative to existing conditions as of 2017.[7]
- The operational impacts of the Preferred Alternative in the 2040 planning horizon year were assessed relative to No-Action Alternative conditions in 2040 and, more briefly, relative to existing conditions. The two-baseline approach was adopted because the No-Action Alternative includes the development of the privately owned air rights above the WUS rail terminal, a separate, large-scale project that would substantially change conditions in the Project Area. Assessment against both No-Action Alternative and existing conditions is intended to provide a more complete understanding of the impacts of the Project.
- Construction impacts were assessed relative to existing conditions.

Table 1-1. Framework for Evaluating Impacts

Alternative	Impacts	No-Action Alternative Baseline (2040)	Existing Conditions Baseline
No-Action Alternative	Operation (2040)	N/A	●
	Construction	N/A	●
Preferred Alternative	Operation (2040)	●	●
	Construction	N/A	●

N/A = Not applicable

1.5 Analysis Methodology

FRA conducted the impact analyses presented in this report in accordance with FRA's *Procedures for Considering Environmental Impacts*[8] along with other applicable guidance and regulations. Each section of the report lists the laws and regulations that apply to the resource under consideration and describes the methodologies used for the impact assessment. Whenever applicable and practicable, the analyses have been conducted in accordance with local environmental review policies and guidance.

For each resource category, the following information is provided:

[7] The existing condition of the affected environment for each resource is described in Appendix C2, *Washington Union Station (WUS) Expansion Project Affected Environment Technical Report*, of the 2020 DEIS. The impacts of the No-Action Alternative are described in Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*.

[8] Federal Railroad Administration. 2012. *Procedures for Considering Environmental Impacts.* Accessed from https://www.fra.dot.gov/eLib/Details/L02710. Accessed on November 15, 2022.

- **Regulatory Context**: List of relevant Federal and local laws and regulations.[9]
- **Study Area**: Definition of the area or areas within which the Project may have impacts.[10]
- **Methodology**: Summary description of the approach adopted to evaluate and assess the potential operational and construction impacts of the alternatives. The methodology section summarizes or complements the information presented in the April 2018 *Environmental Impact Statement Methodology Report* (Appendix C1 of the 2020 DEIS).[11]
- **Impact Analysis**: Description and assessment of the operational (long-term or permanent) and construction impacts of the Preferred Alternative. In accordance with CEQ's regulations for implementing NEPA, the DEIS assesses impacts based on context and intensity. The assessment uses the scale defined in **Section 1.3**, *Definitions* or, as applicable, a more resource-specific scale, as noted.

  For each resource, direct and indirect operational impacts are assessed relative to the No-Action Alternative. This assessment is complemented by a briefer evaluation of the impacts relative to existing conditions. Indirect impacts include the impacts of the potential development of the Federally owned air rights within the footprint of the existing parking garage.
- **Summary of Impacts**: Summary of impact findings.[12]
- **Avoidance, Minimization, and Mitigation:** As applicable, list of measures that FRA is proposing to minimize, avoid, or mitigate the adverse impacts of the Preferred Alternative wherever practicable. These measures will be finalized in the Final EIS.
- **Permits and Regulations**: If applicable, list of relevant permitting or regulatory requirements the Project Sponsor would have to comply with.

1.6 Project Area and Study Area

The impact analysis for each resource considered the Project Area (**Figure 1-1**) as well as a Local and, if applicable, a Regional Study Area representing the radius within which the alternatives have the potential to result in permanent or temporary impacts.

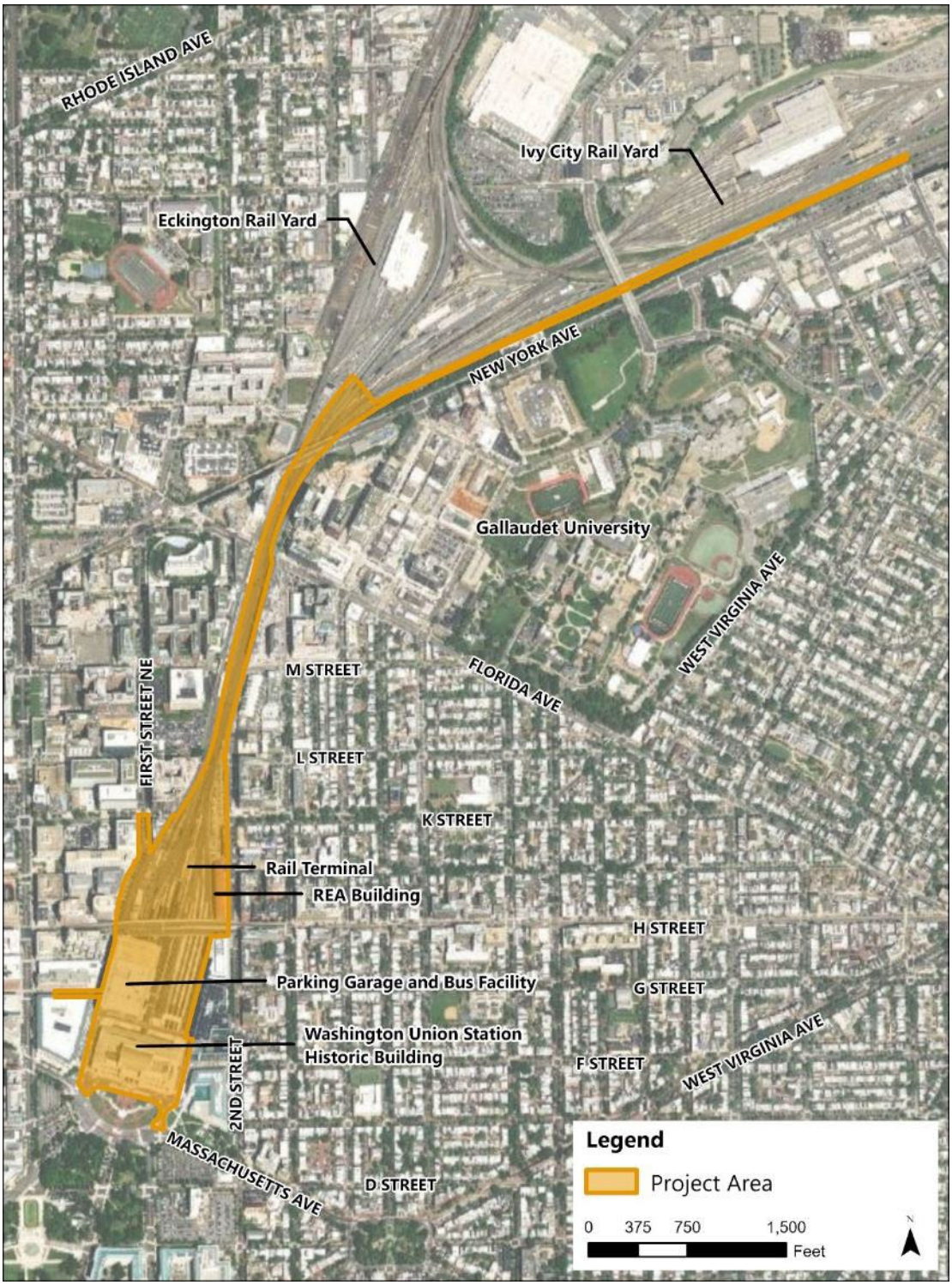
[9] Incorporated by reference: see **Section 1.1**, *Introduction.*

[10] Generally incorporated by reference: see **Section 1.1**, *Introduction*. However, a brief description is provided; where helpful for a better understanding of the impact descriptions, maps are also repeated.

[11] Generally incorporated by reference: see **Section 1.1**, *Introduction.* Where applicable, updates specific to the Preferred Alternative are noted. An exception is the *Methodology* section of **Section 5**, *Transportation*. Although the updates made to that section are discrete, they are scattered through the methodology description and impractical to call out separately; therefore, the entire, updated section is included.

[12] This section replaces the section titled *Comparison of Alternatives* in Appendix C3 of the 2020 DEIS. This report assesses only one alternative, the Preferred Alternative. The impacts of the No-Action Alternative are summarized as well, for reference.

Figure 1-1. Project Area



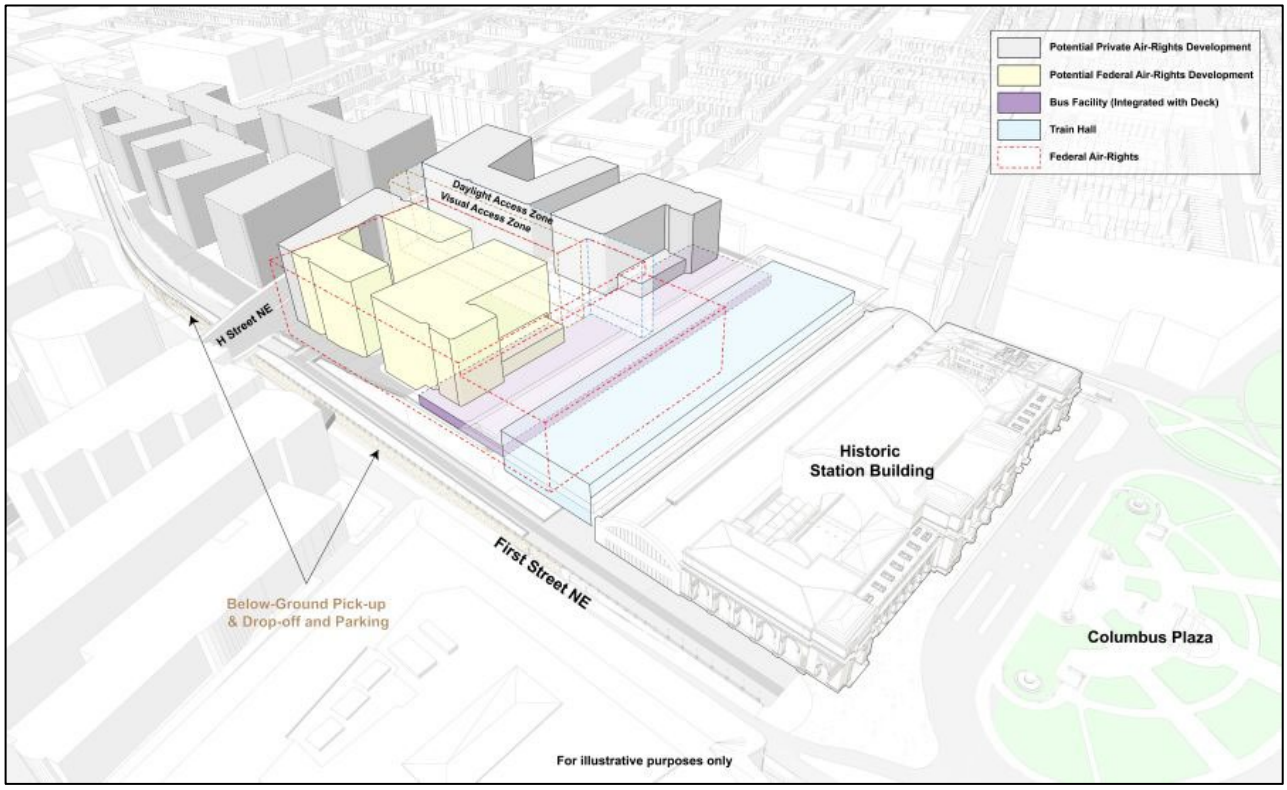
Often, the Local Study Area, proximate to the Project Area, is the focus of direct impacts while indirect impacts may be felt farther away, in the Regional Study Area. The Study Areas differ by resource because the type and range of potential impacts vary.

While the Preferred Alternative required a small modification of the Project Area to incorporate the new proposed access ramps to the below-ground facility, Local and Regional Study Areas did not change from those presented in the 2020 DEIS.

1.7 Summary Description of the Preferred Alternative

The Preferred Alternative assessed in this report features an east west train hall; bus facility integrated into the structural deck above the tracks; and a below-ground parking and pick-up and drop-off facility. The Federally owned air rights space not used for Project elements would be available for potential future transfer and development. **Figure 1-2** illustrates the Preferred Alternative. Summary descriptions of its key features follow.

Figure 1-2. Illustration of the Preferred Alternative



- **Rail Infrastructure**: The rail terminal would be reconstructed to replace the existing tracks and platforms with 19 new tracks: 12 stub-end tracks on the west side and seven run-through tracks on the east side, along with associated platforms.

- **Concourses**: Four new concourses would be provided to facilitate public access and circulation: east-west Concourse A (integrated with the train hall); east-west H Street Concourse; north-south Central Concourse; and north-south First Street Concourse. The new concourses would cover approximately 330,000 square feet.
- **Structures:** The east-west train hall would be approximately 150,000 square feet in area; it would cover the train engines and part of the first car on all the tracks. The bus facility would be approximately 122,500 square feet. It would be integrated within the deck.
- **Mix of Uses:** New retail space would be approximately 64,000 square feet; the Amtrak and related support area would be approximately 379,400 square feet (mostly north of H Street NE).
- **Parking:** Parking (including for rental cars) would be provided on one below-ground level parking facility shared with a pick-up and drop-off facility. There would be space to park approximately 400 to 550 cars. Access to and from the parking facility would be via ramps on G Street NE and First Street NE.
- **Buses:** The one-level integrated bus facility would connect directly to the train hall, facilitating access and intermodal transfers. The bus facility would have 38 slips in normal configuration. An additional slip could be provided in the island platform when needed, for a total of 39 slips. In times of unusually high demand from tour and charter buses, buses could make use of the deck-level pick-up and drop-off area adjacent to the train hall, which would provide the equivalent of approximately 15 bus slips. Buses would access the facility via H Street NE and a new intersection on the east side of the H Street Bridge. Buses would exit back to H Street via a new intersection on the west side of the bridge.
- **For-Hire Vehicles/Pick-up and Drop-off:** A pick-up and drop-off facility would be provided on one below-ground level, shared with the parking facility. Access would be via the ramps on G Street NE and First Street NE described above for parking. In addition, there would be an exit ramp on the east side of WUS allowing taxis to drive to the front of the station to pick up passengers. The facility would provide the equivalent of approximately 60 pick-up and drop-off spaces. Pick-up and drop-off areas would also be provided in front of WUS, on First and Second Streets NE near H Street NE, and at deck-level next to the train hall, above the bus facility.
- **Bicycles:** Bicycle access would be facilitated by two ramps, one on the west side and one on the east side of the station. Parking and storage for approximately 900 bicycles would be provided beneath the ramps and in the H Street Concourse near the entrances from First and Second Streets NE. Additional bikeshare spots would also be provided (approximately 100).
- **Pedestrians:** Pedestrians would access WUS via the existing Metrorail station's First and G Street NE entrance; the southwest portico of WUS; the front of the station; and from H Street NE. New entrances would be located under the H Street Bridge and headhouses would be provided at deck level on both sides of the H Street Bridge. Pedestrian access would also be facilitated by the two previously mentioned ramps on the west and east sides of the station.

- **Visual and Daylight Access Zones:** Areas enabling the development of a public space on the H street deck consistent with the significance of the historic station are included in the Preferred Alternative. These areas consist of a "Visual Access Zone," free of Project elements between H Street and the train hall; and a "Daylight Access Zone," also mostly free of Project elements but within which skylights would be installed to provide the new station concourse underneath with natural light. The private air rights developer would have primary responsibility for the design of the public space and would implement it, in coordination with the Project Sponsor for the Project elements and shared elements supporting the Project, such as the skylights.
- **Intercity and Commuter Operations and Ridership:** Levels of service would grow along with projected demand. Train volume increases relative to existing levels would range from 148 percent (Amtrak) to 187 percent (Virginia Railway Express [VRE]). Volumes in the Preferred Alternative are shown in **Table 1-2**.

Table 1-2. Train Passengers and Volumes by Service in Preferred Alternative

Service	Existing Passenger Volumes	2040 Passenger Volumes	Train Volume Increase over Existing
Amtrak	16,400 daily 5.033 million annually	32,000 daily (+95%) 9.070 million annually	148%
Maryland Area Rail Commuter Train (MARC)	28,100 daily 7.683 million annually	70,700 daily (+152%) 19.293 million annually	163%
VRE	3,900 daily 1.060 million annually	13,600 daily (+249%) 3.706 million annually	187%

- **Property Acquisition**: Approximately 2.9 acres of private air rights would be needed to accommodate various elements of the Preferred Alternative.

As a result, in the Preferred Alternative, the private air-right development would be smaller than in the No-Action Alternative. **Table 1-3** shows the assumed size of each use in both alternatives. FRA developed these assumptions in coordination with the private air rights developer.

Table 1-3. Private Air Rights Development Assumptions

Use	Preferred Alternative	No-Action Alternative
residential	979,950 square feet	1,050,000 square feet
Office	1,060,000 square feet	2,160,000 square feet
Retail	85,000 square feet	120,000 square feet
Hotel	608,000 square feet	410,00 square feet

- **Potential Development of Federal Air Rights:** The Federal air rights above the rail terminal not needed for the Project would be available for potential future transfer and development. For the purposes of impact analysis, the potential development would consist of approximately 500,000 square feet of mixed uses, distributed as shown in **Table 1-4**.

Table 1-4. Potential Federal Air Rights Development Assumptions in Preferred Alternative

Use	Preferred Alternative
residential	979,950 square feet
Office	1,060,000 square feet
Retail	85,000 square feet
Hotel	608,000 square feet

- **Estimated Construction Cost**: The Preferred Alternative would cost approximately $8.8 billion to construct. [13]
- **Estimated Construction Duration:** The Preferred Alternative would take an estimated 13 years to construct. The construction would occur in four main phases, moving from east to west of the rail terminal. During each phase, a set of tracks would be taken out of service. Between Phases 1 and 2, there would be a one-year period (Intermediate Phase) during which work would only occur in the First Street Tunnel. A more detailed description of construction phasing is provided in **Appendix S2**, Section S11.1. **Table 1-5** below shows the duration of each phase.

Table 1-5. Construction Durations

Phase	Total Duration (approximate Excavation Duration)
Phase 1	2 years 4 months (5 months)
Intermediate Phase	12 months (none)
Phase 2	2 years 8.5 months (10 months)
Phase 3	2 years 8.5 months (11 months)
Phase 4	4 years 3 months (2 years 1 month)
Total	13 years (4 years 3 months)

[13] This rough-order-of-magnitude estimate is for the construction of the Project alone, including track work north of K Street NE and excluding costs associated with the private air rights deck. The estimate is subject to future refinement.

2 Natural Ecological Systems

2.1 Overview

This section describes and characterizes the potential direct and indirect impacts of the Preferred Alternative on natural ecological systems. Natural ecological systems include resources such as vegetation, common and protected wildlife, wetlands, and floodplains. This section also identifies applicable permitting requirements.

2.2 Regulatory Context

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 2.2, *Regulatory Context*.

2.3 Study Area

Refer to Appendix C2, *Washington Union Station (WUS) Expansion Project Affected Environment Report*, Section 2.3, *Study Area***.** The Local Study Area includes the Project Area along with a 150-foot buffer. The Regional Study Area includes areas of the District surrounding the Local Project Area out to approximately 1,000 feet.

2.4 Methodology

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report, Section 2.4, Methodology.*

2.5 Impacts of the Preferred Alternative

This section presents the impacts of the Preferred Alternative on natural ecological systems. Impacts are summarized in bold lettering.

2.5.1 Direct Operational Impacts

Relative to existing conditions or the No-Action Alternative, the Preferred Alternative would have no direct operational impacts on natural ecological systems.

The Local and Regional Study Areas are fully developed with transportation infrastructure and buildings. They contain no natural ecological systems. Therefore, the Preferred Alternative would have no direct operational impacts on natural ecological systems.

2.5.2 Indirect Operational Impacts

Relative to existing conditions or the No-Action Alternative, the Preferred Alternative would have no indirect operational impacts on natural ecological systems.

For the same reasons as stated above, the Preferred Alternative would have no indirect operational impacts on natural ecological systems.

2.5.3 Construction Impacts

Construction of the Preferred Alternative would result in minor adverse impacts on natural ecological systems.

There are approximately 26 ornamental Japanese zelkova trees (*Zelkova serrata*) on the east sidewalk of First Street NE between G and K Streets. Based on field observations, they range from approximately 6 to 10 inches in diameter. Construction activities along the western edge of the Project Area and the east side of First Street NE would require the removal of those trees. The construction of pick-up and drop-off spaces on the west side of 2nd Street NE, south of the H Street Bridge, would likely require removing a few of the approximately ten trees currently present on the sidewalk. These would be minor adverse impacts, as the trees are non-native, ornamental street trees that do not form part of a larger natural system. Tree removal would require coordination with the District Department of Transportation (DDOT) Urban Forestry Ward Arborist and permitting, as described in **Section 2.8**, *Permits and Regulatory Compliance*.

Construction activities throughout the Project Area would likely disturb and displace any urban-dwelling birds or mammals that may be present. Such disturbance is common in urban areas and would only affect birds that could easily relocate to adjacent areas or nuisance species such as rats. This would not amount to an impact on natural ecological systems.

2.6 Summary of Impacts

Table 2-1 summarizes the impacts of the No-Action Alternative and the Preferred Alternative.

Table 2-1. Summary of Impacts

Type of Impact	No-Action Alternative	Preferred Alternative
Direct Operational	No impact	No impact
Indirect Operational	No impact	No impact
Construction	No impact	Minor adverse impact

2.7 Avoidance, Minimization, and Mitigation Evaluation

The Federal Railroad Administration (FRA) does not propose any avoidance, minimization, or mitigation measures beyond the permitting requirements described in **Section 2.8**, *Permits and Regulatory Compliance*.

2.8 Permits and Regulatory Compliance

The exact number of street trees to be removed would be determined during construction planning in coordination with the DDOT Urban Forestry Ward Arborist. Removal of street trees would require a Public Space Tree Permit from the DDOT Urban Forestry Division.[14] Compensation for lost trees is based on the health of the tree. Non-hazardous street trees require payment of $200 per inch diameter.[15] Hazardous street trees require planting a new street tree at a 1:1 ratio.[16] Compensation for removed trees would be provided in accordance with the applicable requirements.

[14]Information on the permit application process is available from: *DDOT Public Space Tree Permit*. Accessed on October 14, 2022.

[15]*DDOT Special/Heritage Tree Vs. Street Tree Permitting Process*. Accessed on October 14, 2022.

[16] A hazardous tree is a "a tree that, in the opinion of a certified arborist, is defective, diseased, dying, or dead and should be removed; poses a high risk of failure or fracture with the potential to cause injury to people or damage to property and should be removed; or is causing damage to property or structures that cannot be mitigated in any manner other than removal of the tree." (Code of the District of Columbia, Title 8, Chapter 6B, § 8–651.02, *Definitions*.)

3 Water Resources and Water Quality

3.1 Overview

This section describes and characterizes the potential direct and indirect impacts of the Preferred Alternative on surface waters, groundwater, stormwater, wastewater, and drinking water supply. This section also identifies measures that the Federal Railroad Administration (FRA) is proposing to avoid, minimize, or mitigate potential adverse impacts as well as relevant permitting and regulatory compliance requirements.

3.2 Regulatory Context

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 3.2, *Regulatory Context*.

3.3 Study Area

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 3.3, *Study Area.* The Local Study Area for water resources extends 500 feet from the Project Area to encompass adjacent connections to DC Water stormwater, water supply, and wastewater infrastructure. The Regional Study Area includes the Chesapeake Bay Watershed within the District.

3.4 Methodology

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report, Section 3.4, Methodology*.

3.5 Impacts of the Preferred Alternative

This section presents the impacts of the Preferred Alternative on water resources and water quality. Impacts are summarized in bold lettering, followed by a supporting description and analysis. Direct and indirect operational impacts as well as construction impacts are considered. Operational impacts are

assessed relative to the No-Action Alternative. A brief assessment of operational impacts relative to existing conditions is also provided.

3.5.1 Direct Operational Impacts

3.5.1.1 Surface Waters

Relative to the No-Action Alternative, the Preferred Alternative would have no direct operational impacts on surface waterbodies.

There are no bodies of surface water in or adjacent to the Project Area. Therefore, the Preferred Alternative has no potential to directly affect surface waters or water quality.

3.5.1.2 Groundwater

Relative to the No-Action Alternative, the Preferred Alternative would have a moderate adverse direct operational impact on groundwater.

There are no public groundwater supplies or wellhead protection areas within the Project Area and the Preferred Alternative would have no impacts on those resources. The Project Area is almost fully impervious and is a negligible source of groundwater recharge. This would remain the same in the Preferred Alternative. Land cover within the Project Area in the No-Action Alternative would consist of impervious surfaces that inhibit groundwater recharge. The Project Area's land cover would similarly be fully impervious in the Preferred Alternative. Therefore, the Preferred Alternative would have no impacts on groundwater recharge.

The Preferred Alternative would have moderate direct operational impacts on groundwater levels. The Preferred Alternative would require excavating most of the rail terminal to a depth of approximately 3 feet above sea level. This would be below current groundwater elevations at the site. The construction of a slurry wall down to the Potomac Clay layer underlying the Project Area around the perimeter of the excavation and the installation of concrete pressure slabs at the bottom of the excavation would minimize any long-term groundwater seepage, but it may not eliminate it entirely. Preliminary modeling conducted for the 2020 DEIS Action Alternatives indicated that, depending on the rates of ongoing dewatering in the area, long-term dewatering rates under 2020 DEIS Alternative C would range from 20 to 30 gallons per minute. This equates to 28,800 to 43,200 daily gallons that would have to be pumped and disposed of, after treatment if required. Because the Preferred Alternative would involve the same depth of excavation as 2020 DEIS Alternative C, the same long-term dewatering rates are anticipated.[17] This would be within the threshold for a District Significant Non-Categorical Industrial User Wastewater

[17] Wood. February 2019. *Preliminary Report of Aquifer Pumping Test and Seepage Analysis, Union Station, Washington, D.C.* With respect to depth of excavation and impacts on groundwater, the Preferred Alternative is most similar to 2020 DEIS Alternative C with cut-off wall to the Potomac Clay analyzed in the report.

Discharge Permit (25,000 gpd or more).[18] Groundwater withdrawal may increase the risk of soil settlement, as described in **Section 3.5.3.2**, *Groundwater*.

3.5.1.3 Stormwater

Relative to the No-Action Alternative, the Preferred Alternative would have a moderate beneficial direct operational impact on stormwater infrastructure and stormwater flows.

Because the Project Area would be entirely impervious in the No-Action Alternative and would remain so in the Preferred Alternative, the Preferred Alternative would cause no change in impervious cover. However, modifications to the Project Area's drainage infrastructure, including roof drains, catch basins, and drainage pipes, would be necessary to accommodate the Preferred Alternative under current District stormwater management laws and regulations. [19]

The stormwater management practices currently in place in the Project Area were put in place before the District adopted its more stringent current stormwater regulations. Under current regulations, the Preferred Alternative would be a Major Land Disturbing Activity.[20] The applicable retention standard is to retain the first 1.2 inches of rainfall on-site or by combining on-site and off-site retention. The applicable detention standard is to maintain peak discharge from the two-year storm to pre-development conditions; and from the 15-year storm to pre-project conditions. [21] Therefore, the Preferred Alternative would require additional stormwater management to treat any Storm Water Retention volume (SWRv) not treated under the No-Action Alternative. The Preferred Alternative would also comply with Section 438 of the Energy Independence and Security Act (EISA) of 2007. The resulting upgrades would decrease runoff volume, peak flow rate, and pollutant loading from the Project Area, which would be a beneficial impact.

In the No-Action Alternative, the private air rights development, which would cover most of the Project Area, would be subject to the current District regulations. Therefore, the area that would be upgraded to current stormwater treatment regulations in the Preferred Alternative would be limited to the footprint of the Project within the Federally owned air rights and the edges of the historic station building. For this reason, the beneficial impact of the Preferred Alternative relative to the No-Action Alternative would be moderate.

[18] DC Water. *Industrial User Wastewater Discharge Permit*. Accessed from https://www.dcwater.com/industrial-user-wastewater-discharge-permit. Accessed November 11, 2022. The permit is for disposal through the District's wastewater system and this requirement is not indicative of the intensity of impacts on groundwater.

[19] Department of Energy and Environment (DOEE). *2020 Stormwater Management Guidebook*. Accessed from https://doee.dc.gov/swguidebook. Accessed on November 10, 2022.

[20] Major Land Disturbing Activity is considered to be any land disturbance greater than or equal to 5,000 square feet.

[21] DOEE. *2020 Amendments to the District's Stormwater Management Regulations.* Accessed from https://doee.dc.gov/sites/default/files/dc/sites/ddoe/page_content/attachments/0%20Full%2021%20DCMR%20Chapter%205%20with%20Changes%20Accepted%20-%202020%20Amendments.pdf. Accessed on January 19, 2023.

3.5.1.4 Wastewater

Relative to the No-Action Alternative, the Preferred Alternative would have minor adverse direct operational impacts on wastewater infrastructure and wastewater flows.

The Preferred Alternative would likely require modifications to sewer laterals to serve the expanded station. At the current, early stage of Project design, no information is available on the location and extent of these modifications, but they would likely overlap with those that would occur in the No-Action Alternative for the private air rights development as both projects would occur within the boundaries of the WUS terminal. Coordination would minimize the work needed to accommodate the Project if both projects are constructed, as it is assumed to be the case in the Preferred Alternative. Relative to the No-Action Alternative, adverse impacts would be minor.

Table 3-1 shows estimated additional wastewater flows from the Project Area in the Preferred Alternative relative to the No-Action Alternative (estimates are recapitulated in **Table 3-5** below). WUS-related generation would increase in proportion to the number of additional passengers relative to the No-Action Alternative. Because the Preferred Alternative would use some of the private air rights area, there would also be a change in the size of the private air rights development and the quantity of wastewater this development would produce relative to the No-Action Alternative. Altogether, the net total additional daily flow in the Preferred Alternative would be approximately 29,000 gallons per day (after rounding).

This estimate does not include the increase due to any needed long-term groundwater disposal, which would be up to 43,200 gallons per day of groundwater from long-term (see **Section 3.5.1.2**, *Groundwater*, including the permitting requirement triggered by long-term groundwater disposal), for a total of approximately 72,200 gallons per day that would be discharged to the sewer conveyance system. This would be a 13 percent increase relative to the No-Action Alternative (547,700 gallons per day). The net increase in flows from the Project Area is not likely to result in more frequent combined sewer overflows. In normal conditions, wastewater from the Project Area would continue to be conveyed to the Blue Plains Advanced Wastewater Treatment Plant (Blue Plains), which has the capacity to treat an average of 384 million gallons per day and treats approximately 300 million gallons on an average day.[22] The increase from the Preferred Alternative would only represent approximately 0.02 percent of Blue Plains' average daily capacity and 0.08 percent of the average unused daily capacity. The impact would be minor.

[22] DC Water. *Blue Plains Advanced Wastewater Treatment Plant*. Accessed from https://www.dcwater.com/sites/default/files/documents/blue_plains_plant_brochure_2020_final_0.pdf. Accessed on October 14, 2002. DC Water. *The Largest Advanced Wastewater Treatment Plant in the World*. Accessed from https://www.dcwater.com/blue-plains. accessed on January 10, 2023.

Table 3-1. Estimated Changes in Wastewater Generation (Average Daily Flow)

Location	Use	Unit Flow Rate (gpd)	Total Unit (2040)	Estimated Average Daily Flow (gpd)
WUS	Rail and Bus[1]	1.7 / passenger[2]	+50,900 passengers	+86,530
	Retail	0.05 /square foot[3]	+64,000 square feet	+3,200
Sub-total				+89,730
Private Air Rights Development[5]	Residential	60 /resident	-160 residents[4]	-9,600
	Office	0.09 /square foot	-1,100,000 square feet	-99,000
	Retail	0.05 /square foot	-35,000 square feet	-1,750
	Hotel	0.25 /square foot	+198,600 square feet	+49,650
Sub-total				-60,700
Total				+29,030

1. Amtrak + MARC + VRE + Intercity bus ridership.
2. Per-passenger unit rate calculated for existing conditions based on 2017 station water usage.
3. Rates based on Maryland Design Guidelines for Wastewater Facilities unless otherwise noted.[23]
4. Assumes 2.1 residents per unit.
5. Negative numbers indicate a reduction relative to the No-Action Alternative due to the smaller size of the private air rights development.

3.5.1.5 Drinking Water

Relative to the No-Action Alternative, the Preferred Alternative would have a minor adverse direct operational impact on drinking water infrastructure and demand.

The Preferred Alternative would likely require modifications to the water distribution infrastructure to serve the expanded station. At the current, early stage of Project design, there is no information on the location and extent of the needed modifications, but they would likely overlap with those that would occur in the No-Action Alternative for the private air rights development and could be coordinated with them as would be the case in the Preferred Alternative. This would minimize the work needed to accommodate the Project. Relative to the No-Action Alternative, adverse impacts would be minor.

Additional water demand from the Project Area in the Preferred Alternative, based on wastewater generation with an added factor of 10 percent to account for consumption, system losses, and other use, would be approximately 31,930 gallons per day, a 5 percent increase relative to the No-Action Alternative (602,470 gallons per day; estimates are recapitulated in **Table 3-5** below). Drinking water would continue to be distributed by DC Water and supplied by the Washington Aqueduct. The Aqueduct

[23] Maryland Department of the Environment Engineering and Capital Projects Program. 2016. *Design Guidelines for Wastewater Facilities.* Accessed from https://mde.maryland.gov/programs/Permits/WaterManagementPermits/Documents/WastewaterDesignGuidelines-2016.pdf. Accessed on October 14, 2022.

produces an average of 135 million gallons per day in the two treatment plants located in the District.[24] The increase in demand relative to the No-Action Alternative would represent about 0.02 percent of this capacity. This would be a minor adverse impact.

3.5.2 Indirect Operational Impacts

3.5.2.1 Surface Waters

Relative to the No-Action Alternative, the Preferred Alternative would result in a negligible adverse indirect operational impact to surface waterbodies, including the Anacostia River, Potomac River, and Chesapeake Bay.

Relative to the No-Action Alternative, the Preferred Alternative would have a beneficial impact on the quantity and quality of the stormwater generated in the Project Area and a minor adverse impact on the quantity of wastewater produced there. As noted above, the net increase in flows from the Project Area is not likely to result in more frequent combined sewer overflows. In normal conditions, Blue Plains would treat all wastewater flowing from the Project Area. Adverse impacts on the quantity and quality of water in the Anacostia River or Potomac River, and beyond, in the Chesapeake Bay, would be negligible given the small size of the Project Area and the small amount of effluent it would generate compared to the drainage basins of those waterbodies (176 square miles for the Anacostia River alone).[25]

3.5.2.2 Groundwater

Relative to the No-Action Alternative, the Preferred Alternative would have no indirect operational impacts on groundwater.

Construction of the Federal air rights development on a structural deck above the rail terminal would involve no excavation. It would require no temporary or long-term pumping and disposal of groundwater. Therefore, the Preferred Alternative would have no indirect impacts on groundwater in addition to its direct impacts.

3.5.2.3 Stormwater

Relative to the No-Action Alternative, the Preferred Alternative would have a moderate beneficial indirect operational impact on stormwater.

The potential development of the Federal air rights would lead to upgrades to the existing infrastructure in compliance with current requirements. As explained in **Section 3.5.1.3**, *Stormwater*, current

[24] U.S. Army Corps of Engineers. *Washington Aqueduct*. Accessed from https://www.nab.usace.army.mil/Missions/Washington-Aqueduct/. Accessed on October 14. 2022.

[25] U.S. Environmental Protection Agency. *Anacostia River Background Information Factsheet*. Accessed from https://www.epa.gov/sites/default/files/2014-06/documents/anacostia-river-background-2013.pdf. Accessed on February 10, 2023.

stormwater treatment regulations are more stringent than those in place when the existing and No-Action use of the area (parking garage) was constructed, resulting in a beneficial impact relative to No-Action Alternative conditions. Because of the limited size of the affected area, this beneficial impact would be moderate.

3.5.2.4 Wastewater

Relative to the No-Action Alternative, the Preferred Alternative would have a minor adverse indirect operational impact on wastewater.

In the Preferred Alternative, the potential Federal air rights development would consist of approximately 175,000 square feet of residential uses; 310,000 square feet of office uses; and 15,000 square feet of retail uses. As shown in **Table 3-2**, this would generate approximately 51,810 gallons per day of additional wastewater (estimates are recapitulated in **Table 3-5** below). it would represent an increase of 9 percent relative to the No-Action Alternative.

Table 3-2. Estimate of Annual Potential Federal Air Rights Development Wastewater Generation (Average Daily Flow)

Use	Unit Flow Rate[1] (gpd)	Total Unit (2040)	Estimated Average Daily Flow (gpd)
Residential	60 / resident	386 residents[1]	23,160
Office	0.09 / sf	310,000 sf	27,900
Retail	0.05 / sf	15,000 sf	750
Total			**51,810**

1. Assumes an average of 950 square feet and 2.1 residents per unit.

Wastewater would continue to be collected and conveyed via DC Water combined sewer lines to Blue Plains. The additional production of 51,810 gallons per day is not likely to increase the frequency of combined sewer overflows. It would represent about 0.013 percent of Blue Plains' average daily capacity (384 million gallons per day) and about 0.06 percent of the average unused daily capacity (84 million gallons per day).

3.5.2.5 Drinking Water

Relative to the No-Action Alternative, the Preferred Alternative would have a minor adverse indirect operational impact on drinking water.

In the Preferred Alternative, the potential development of the Federal air rights would increase drinking water demand. The Federal air rights development, consisting of a mix of residential, office, and retail space as described above, would approximately generate an additional 56,991 gallons per day of water demand (calculated as wastewater demand plus 10 percent for consumption, system losses, and other uses; estimates are recapitulated in **Table 3-5** below). This would represent an increase of 9 percent relative to the No-Action Alternative.

Drinking water would continue to be distributed by DC Water and supplied by the Washington Aqueduct. The Aqueduct produces an average of 135 million gallons per day. The increase in demand from the Federal air rights development would represent 0.04 percent of this capacity, a minor adverse impact.

3.5.3 Construction Impacts

3.5.3.1 Surface Waters

Construction of the Preferred Alternative would have no impacts on surface waterbodies.

No surface waterbodies lie within or adjacent to the Project Area. Therefore, the construction activities associated with the Preferred Alternative would not affect surface waterbodies.

3.5.3.2 Groundwater

Construction of the Preferred Alternative would have moderate adverse impacts on groundwater.

Because of the depth of the excavation required in the Preferred Alternative, groundwater seepage would occur during construction and require dewatering. Preliminary modeling conducted for 2020 DEIS Alternative C (see **Section 3.5.1.2**, *Groundwater*, above) estimated a short-term dewatering rate ranging from approximately 220 gallons per minute (316,800 gallons per day) to 280 gallons per minute (403,200 gallons per day).[26] This would be well above the minimum threshold for, and thus require, a Significant Non-Categorical Industrial User Wastewater Discharge Permit (25,000 gpd).[27] Dewatering would have to be conducted in compliance with National Pollutant Discharge Elimination System (NPDES) construction general permit dewatering requirement[28], as well as the Department of Energy and Environment (DOEE) and DC Water requirement for treatment and metering of pumped groundwater.

Groundwater withdrawal has the potential to cause soil settlement in the vicinity of the withdrawal. Until geotechnical studies are conducted and identify existing dewatering operations, the level and extent of potential soil settlement cannot be determined. Based on preliminary modeling, it can be anticipated that the greatest risk of subsidence would occur immediately adjacent to the cut-off wall, where groundwater drawdown would be greatest, and that it would decrease with increasing distance from the wall. The features at greatest risk for drawdown-induced settlement would likely be shallow utility infrastructure such as sewer lines, gas lines, or water lines in the Project Area or adjacent public

[26] Wood. February 2019. *Preliminary Report of Aquifer Pumping Test and Seepage Analysis, Union Station, Washington, D.C.* With respect to depth of excavation and impacts on groundwater, the Preferred Alternative is similar to 2020 DEIS Alternative C with cut-off wall to the Potomac Clay analyzed in the report.

[27] The permit is for disposal through the District's wastewater system. This requirement is not indicative of the intensity of impacts on groundwater.

[28] EPA. 2022. *National Pollutant Discharge Elimination System (NPDES) General Permit for Construction Activities. Section 2.4 Construction Dewatering Requirements*. Accessed from https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-fact-sheet.pdf. Accessed on October 21, 2022

roadways; the WUS Metrorail station; and adjoining buildings supported by shallow foundation systems. Most of the larger buildings adjacent to WUS are likely to sit on deep foundations and, therefore, are unlikely to experience settlement. [29] Therefore, any impacts would be moderate. **Section 3.7**, *Avoidance, Minimization, and Mitigation Evaluation*, outlines measures to minimize the risk of settlement.

3.5.3.3 Stormwater

Construction of the Preferred Alternative would cause minor adverse impacts on stormwater flows.

Ground-disturbing activities associated with the construction of the Preferred Alternative could result in increased erosion and sedimentation, which would affect the quality of stormwater runoff from the Project Area. Increased sediment loadings in stormwater conveyed by drainage systems can also result in lost conveyance capacity. These risks would be minimized because the Project would be required to include erosion and sediment controls in compliance with NPDES construction general permit and DOEE's *Erosion and Sediment Control Manual.* [30,31] Erosion and sediment control practices would prevent the transport of significant amounts of sediment from the construction site to city streets, drainage systems, and waterbodies. Adverse impacts would be minor.

3.5.3.4 Wastewater

Wastewater flows from construction-related dewatering in the Preferred Alternative would cause a minor adverse impact on wastewater.

Groundwater pumped out of the Project Area during construction would be discharged to the wastewater conveyance system after being treated on site, if required. As explained above, the maximum modeled amount of discharged groundwater would be approximately 403,200 gallons a day. This would require a Significant Non-Categorical Industrial User Wastewater Discharge Permit, as noted in **Section 3.5.1.2**, *Groundwater*. Wastewater would be conveyed via DC Water sewer lines to Blue Plains. Given Blue Plains' total and unused capacity (an average of 384 million gallons per day and 84 million gallon per day, respectively), the additional amount from the Preferred Alternative construction would represent a minor impact (0.1 percent of total capacity and 0.5 percent of unused capacity).

3.5.3.5 Drinking Water

Water demand during construction of the Preferred Alternative would result in a negligible adverse impact on drinking water.

Water would be used during construction activities for dust control, equipment washing, and construction worker sanitation and consumption. DC Water would likely provide the water. Although

[29] Wood. February 2019. *Preliminary Report of Aquifer Pumping Test and Seepage Analysis, Union Station, Washington, D.C.*

[30] EPA. 2022. *National Pollutant Discharge Elimination System (NPDES) Construction General Permit*. Accessed from https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-fact-sheet.pdf. Accessed on October 21, 2022.

[31] District Office of Energy and Environment. 2017. *Erosion and Sediment Control Manual*. Accessed from https://doee.dc.gov/esc. Accessed on October 21, 2022.

the amount of water that would be used cannot be estimated, it would be typical of a large-scale construction project in the District and is not likely to exceed the Washington Aqueduct capacity. Impacts would be negligible.

3.5.4 Comparison to Existing Conditions

Relative to existing conditions, the impacts of the Preferred Alternative on surface waterbodies and groundwater would be the same as relative to the No-Action Alternative (see **Table 3-4**). There is no relevant difference between the two baselines.

Relative to existing conditions, the Preferred Alternative would have a major beneficial impact on stormwater, as it would bring the entire rail terminal up to current stormwater treatment regulatory requirements.

Relative to existing conditions, the Preferred Alternative would have minor adverse impacts on wastewater and drinking water. The Preferred Alternative would cause an increase in demand for these services as shown in **Table 3-3**. Impacts would be minor because the increases in demand would be small relative to the capacity of DC Water's water supply and wastewater infrastructure. The increase in wastewater demand would represent approximately 0.05 percent of Blue Plains' average daily capacity. The increase in drinking water demand would represent approximately 0.1 percent of the Washington Aqueduct's daily production.

Table 3-3. Comparison of Preferred Alternative to Existing Conditions

Water Resource Category	Impact	Existing Conditions (gpd)	Increased Demand in Preferred Alternative (2040) (gpd)	Increase Relative to Existing Conditions
Wastewater	Direct	83,500	+132,930[1]	+159%
	Indirect	0	+51,810	-
	Total	83,500	+184,740	+221%
Drinking Water	Direct	91,850	+98,703[2]	+107%
	Indirect	0	+56,991	-
	Total	91,850	+155,694	+169%

1 Based on increase in Amtrak + MARC + VRE + Intercity bus ridership relative to existing conditions, new retail, and groundwater disposal from long-term dewatering.

2 Based on wastewater from total ridership and retail + 10 percent.

3.6 Summary of Impacts

Table 3-4 and **Table 3-5** summarize the impacts of the No-Action Alternative and the Preferred Alternative on water resources and water quality.

Table 3-4. Summary of Impacts

Impact Category	Type of Impact	No-Action Alternative	Preferred Alternative
Surface Waters	Direct Operational	No impact	No impact
	Indirect Operational	Negligible adverse impact	Negligible adverse impact
	Construction	No impact	No impact
Groundwater	Direct Operational	Negligible adverse impact	Moderate adverse impact
	Indirect Operational	No impact	No impact
	Construction	Negligible adverse impact	Moderate adverse impact
Stormwater	Direct Operational	Major beneficial impact[32]	Moderate beneficial impact
	Indirect Operational	No impact	Moderate beneficial impact
	Construction	Minor adverse impact	Minor adverse impact
Wastewater	Direct Operational	Minor adverse impact	Minor adverse impact
	Indirect Operational	No impact	Minor adverse impact
	Construction	Negligible adverse impact	Minor adverse impact
Drinking Water	Direct Operational	Minor adverse impact	Minor adverse impact
	Indirect Operational	No impact	Minor adverse impact
	Construction	Negligible adverse impact	Negligible adverse impact

[32] Updated from 2020 DEIS after review.

Table 3-5. Quantitative Estimates of Direct and Indirect Impacts by Alternative

Impact Category	Parameter	Source of Impact	No-Action Alternative (Additional)	No Action Alternative (Total)	Preferred Alternative (Additional)	Preferred Alternative (Total)
Construction-phase dewatering	Dewatering rate (gpm)	Project Area	N/A	N/A	220 to 280	220 to 280
Long-term Dewatering	Dewatering rate (gpm)	Project Area	N/A	N/A	20 to 30	20 to 30
Wastewater	Demand (gpd)	WUS	+32,300	115,800	+132,930	248,730
		Private Air Rights Development	+431,900	431,900	-60,700	371,200
		Potential Federal Air Rights Development	0	0	+51,810	51,810
		Total	**+464,200 (+556%)**	**547,700**	**+124,040 (+23%)**	**671,740**
Water	Demand (gpd)	WUS	+35,530	127,380	+98,703	226,083
		Private Air Rights Development	+475,090	475,090	-66,770	408,320
		Potential Federal Air Rights Development	0	0	+56,991	56,991
		Total	**+510,620 (+556%)**	**602,470**	**+88,924 (+15%)**	**691,394**

Abbreviations: gpm = gallons per minute; gpd = gallons per day; N/A = not available

3.7 Avoidance, Minimization and Mitigation Evaluation

FRA is proposing the following measures to minimize adverse impacts to surface waterbodies, groundwater, stormwater, wastewater, and water supply infrastructure, consistent with the U.S. Environmental Protection Agency (EPA)'s 2022 NPDES Construction General Permit,[33] Section 438 of the EISA, DOEE's *Stormwater Management Guidebook*,[34] the District Department of Transportation (DDOT)'s *Green Infrastructure Standards*,[35] DC Water's *Green Infrastructure Utility Protection Guidelines*,[36] and DC Water's *Project Design Manual, Volume 3, Linear Infrastructure Design*.[37]

- Construction-phase measures
  - Union Station Development Corporation (USRC) to require construction contractor to develop and implement erosion and sedimentation controls.
  - USRC to require construction contractor to provide on-site treatment of pumped groundwater as needed, and discharge through the District's combined sewer combined sewer system after receiving authorization from DC Water for a Temporary Discharge Authorization Permit.
  - Prior to the beginning of construction, USRC to conduct additional groundwater studies, including, as appropriate:
    - Performing additional borings to depths of 120 to 150 feet inside and along the perimeter of the Project Area to better characterize the lower aquifer's composition and extent as well as any discontinuities of the Potomac Clay layer separating the aquifers.
    - Performing research on adjacent properties to understand the local impacts of ongoing or periodic dewatering systems operating around the Project Area.
    - Performing additional pump testing that target zones of clay discontinuity in the lower aquifer.
    - If warranted by the above, performing further modeling to map the areas that have high potential to experience ground subsidence from groundwater drawdown.

[33] U.S. Environmental Protection Agency. *2022 General Construction Permit*. Accessed from https://www.epa.gov/npdes/2022-construction-general-permit-cgp. Accessed on November 10, 2022.

[34] DOEE. *2020 Stormwater Management Guidebook*. Accessed from https://doee.dc.gov/swguidebook. Accessed on November 10, 2022.

[35] DDOT. *Green Infrastructure Standards* (2014). Accessed from https://ddot.dc.gov/GreenInfrastructure. Accessed on November 10, 2022.

[36] DC Water. *Green Infrastructure Utility Protection Guidelines*. Accessed from https://www.dcwater.com/sites/default/files/Green%20Infrastructure%20Utility%20Protection%20Guidelines.pdf. Accessed on November 10, 2022.

[37] DC Water. *Project Design Manual, Volume 3, Linear Infrastructure Design.* Accessed from https://www.dcwater.com/sites/default/files/engineering/PDM%20Vol%203%20-%20Linear%20Infrastructure%20Design_0.pdf. Accessed on November 10, 2022.

- During construction, if warranted by the studies listed above, monitoring and control of the amount of active dewatering on the site so it does not create subsidence in and around adjacent properties.

- Post-construction measures:
  - USRC to ensure that Project design incorporates stormwater management features, including green infrastructure practices such as rainwater collection and reuse, green roofs, and bioretention facilities, to manage stormwater flows, as appropriate in accordance with DOEE's *Stormwater Management Guidebook*.
  - USRC to incorporate in Project design to the maximum extent technically feasible additional stormwater management measures to restore, pre-development site hydrology in compliance with Section 438 of the EISA.

3.8 Permits and Regulatory Compliance

DOEE is the lead authority on environmental compliance within the District. DOEE completes reviews and issues permits for land-disturbing projects. The Project would qualify as a Major Land Disturbing Activity[38] and would be required to secure permits for erosion and sediment control, dewatering, and post-construction stormwater management.

The Project would also be regulated under the EPA's NPDES Construction General Permit and would need to submit a Stormwater Pollution Prevention Plan (SWPPP) to both DOEE and EPA Region 3 that is compliant with the requirements of the permit. A SWPPP is a document that identifies potential sources of stormwater pollution at a construction site, describes practices to reduce pollutants in stormwater and non-stormwater discharges from the site, and identifies procedures to achieve compliance.

DC Water is an independent authority that distributes drinking water and collects and treats stormwater and wastewater in the District. The Project would need to secure a DC Water Permit Operations Department approval for water and wastewater connections, as well as discharge of pumped groundwater.

DOEE and DC Water regulate construction and post-construction phase groundwater discharge. The discharge must comply with DC Municipal Regulation, Title 21 – Water and Sanitation. Particularly relevant sections include Chapter 21-1501, Discharge Standards and Sewer Use Requirements and §21-207, Sanitary Sewer Service Charge for Groundwater: Improved Sites and Construction Sites. Treatment prior to discharge may be required. The construction groundwater discharge is metered and DC Water charges $3.78 (FY 2022 rates) per 1,000 gallons.[39] The Project may require a Significant Non-Categorical Industrial User Wastewater Discharge Permit (more than 25,000 gallons per day and more than six months duration), which has an annual cost of $3,100 (based on rates effective October 1, 2022).[40]

[38] Major Land Disturbing Activity is considered to be any land disturbance greater than or equal to 5,000 square feet.

[39] DC Water. Approved Fiscal Year 2023 and 2024 rates. Accessed from https://www.dcwater.com/approved-fy-2023-and-fy-2024-rates. Accessed on November 10, 2022.

[40] DC Water. *Fees and Charges*. Accessed from https://www.dcwater.com/fees-charges. Accessed on November 10, 2022.

4 Solid Waste Disposal and Hazardous Materials

4.1 Overview

This section describes and characterizes the potential direct and indirect impacts of the Preferred Alternative on solid waste production and disposal and on hazardous material use and disposal. This section also identifies measures the Federal Railroad Administration (FRA) is proposing to avoid, minimize, or mitigate potential adverse impacts as well as relevant permitting and regulatory compliance requirements.

Solid waste in general means "any garbage or refuse, sludge from a wastewater treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, resulting from industrial, commercial, mining, and agricultural operations, and from community activities."[41] In the case of WUS and the Project, solid waste consists primarily of municipal waste (trash or garbage). Hazardous materials are any substances or chemicals that are a "health hazard" or "physical hazard" as defined by 29 Code of Federal Regulations (CFR) 1910.1200.

4.2 Regulatory Context

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 4.2, *Regulatory Context*.

4.3 Study Area

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 4.3, *Study Area.* The Local Study Area for solid waste and hazardous materials is the Project Area. It is unlikely that solid waste and hazardous materials present at a regional level would require handling or storage within the Project Area; therefore, a Regional Study Area was not considered.

[41] United States Environmental Protection Agency. *Criteria for the Definition of Solid Waste and Solid and Hazardous Waste Exclusions*. Accessed from https://www.epa.gov/hw/criteria-definition-solid-waste-and-solid-and-hazardous-waste-exclusions. Accessed on October 31, 2022.

4.4 Methodology

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report,* Section 4.4*, Methodology.*

4.5 Impacts of the Preferred Alternative

This section presents the impacts of the Preferred Alternative on solid waste and hazardous materials. Impacts are first summarized in bold lettering, followed by a supporting description and analysis. Direct and indirect operational impacts as well as construction impacts are considered. Operational impacts are assessed relative to the No-Action Alternative. A brief assessment of impacts relative to existing conditions is also provided.

4.5.1 Direct Operational Impacts

4.5.1.1 Municipal Solid Waste

Relative to the No-Action Alternative, the Preferred Alternative would have a minor beneficial direct operational impact on solid waste generation.

Table 4-1 shows the net change in the amount of municipal waste that the Project Area would generate in the Preferred Alternative. The table shows both the additional waste that WUS would generate and the reduction in the amount of waste that the smaller private air rights development would produce.

Increased activity and ridership at WUS in the Preferred Alternative would generate an increase in the amount of municipal solid waste produced by the station. An order-of-magnitude estimate of the increase in solid waste generation that would occur can be calculated based on the assumption that it would be approximately proportional to the increase in ridership. In 2040, daily WUS ridership (Amtrak, VRE, MARC, and intercity buses) would increase by around 65 percent relative to the No-Action Alternative. No-Action ridership would produce approximately 3,105 tons of municipal waste annually. An increase in solid waste proportional to the increase in ridership in the Preferred Alternative would result in approximately 2,020 more tons of municipal waste per year.

Table 4-1. Change in Solid Waste Generation in the Preferred Alternative

	Difference Between No-Action and Preferred Alternative	Waste generation Rate (Pounds/Day)[2]	Waste Generation Estimate (Tons/Year)
WUS			
Station	-	-	2,020[1]
Retail	+64,000 square feet	5.5/100 square feet	642
Total WUS	**-**	**-**	2,662
Private Air Rights Development			
Residential	-75 units[3]	4.75/unit	-65
Office	-1,100,000 square feet	2.75/100 square feet	-5,521
Retail	-35,000 square feet	5.5/100 square feet	-351
Hotel	+236 rooms	20/room	+861
Total Private Air Rights Development	-	-	-5,076
Total			
-	**-**	**-**	**-2,414**

1. Proportional to increase in passengers.
2. Rates developed based on waste generation rates provided by District Department of Public Works, Office of Waste Diversion (January 2019) and volume-to-weight conversion factors obtained from EPA (https://www.epa.gov/sites/production/files/2016-04/documents/volume_to_weight_conversion_factors_memorandum_04192016_508fnl.pdf).
3. Assuming 950 feet per unit.

The Preferred Alternative would also add 64,000 square feet of retail to the approximately 208,000 square feet of existing and No-Action Alternative retail space at WUS. This would contribute approximately 642 tons of additional waste per year, bringing the total increase in WUS-generated waste to about 2,662 tons per year.[42] This increase would amount to approximately 0.2 percent of the 1,139,846 tons of waste produced in the District in 2018.[43]

[42] Based on daily generation rates provided by District Department of Public Works, Office of Waste Diversion (January 2019) and volume-to-weight conversion factors obtained from EPA (https://www.epa.gov/sites/production/files/2016-04/documents/volume_to_weight_conversion_factors_memorandum_04192016_508fnl.pdf). The generation rate for retail is 5.5 pounds per 100 square feet.

[43] Department of Public Works. *Washington DC Solid Waste Diversion Annual Report. Calendar Year 2018*. Accessed from: https://zerowaste.dc.gov/sites/default/files/dc/sites/zerowaste/CY%2018%20Diversion%20Report%20Final%203%2010%2021.pdf. Accessed on January 13, 2023. This is the most recent date for which a report is available.

Consistent with the District's Zero Waste vision, a part of the solid waste generated in the Project Area would be recycled or composted.[44] Non-recycled waste would be sent to landfill facilities in Virginia or Maryland, as there are no landfills in the District. In Virginia alone, total sanitary landfill capacity at the end of 2020 was approximately 248.3 million tons spread across 50 landfills. These landfills had an average remaining permitted life of 21.3 years.[45] Additional solid waste from WUS in the Preferred Alternative is unlikely to cause capacity issues.

Because the Preferred Alternative would make use of part of the private air rights area, the private development in this alternative would be different from what it would be in the No-Action Alternative. **Table 4-1** shows the difference in assumed square footage for each use and the resulting change in projected solid waste generation. The private air rights development would generate approximately 5,076 tons less waste in the Preferred Alternative than in the No-Action Alternative.

Altogether, the Project Area in the No-Action Alternative would produce a total of around 17,585 tons of municipal waste per year. In the Preferred Alternative, because of the smaller size of the private air rights development, the Project Area would produce a total of 15,171 tons, a reduction of approximately 14 percent relative to the No-Action Alternative. This reduction would be small in the context of District-wide waste production: it would represent about 0.2 percent of the 1,139,846 tons of waste produced in the District in 2018. While beneficial, the impact would be minor.

4.5.1.2 Hazardous Materials and Waste

Relative to the No-Action Alternative, the Preferred Alternative would have negligible adverse direct operational impacts pertaining to hazardous materials and waste.

Train operations involve the storage and use of fuel, oils, lubricants, and other hazardous or regulated materials for operation or maintenance of stationary or mobile equipment. There would be an increase in rail operations at WUS in the Preferred Alternative relative to the No-Action Alternative. However, the nature of operations would remain similar to what it is currently. The same type of hazardous materials would continue to be used, though in greater quantities. [46] The storage, utilization, and disposal of these materials would continue to be performed in compliance with applicable laws, regulations, and policies.

Increased activities at WUS may slightly increase the risk of accidental spills and release of fuel or hazardous materials. All releases of hazardous materials would continue to be reported to the

[44] Zero Waste is defined as diverting 80% or more of the city's solid waste stream away from landfills and waste-to-energy facilities (District of Columbia. *About Zero Waste DC*. Accessed from https://zerowaste.dc.gov/about-zero-waste-dc. Accessed on January 13, 2023). In 2018, the citywide waste diversion rate was estimated to be 16.11% (Department of Public Works. *Washington DC Solid Waste Diversion Annual Report. Calendar Year 2018*. Accessed from: https://zerowaste.dc.gov/sites/default/files/dc/sites/zerowaste/CY%2018%20Diversion%20Report%20Final%203%2010%2021.pdf. Accessed on January 13, 2023.

[45] Commonwealth of Virginia Department of Environmental Quality. *2021 Annual Solid Waste Report for CY 2020*. Accessed from: https://www.deq.virginia.gov/home/showpublisheddocument/9500. Accessed on October 17, 2022.

[46] See Section 4.5.1, *Project Area Data* of the July 2018 *WUS Expansion Project Affected Environment Technical Report* (Appendix C2) for information on the type and quantity of hazardous materials currently used or stored at WUS, which would continue to be used or stored in both the No-Action and the Preferred Alternative.

applicable regulatory authority in accordance with the Emergency Planning and Community Right-to-Know Act (EPCRA) or Oil Pollution Act (OPA). In the District, this authority is the Homeland Security and Emergency Management Agency. Actions to be taken in the event of a spill would be specified in the station's Spill Prevention, Control, and Countermeasure (SPCC) Plan in the Preferred Alternative as in the No-Action Alternative. Union Station Redevelopment Corporation (USRC), the Project Sponsor, would update the existing SPCC Plan to reflect any major changes to on-site petroleum product or liquid hazardous waste storage.

4.5.2 Indirect Operational Impacts

4.5.2.1 Municipal Solid Waste

Relative to the No-Action Alternative, in the Preferred Alternative, the potential development of the Federal air rights would result in a minor adverse indirect operational impact on solid waste generation.

In the Preferred Alternative, the potential Federal air rights development would consist of approximately 175,000 square feet of residential uses; 310,000 square feet of office uses; and 15,000 square feet of retail uses. **Table 4-2** shows estimates of the amount of waste these land uses would produce.

Table 4-2. Estimate of Annual Potential Federal Air Rights Development Solid Waste Generation

Use	Waste generation Rate/Day[1]	Size	Waste Generation Estimate/Year
Residential	4.75 pounds (lbs)/unit	184 units[2]	160 tons
Office	2.75 lbs/100 square feet	310,000 square feet	1,556 tons
Retail	5.5 lbs/100 square feet	15,000 square feet	151 tons
Total	-	-	**1,865 tons**

1. Developed based on generation rates provided by District Department of Public Works, Office of Waste Diversion (January 2019) and volume-to-weight conversion factors obtained from EPA (https://www.epa.gov/sites/production/files/2016-04/documents/volume_to_weight_conversion_factors_memorandum_04192016_508fnl.pdf).
2. Assuming 950 feet per unit.

The potential Federal air rights development would generate an estimated 1,865 tons per year of additional solid waste. The impact would be minor, representing about 0.16 percent of the 1,139,846 tons of waste produced in the District in 2018.[47] A part of it would be recycled, in keeping with the policies in place to achieve the District's goals of diverting 80 percent of the citywide waste stream from landfills or waste-to-energy facilities. Non-recycled waste would be sent to landfills in Maryland and Virginia. As noted above, in Virginia alone, as of the end of 2020, sanitary landfill capacity was

[47] District Department of Public Works. *Washington DC Solid Waste Diversion Annual Report. Calendar Year 2018*. Accessed from: https://dpw.dc.gov/wastediversionreport. Accessed on October 17, 2022.

approximately 248.3 million tons spread across 50 landfills. These landfills had an average remaining permitted life of 21.3 years. The additional solid waste generated by the potential Federal air rights development in the Preferred Alternative is not likely to cause capacity issues.

4.5.2.2 Hazardous Materials and Waste

Relative to the No-Action Alternative, in the Preferred Alternative, the potential development of the Federal air rights would result in a negligible indirect operational adverse impact on hazardous material and waste.

Development of the Federal air rights into mixed-use space would not involve the storage and use of hazardous materials beyond products typically found in mixed-use buildings. In addition to common batteries, solvents, paints, or detergents, these may include fuel for emergency generators and Uninterruptable Power Supply batteries. The storage, utilization, and disposal of these materials would be performed in compliance with applicable laws, regulations, and policies. Impacts would be negligible.

4.5.3 Construction Impacts

Construction of the Preferred Alternative would result in minor adverse impacts from the storage and use of hazardous materials and the generation and disposal of hazardous and non-hazardous waste and debris. It would have potential minor beneficial impacts from the removal of contaminated materials or media from the Project Area.

Construction of the Preferred Alternative would require the storage, use and disposal of petroleum products and hazardous materials. Examples include fuel, lubricants, antifreeze, fire retardants, brake fluid, adhesives, or solvents for the operation and maintenance of construction equipment and vehicles. This would create a risk of spill or release into the environment. Compliance with the requirements of EPCRA, OPA, Resource Conservation and Recovery Act (RCRA), and other applicable Federal and local laws and regulations would minimize these risks. These laws and regulations are intended to minimize the potential release of harmful substances in the environment. The implementation of standard best management practices by the construction contractor, including spill prevention plans and the construction and maintenance of containment systems, would contribute to minimizing the risk of spills. Adverse impacts would be minor.

The Preferred Alternative would require excavating the rail terminal to approximately 3 feet above sea level. It would also involve demolishing existing infrastructure such as tracks, platforms, and catenaries as well as the Claytor Concourse and the existing parking garage. Construction of the access ramps on G Street NE, First Street NE, and the east side of WUS would also involve excavation and disposal of soil. This would generate a substantial quantity of spoils and debris—approximately 1.5 million cubic yards—that would need to be transported and disposed of offsite over the entire construction period (13 years). However, excavation and associated disposal needs would not occur all at once. Instead, it would occur in four separate steps, as each construction phase would include a period of excavation early in the phase. The amount of spoil produced in each phase would vary, from a total of approximately 141,000 cubic yards during Phase 1 to a total of approximately 753,000 cubic yards during Phase 4. Appropriate transport methods and disposal locations would be identified during construction planning.

Limited sampling in the Project Area suggests that soil and groundwater below the rail terminal contain contaminants in low concentrations. Some soil concentrations exceeded regulatory screening levels for total petroleum hydrocarbons, diesel range organics (TPH-DRO), Polychlorinated Biphenyls (PCBs), and arsenic. The presence of diesel-based hydrocarbons and some PCBs is expected in a historic railyard within a dense urban environment. Arsenic concentrations in soil are consistent with regional background concentrations and are likely not the result of site-related activities. Shallow groundwater samples from beneath the former H Street Tunnel contained metal concentrations in excess of regulatory levels.[48]

Construction contractors would be required to handle and dispose of spoil materials and groundwater in accordance with applicable laws and regulations, including RCRA and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). This would likely involve further characterizing the environmental condition of those materials and treating them in accordance with the type of contamination present, if any. Contaminated soils would be transported in accordance with U.S. Department of Transportation regulations and disposed of at facilities permitted to receive them. Contaminated groundwater may be treated on site before being discharged to the municipal sewer system.

Construction debris would include platforms and railroad tracks. Used wooden railroad ties are typically coated with chemical preservatives including creosote, which contains semi-volatile organic compounds. Materials would have to be characterized, managed, and disposed of in accordance with RCRA and other applicable regulations. This would also be the case of debris that, based on age, may contain asbestos or lead-based paint. All such waste would be disposed of at facilities permitted for this type of material.

Spoil generated under each phase by excavation activities would be disposed of at regional disposal facilities based on the type of waste, facility capacity, and waste characterization requirements. Receiving facilities may include solid waste landfills; soil reclamation areas; soil recycling facilities; asbestos receiving landfills; hazardous waste landfills; hazardous waste incinerators; and Toxic Substances Control Act (TSCA) incinerators. Construction planning would include identifying the appropriate transport methods and disposal locations.

The removal of contaminated media materials from the Project Area would constitute a minor beneficial impact. This impact would be minor because of the likely limited level of contamination that would be encountered and removed. All fill used during construction would be certified-clean material.

4.5.4 Comparison to Existing Conditions

Relative to existing conditions, the Preferred Alternative would result in an operational, long-term increase of approximately 113 percent in solid waste generation in the Project Area (from approximately 2,340 tons to approximately 5,002 tons per year). Factoring in the indirect impacts from the potential Federal air rights development, the increments would be 193 percent (from approximately 2,340 tons to

[48]Amtrak. November 2019. *Washington Union Station Terminal Infrastructure Project Constructability Report*.

approximately 6,867 tons per years). This is not likely to exceed the capacity of potential receiving facilities in the region. Adverse impacts would be minor.

In the Preferred Alternative, there would be an increase in the quantity of hazardous materials stored, used, and disposed of in the Project Area relative to existing conditions. This would represent a negligible adverse direct operational impact. The greater number of operations in the Preferred Alternative than in existing conditions would involve an increase in the storage and use of fuel, oils, lubricants, and other hazardous or regulated materials. However, the nature of operations would remain similar to what it is currently. The same type of hazardous materials would remain in use, though in greater amounts. The storage, utilization, and disposal of these materials would continue to be performed in compliance with applicable laws, regulations, and policies.

4.6 Summary of Impacts

Table 4-3 and **Table 4-4** summarize the impacts of the No-Action Alternative and the Preferred Alternative.

Table 4-3. Summary of Impacts

Impact Category	Type of Impact	No-Action Alternative	Preferred Alternative
Municipal Solid Waste	**Direct operational**	Minor adverse impact	Minor beneficial impact
	Indirect operational	No impact	Minor adverse impact
	Construction	Minor adverse impact	Minor adverse impact
Hazardous Materials and Waste	**Direct operational**	Negligible adverse impact	Negligible adverse impact
	Indirect operational	No impact	Negligible adverse impact
	Construction	Negligible adverse / minor beneficial impact	Minor adverse / minor beneficial impact

Table 4-4. Quantitative Estimates

Source	No-Action Alternative (Additional)	No-Action Alternative (Total)	Preferred Alternative (additional)	Preferred Alternative (Total)
Operational				
WUS	+765 tpy (+33%)	3,105 tpy	+2,662 tpy (+86%)	5,767 tpy
Private Air Rights Development	+14,480 tpy	14,480 tpy	-5,076 tpy (-35%)	9,404 tpy
Potential Federal Air Rights Development	-		+1,865 tpy	1,865 tpy
Total	+15,245 tpy (+651%)	17,585 tpy	-549 tpy (-3.1%)	17,036 tpy
Construction Spoils and Debris				
Construction Spoils and Debris	-		1,507,102 cy	

tpy = tons per year; cy = cubic yards

4.7 Avoidance, Minimization and Mitigation Evaluation

FRA is proposing the following measures to avoid and minimize adverse impacts pertaining to solid waste and hazardous materials:

- USRC would update WUS' existing SPCC Plan to reflect any major changes to on-site petroleum product or liquid hazardous waste storage.
- For the construction phase of the Project, USRC would require the construction contractor to prepare and implement a construction-specific SPCC.
- USRC would require that the construction contractor identify hazardous building materials (asbestos- containing material, lead-based paint, PCBs, mercury, etc.) prior to any demolition work. If such materials are present, USRC would require they be properly abated by a licensed contractor in accordance with District regulations. Debris would go to a receiving facility licensed to handle the relevant type of waste in compliance with applicable shipping regulations.
- USRC would require the construction contractor to develop a Soil Management Plan (SMP) based upon subsurface investigations, as needed. The purpose of these investigations would be to pre-characterize the soils to be removed during the construction of the Project. The SMP typically outlines standards and procedures for the identification and disposal of contaminated materials encountered during construction.
- USRC would require the construction contractor to use only certified clean fill to replace excavated soils.
- USRC would require that, during soil disturbing activities, the construction contractor control fugitive dust through wetting, sweeping, and other suppression techniques.
- USRC would require the construction contractor to develop a Health and Safety Plan to provide the minimum health and safety specifications that must be met during construction, including requirements for environmental monitoring, personal protective equipment, site control and security, and training.
- The District of Columbia has adopted a Zero Waste vision, defined as diverting 80% or more of all solid waste generated in the District through source reduction, reuse, recycling, composting, and anaerobic digestion. USRC would require that municipal solid waste generated at WUS be managed to maximize opportunities for recycling or other waste diversion methods in support of the District's vision.

4.8 Permits and Regulatory Compliance

Spill management to prevent the release of hazardous materials due to inappropriate storage and handling is dictated by the local and federal authorities. A SPCC Plan per Title 40 CFR, Part 112, Oil Pollution Prevention, is currently in place at WUS and must be updated as needed. Updates are required when there is a change in the facility design, construction, operation, or maintenance that materially affects its potential for a discharge as described in 40 CFR Part 112.1(b). SPCC plans must meet standard engineering practices and be certified by a

licensed Professional Engineer. During construction, the contractor would be responsible for implementing a construction-specific spill prevention program. Should release notification be required by the U.S. Environmental Protection Agency, U.S. DOT, or National Response Center, notice shall also be given to the District's Emergency Management Agency and Department of the Environment, Hazardous Waste Division per 20 District of Columbia Municipal Regulations (DCMR) Chapter 42.

Underground storage tanks that are covered under 20 DCMR Chapter 55 must be registered in accordance with 20 DCMR Chapter 56. Heating oil underground storage tanks (USTs) less than 1,100 gallons and petroleum USTs that are less than 110 gallons need not be registered with the District. Aboveground storage tanks are primarily regulated by the DC Fire code. Inspections are required by the Office of the Fire Marshall's Fire Prevention Division.

The abatement of hazardous building materials requires a licensed contractor and prior notification to the District. The District's Department of Energy and Environment (DOEE) provides an Asbestos Notification Form for the removal of asbestos and a Lead Abatement and Renovation permit for the abatement of lead-based paints. Other fixtures containing hazardous materials such as light ballasts, thermostats, etc. should only be removed by a qualified contractor and must be disposed to a facility that will accept these types of wastes via manifest or other appropriate shipping documentation.

The on-site management of contaminated soil must be performed in accordance with a SMP that will dictate appropriate handling and storage procedures. Contaminated soils may only be consigned, conveyed, and/or transported to facilities and locations licensed, permitted, or approved to accept such materials by appropriate federal, state or local authorities. Soils that meet the criteria defining a listed or characteristic hazardous waste may only be disposed of at a RCRA hazardous waste landfill, TSCA facility, or RCRA hazardous waste incinerator.

Municipal solid waste can only be sent to a facility that is appropriately licensed under RCRA Subtitle D and must be managed per 21 DCMR Chapters 7-8. To meet the District's sustainability goals, commercial properties must separate recycling paper, paperboard, cardboard, and clean and rinsed metal, glass and plastic containers per 21 DCMR Chapter 20.

5 Transportation

5.1 Overview

This section describes the potential impacts of the Preferred Alternative on the multiple transportation modes (modes) in and around Washington Union Station (WUS). These include:

- Railroad (National Railroad Passenger Corporation [Amtrak], Virginia Railway Express [VRE], and Maryland Area Regional Commuter [MARC] Train);
- Intercity, tour/charter, and sightseeing buses (including hop-on/hop-off buses and daily sightseeing coaches);[49]
- Private vehicles;
- For-hire vehicles;[50]
- Bicycles;
- Transit (Metrorail, Streetcar, and Metrobus); and
- Pedestrians

This section also identifies measures the Federal Railroad Administration (FRA) is proposing to avoid, minimize, or mitigate potential adverse impacts.

5.2 Regulatory Context

Refer to **Appendix C3**, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 5.2, *Regulatory Context*.

[49] Hop-on/hop-off sightseeing buses provide scheduled routes that allow tourists to visit different sites in Washington, DC and surrounding areas either by continuously riding the bus in a loop, or by getting off the bus at certain stops and then getting back on to continue with their visit. Daily sightseeing buses are coach-style buses that provide scheduled service to certain tourist destinations. Currently, hop-on/hop-off buses serve the front of WUS while daily buses are located in the existing bus facility.

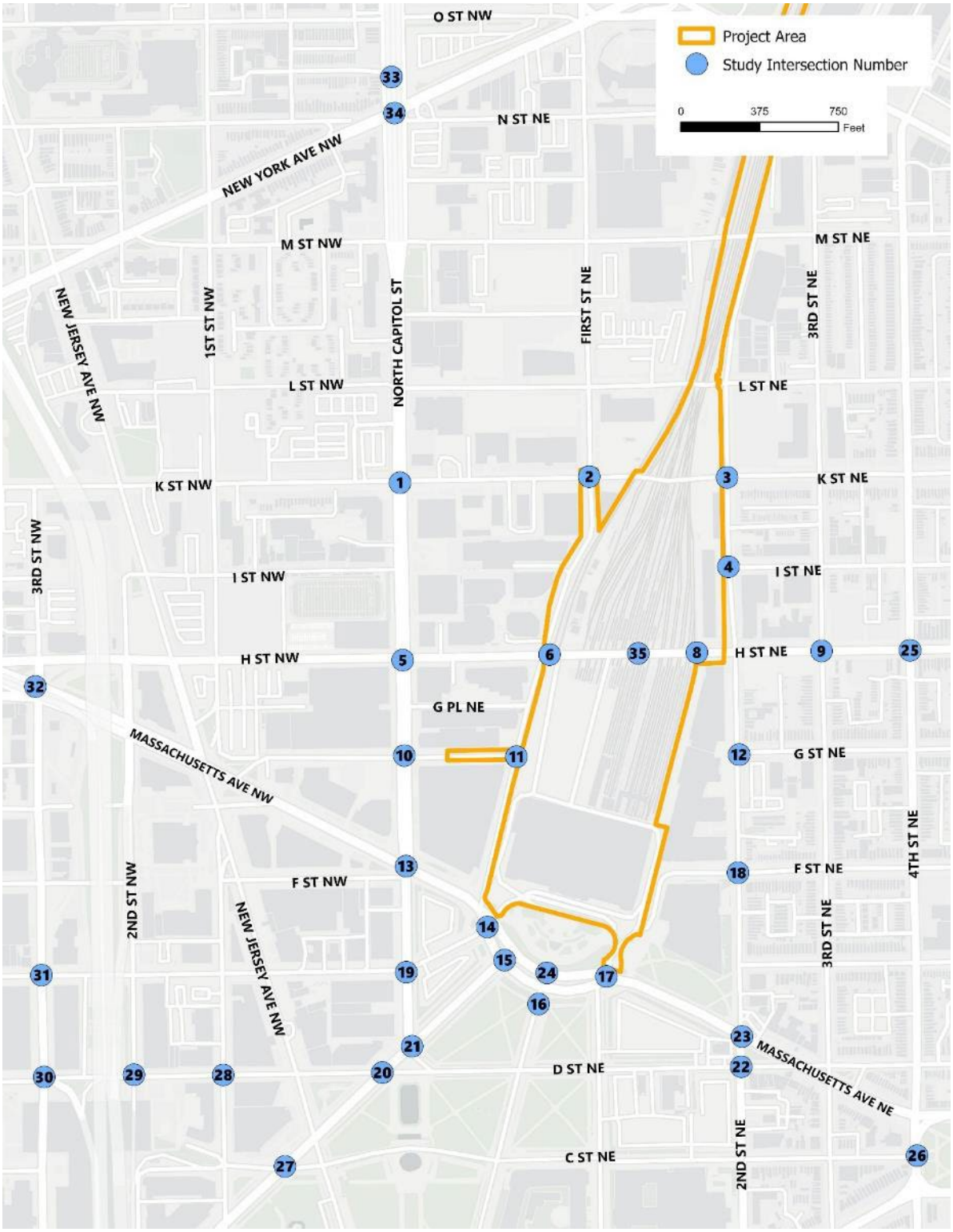
[50] In the District and in this SDEIS, "for-hire vehicles" refers to all vehicles where the passenger pays for a ride, including taxis, livery/car services, and transportation networking companies (TNCs) such as Uber and Lyft.

5.3 Study Area

The Local Study Area for transportation impacts includes the Project Area and immediately adjacent roadway network along with key roadway intersections (study intersections) near WUS (**Figure 5-1**). Traffic conditions and coordination with District Department of Transportation (DDOT) were the basis for the identification of the study intersections. These intersections are listed below (numbers refer to **Figure 5-1**):

1. North Capitol and K Street
2. First Street and K Street NE
3. Second Street and K Street NE
4. Second Street and I Street NE
5. North Capitol Street and H Street
6. WUS Garage Entrance and H Street NE/Future New West Intersection
7. WUS Bus Exit and H Street NE (not applicable to the Preferred Alternative; not shown in **Figure 5-1**)
8. Kaiser Permanente Entrance and H Street NE/Future New East Intersection
9. H Street and 3rd Street NE
10. North Capitol Street and G Street
11. First Street and G Street NE
12. Second Street and G Street NE
13. North Capitol Street, Massachusetts Avenue, and F Street
14. E Street, Massachusetts Avenue, and First Street NE
15. Louisiana Avenue and Massachusetts Avenue NE
16. Delaware Avenue and Massachusetts Avenue NE
17. First Street and Massachusetts Avenue NE (at WUS entrance)
18. Second Street and F Street NE
19. North Capitol Street and E Street
20. Louisiana Avenue and D Street NW
21. Louisiana Avenue and North Capitol Street
22. Second Street and D Street NE
23. Second Street and Massachusetts Avenue NE
24. Massachusetts Avenue and Delaware Avenue NE

Figure 5-1. Transportation Local Study Area



25. 4th Street and H Street NE
26. Massachusetts Avenue, C Street NE, and 4th Street NE
27. Louisiana Avenue and C Street NW
28. First Street and D Street NW
29. I-395 Tunnel at Second Street and D Street NW
30. 3rd Street and I-395 On-Ramp and Indiana Avenue and D Street NW
31. 3rd Street and E Street NW
32. 3rd Street, Massachusetts Avenue, and H Street NW
33. North Capitol Street (Southbound Ramp) and New York Avenue
34. North Capitol Street (Northbound Ramp) and New York Avenue
35. Future Central Intersection on H Street between North Capitol Street and 3rd Street NE

Given transportation patterns in the District, the impacts of the Project on the transportation network would quickly dissipate outside the Local Study Area.

5.4 Methodology

This section presents the methodology used to analyze the transportation impact of the Preferred Alternative. It is generally the same as the methodology described in **Appendix C3**, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report, Section 4.4, Methodology*. However, some updates have been made to incorporate specific aspects of the Preferred Alternative and updates to the transportation context that are relevant to the methodology. For greater clarity and ease of reference, this supplemental report provides the full methodology description rather than just the updates.

5.4.1 General Methodology

The transportation impact analysis used existing and anticipated trip generation information to estimate future transportation volumes and the resulting impacts on the various modes. Transportation agencies, private operators, and site visits provided the data informing the analysis. The limitations of certain sources are noted in the analysis. Key inputs included:

- Projected ridership, service frequency, and schedule data (provided by Amtrak, DDOT, MARC, Washington Metropolitan Area Transit Authority [WMATA], and VRE);
- National Capital Region Transportation Planning Board (TPB) travel demand model;
- TPB 2040 Constrained Long-Range Transportation Plan;

- Reasonable assumptions about future private and Federal air rights development programs, including office, residential, and retail uses;
- Projected local transit ridership;
- Projected pedestrian and bicycle activity;
- Projected intercity bus ridership;
- WUS retail uses; and
- Growth from planned private development projects within a half mile of WUS and general background growth.

FRA developed projections for each mode through a detailed multimodal model (model) using existing and projected ridership and developments, and estimated mode splits.[51] Projections included morning (AM) and evening (PM) peak-hour rail, intercity and tour/charter bus, shuttle bus, and transit ridership, traffic,[52] bicycle, and pedestrian information.

Data sources for the mode projections included:

- Amtrak, MARC, and VRE ridership, and Intercity bus projections from the *Northeast Corridor (NEC) FUTURE Tier 1 FEIS*;[53]
- Amtrak Terminal Infrastructure Study and Operations Plan;
- VRE 2040 System Plan;[54]
- MARC Train 2040 Growth and Investment Plan;[55]
- WMATA Land Use Ridership Model;
- Metropolitan Washington Council of Governments (MWCOG) Regional Bus Staging, Layover, and Parking Location Study;[56]
- MWCOG Cooperative Forecast – WMATA ridership;
- MWCOG 2040 Cooperative Forecast - local Transportation Activity Zone data;
- DDOT DC Circulator ridership;

[51] Mode splits are the percentage of trips that are taken via a certain mode. For example, if twenty percent of station users take transit, their "transit mode split" is twenty percent.

[52] Traffic in this context refers to the movements of different vehicular modes, including private vehicles, for-hire vehicles, trucks for loading and delivering, and buses, on roadways.

[53] Federal Railroad Administration. 2017. *NEC FUTURE Tier I Final Environmental Impact Statement*. Accessed from https://www.fra.dot.gov/necfuture/. Accessed on May 10, 2020.

[54] Virginia Railway Express. 2014. *System Plan 2040*. Accessed from https://www.vre.org/about/studies-and-reports/2040/. Accessed on November 17, 2022.

[55] Maryland Transit Administration. 2013. *MARC Growth and Improvement Plan Update: 2013 to 2050*.

[56] Metropolitan Washington Council of Governments. 2015. *Regional Bus Staging, Layover, and Parking Location Study*.

- DDOT Streetcar Ridership projections;
- District land use sources including the Office of Planning (OP), Zoning Commission, Board of Zoning Appeals, Department of Consumer and Regulatory Affairs (DCRA), the North of Massachusetts Avenue (NoMA) Business Improvement District (BID), the Mount Vernon Triangle BID, the Capitol Hill BID, and local Advisory Neighborhood Commissions;
- Destination DC visitor statistics;[57] and
- Submissions from the private air rights developer to FRA.

The model was constructed specifically for the context of WUS. However, industry standards, including the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 11th Edition were the basis for developing trip generation and origin-destination outputs. The model is similar to a standard trip generation model for a development project but with added complexity because of the different transportation modes and trip generators present at WUS. FRA and DDOT reviewed the model and underlying assumptions for accuracy and validity.

The analysis used the model to forecast anticipated multimodal transportation demands from WUS, the private air rights development, and rail, intercity bus, and transit services at WUS. Mode splits were used to estimate how trips from transportation and land use generators would be distributed into the broader transportation network. The transit mode splits were derived from Amtrak, VRE, MARC, and WMATA ridership surveys, modified based on Project commitments designed to shift trips away from motor vehicles toward non-auto modes. The land use mode splits were derived from American Community Survey Census data and data from other developments in the District. The analysis initially adjusted 2040 mode splits by reducing single occupancy vehicles trips by 10 percent in favor of transit and bicycle/pedestrian modes compared to existing conditions. This adjustment reflects the long-term shift predicted in the MWCOG model estimates. Subsequently, the mode slip was further updated based on Project commitments identified during the development of the Preferred Alternative. **Table 5-1** and **Table 5-2** show the mode splits used for the analysis of the Preferred Alternative.

Information generated by the model served as input for a more detailed analysis of the transportation network and the pedestrian flows in and near WUS. This more detailed analysis was conducted using the modeling programs Synchro and MassMotion. Synchro analysis, which assesses the performance of intersections based on vehicle volumes, was performed using Synchro 8.0. This tool provided a macroscopic overview of traffic conditions at key intersections near WUS (**Figure 5-1** shows these intersections).

[57] Destination DC. *Washington, DC Visitor Research*. Accessed from https://washington.org/press/DC-information/washington-dc-visitor-research. Accessed on April 19, 2023.

Table 5-1. Federal Air Rights Development Land Use Generator Mode Splits for the Preferred Alternative

Mode	Retail		Office		Residential	
	Mode Share (%)	Vehicle Occupancy Ratio (VOR)[1]	Mode Share (%)	VOR	Mode Share (%)	VOR
Amtrak – Acela	2		1		1	
Amtrak – Long Distance	0		0		0	
Amtrak – Regional	2		0		0	
MARC	1		14		7	
VRE	0		8		0	
Metrorail	29		40		28	
Intercity Bus	2		0		1	
Local Bus	5		6		5	
Shuttle Bus	1		0		1	
Streetcar	4		3		5	
Tour Bus	3		0		0	
Private Vehicle	22	1.20	18	1.06	25	1.20
Private Pick-up/Drop-off[2]	0	1.20	0	1.20	0	1.20
Rental Car	0	1.20	0	1.06	0	1.20
For-hire Vehicle	9	1.20	2	1.20	2	1.20
Walk	16		4		20	
Bike	4		4		5	
Total	**100**		**100**		**100**	

[1] VOR refers to the number of passengers per vehicle.

[2] This refers to pick-up and drop-off by a friend or family member. This mode split would be negligible compared to for-hire vehicle or private parking.

Table 5-2. Transportation Generator Mode Splits for the Preferred Alternative

Receiving Mode	Amtrak		MARC		VRE		Intercity Bus		Metrorail[2]	
	Mode Share (%)	Vehicle Occupancy Ratio (VOR)[1]	Mode Share (%)	VOR[1]	Mode Share (%)	VOR[1]	Mode Share (%)	VOR[1]	Mode Share (%)	VOR[1]
Amtrak - Acela	3		0		0		1		4	
Amtrak - Long Distance	2		0		0		0		0	
Amtrak - Regional	6		0		0		0		5	
MARC	5		0		1		1		12	
VRE	2		0		0		0		6	
Metrorail	20		45		26		40		0	
Intercity Bus	1		0		0		1		1	
Local Bus	5		7		8		11		5	
Shuttle Bus	0		0		0		1		1	
Streetcar	3		5		2		3		1	
Tour Bus	1		0		0		1		0	
Parking	3	1.20	0	1.20	0	1.20	3	1.20	1	1.20
Private Pick-up/Drop-off	183	1.20	2	1.20	0	1.20	21	1.20	2	1.20
Rental Car	2	1.20	0	1.20	0	1.20	1	1.20	0	1.20
For-Hire Vehicle	23	1.20	0	1.20	1	1.20	10	1.20	0	1.20
Walk	6		41		60		4		61	
Bike	1		0		1		2		1	
Total[4]	**100**		**100**		**100**		**100**		**100**	

[1] VOR refers to the number of passengers per vehicle.

[2] These mode splits derive from WMATA's access surveys. Connections between other WUS transportation generators and Metro are accounted for in the Metro mode splits under those generators when the model is run. For example, the number of intercity bus-Metro passengers is based on the 40 percent mode share shown in the intercity bus column.

[3] Private pick-up/drop-off refers to pick-up and drop-off by a friend or family member.

[4] Some totals may not add to exactly 100 percent due to rounding.

5.4.1.1 Land Use Generators

The model considered the transportation demand associated with the following land uses:

- Retail, office, and Amtrak "back of house" space at WUS; [58]
- Potential mixed-use Federal air rights development; and
- Private mixed-use air rights development.[59]

The purpose of the analysis is to determine the impacts attributable to the Project separately from those of nearby private projects, including the private air rights development.

WUS Retail

In the Preferred Alternative, the square footage of retail at WUS would increase by approximately 64,000 square feet to approximately 272,000 square feet.

WUS Office and Back of House

The Preferred Alternative would increase the amount of back of house areas to a total of approximately 379,400 square feet.

Federal Air Rights Development

The Preferred Alternative would leave space available for potential future development by government or private entities in the Federally owned air rights area above the rail terminal. The existing WUS parking garage and bus facility currently occupy this area. Based on current assumptions, potential development would consist of 310,000 square feet of office, 175,000 square feet of residential, and 15,000 square feet of retail.[60]

Adjacent Planned Land Uses

Adjacent planned land uses were factored into the analysis through a uniform background growth rate in traffic (as described below in **Section 5.4.1.3**, *Vehicular Traffic Analysis*) and through background growth in WMATA Metrorail ridership per the MWCOG model estimate. Background growth includes growth from projects identified by a District government agency or BID as being in the "development

[58] "Back of house" refers to areas that support Amtrak and WUS operational needs.

[59] The private air rights development is included in the impact analysis because, although separate and independent from the Project, it is assumed to have occurred in the No-Action Alternative and the Preferred Alternative. Its inclusion ensures that the analysis provides a comprehensive description of the potential impacts of the Project in the context of all activities in the Local Study Area.

[60] This assumed land use program is consistent with a conservative test fit developed in concert with the private air rights developer to estimate future mixed-use development capacity.

pipeline."[61] Background growth also included MWCOG regional land use forecasts, which estimate future population and employment levels.

Private Air Rights Development

Table 5-3 shows the land use program assumed for the private air rights development in the Preferred Alternative for the purposes of transportation impact analysis.[62]

Table 5-3. Assumed Private Air Rights Development Program in the Preferred Alternative

	North Parcel[1]	South Parcel[1]
Office	485,000 square feet (sf)	575,000 sf
Residential	868 units	163 units
Hotel	453 keys	263 keys
Retail	60,000 sf	25,000 sf

[1] "North parcel" refers to areas north of H Street NE owned by the private air rights developer; "South parcel" refers to areas south of H Street NE owned by the private air rights developer.

5.4.1.2 Transportation Generators

The model also considered the demand associated with the transportation modes listed below. The following modes are also trip generators.

Generators

- Amtrak (Express, Long Distance, Corridor) and Metropolitan;[63]
- MARC;
- VRE;
- Metrorail; and
- Intercity buses (Greyhound, Megabus, BoltBus, BestBus, Washington Deluxe).

The modes below are not generators for the purposes of the model but they would be used to access the land use and transportation generators. Therefore, the analysis provided volume estimates for these

[61] These are projects under construction or development that can be reasonably expected to occur due to their levels of planning and public approvals. Sources include the Deputy Mayor for Planning and Economic Development, DCRA, the District of Columbia Housing Authority, DCOP, the District of Columbia Board of Zoning Appeals, the District of Columbia Zoning Commission, Advisory Neighborhood Commission 6E, Mount Vernon Triangle Community Improvement District, NoMA BID, and Capitol Hill BID.

[62] This program is based on the current potential development program identified by Akridge.

[63] The Metropolitan service, proposed in the *NEC FUTURE FEIS*, is a future low-cost unreserved service in the Northeast Corridor. This service would provide more intermediate stops than the Northeast Regional does today.

modes. Trip assignments to the other services were based on mode choice as indicated in the transportation generator mode splits.

- Bicycle;[64]
- Commuter buses (Maryland Transit Administration [MTA], Loudoun County Transit [LCT], PRTC OmniRide);
- Local buses (Metrobus, DC Circulator);
- University shuttle;
- DC Streetcar; and
- Tour/charter and sightseeing buses (including hop-on/hop-off buses).

The model considered existing ridership levels and projected growth by service. The model checked transportation mode trip generation against targeted capacity and occupancy levels and eliminated double counting. Capacity levels were based on operator standards. Pedestrian, bicycle, shuttle, commuter and local bus, and Streetcar volumes were estimated based on the generator mode splits. The following sections describe key assumptions for the various modes.

Intercity and Commuter Railroad

Amtrak, Metropolitan, MARC, and VRE operations in the Preferred Alternative are those described in the *Terminal Infrastructure (TI) Report* (**Appendix B** of the 2020 DEIS).

WMATA Metrorail

The analysis assumes that during the peak hour, all Red Line trains would be eight-car trains and would arrive at the WUS Metrorail station every 3 minutes.[65] This frequency would amount to 20 peak-hour eight-car trains. WMATA standards assume 120 passengers per car. On this basis, the estimated peak capacity is 19,200 riders during peak hour. An increase in ridership that would result in a volume to capacity (V/C) ratio equal to or greater than 100 percent would be a major adverse impact (see also the discussion of peak hour factors below) on WMATA operations. Where the V/C ratio would reach or exceed 100 percent, additional service would be needed to prevent overcrowding.

WMATA begins to consider the need for service improvements once volumes in a segment reach 100 passengers per car. Therefore, for disclosure purposes, the impact analysis also identifies when this threshold would be reached or exceeded.

Metrorail volumes at WUS were distributed by direction based on existing peak flows. **Table 5-4** shows the assumed directional distribution of peak-hour passengers in 2040.

[64] Local Capital Bikeshare stations considered were North Capitol Street and F Street NW; Columbus Circle/Union Station, North Capitol Street and G Place NE; Second and G Street NE; and Second Street and Massachusetts Avenue NE.

[65] FRA made this assumption based on input from WMATA staff provided during a coordination meeting held on April 23, 2019.

Table 5-4. Directional Distributions by Peak Hour at WUS Metrorail Station

	Boardings		Alightings	
	Direction	**%**	**Direction**	**%**
AM Peak Hour	**Shady Grove**	84	**Shady Grove**	60
	Glenmont	16	**Glenmont**	40
PM Peak Hour	**Shady Grove**	40	**Shady Grove**	16
	Glenmont	60	**Glenmont**	84

Source: MWCOG Model

The analysis used a peak-hour factor to reflect the demand during the most congested 15-minute period of each peak hour. The peak-hour factor was obtained by multiplying the highest peak 15-minute volume by 4 and then dividing by the actual peak-hour total. The peak-hour factor for No-Action Alternative trip volumes (boardings and alightings) was used to scale down the peak capacity for the peak hours in the Preferred Alternative.[66] **Table 5-5** shows the AM and PM peak-hour factors calculated using pre-pandemic 15-minute entry and exit volumes at WUS.

Table 5-5. Metrorail Peak-Hour Factors

Time Period	Peak Hour Factor (Highest Peak)
AM	1.12
PM	1.22

The background growth[67] of WMATA ridership was initially estimated based on MWCOG model outputs.[68] The MWCOG model estimates directional growth in Red Line ridership. **Table 5-6** shows station-specific background growth. The background growth accounts for the increase in trips to and from the WUS Metrorail station associated with increased development and activity in the surrounding neighborhoods. This estimate was further adjusted based on coordination with DDOT to better align with historical trends at WUS and to reflect changes in WMATA ridership over the 2010s.

Table 5-6. WMATA Background Ridership Growth

Model	WUS Station Growth	Red Line Segment Growth
MWCOG Regional Model, Adjusted	26%	12% westbound 26% eastbound

[66] In a crowded system subject to queueing behavior, capacity is constrained during peak periods to levels below the theoretical capacity of the system. The No-Action trip volumes provide a reliable baseline to estimate how much peak demand would constrain capacity during the peak period.

[67] Background growth represents increases in traffic volumes caused over time by local development projects (other than WUS) and general increases in population and employment.

[68] Amazon announced in 2018 that it would be locating part of its "HQ2" in the Crystal City area of Arlington, Virginia. That development is expected to occur within existing master planned development limits and is not expected to affect WMATA ridership, or other transportation modes, beyond what is already accounted for in the MWCOG model.

Based on coordination with DDOT, the analysis assumed that by 2040 the introduction of MARC through-running service to the south of WUS would cause some shift in transit ridership away from WMATA to one-seat ride on commuter rail. This is because it can be assumed that with through-running service being available, passengers whose destination is served by a MARC or VRE station, or by a WMATA station adjacent to a MARC or VRE-served station, would not need to use Metrorail to or from WUS. This assumption was incorporated into the ridership numbers used in the analysis. The analysis also assumed that increased traffic congestion along the North Capitol Street corridor by 2040 would lead to shifts in mode choice from personal vehicles to Metrorail.

Intercity Buses

Based on a review of a range of potential modeling scenarios (see **Appendix S1,** *Multimodal Refinement Report)*, the growth in intercity bus ridership in the Preferred Alternative was estimated at 48 percent above existing conditions. Per pre-pandemic operations, approximately 60 percent of buses would be traveling to and from the east and 40 percent to and from the west.

Local Buses

For the purposes of the analysis, the bus routes serving the Local Study Area were grouped by the directions in which they operate during each peak period. Bus volumes were distributed first to each directional group based on the results of the model, then further distributed to specific routes within each directional group. The analysis assumed a continuation of pre-pandemic levels of service.

DC Streetcar

The analysis assumed that the DC Streetcar would be extended east to the Benning Road Metrorail Station. While the District has postponed the extension of the Streetcar to the west indefinitely, it is anticipated that an equivalent high-capacity transit option such as a busway to Georgetown implemented as part of DDOT's Bus Priority Program will be in place by 2040.[69] For the purpose of the present analysis, this transit option is considered under the DC Streetcar heading. Based on coordination with DDOT, it was estimated that headways west to Georgetown would be 5 minutes and headways east to Benning Road would be 10 minutes. Passenger distribution was derived from the traffic distribution (described below).

With implementation of the Project, the connectivity of the DC Streetcar (or equivalent transit system) to WUS would be enhanced due to the new concourses and station entrance on the H Street Bridge, adjacent to the Streetcar station. This would boost the number of WUS users that would use the Streetcar or equivalent western transit line.

[69] This assumption was made in coordination with DDOT. H Street has been incorporated in the District's Bus Priority Plan. *See* DDOT. 2021. *Bus Priority Plan.* Accessed from https://ddot.dc.gov/sites/default/files/dc/sites/ddot/Bus%20Priority%20Plan_2021-12-20.pdf. Accessed on November 12, 2022. As of 2022, DDOT is planning dedicated bus lanes on H Street as part of the H Street NE Bus Priority Project and the H Street NW Bus Priority Project: DDOT. *H Street NW Bus Priority*. Accessed from https://ddot.dc.gov/page/h-street-nw-bus-priority. Accessed on November 12, 2022; and DDOT. *H Street NE Bus Priority Project*. Accessed from https://ddot.dc.gov/page/h-street-ne-bus-priority-project. Accessed on November 12, 2022.

5.4.1.3 Vehicular Traffic Analysis

The traffic impact analysis involved the determination of traffic volumes, future forecasts, trip distribution, private and for-hire vehicle trips, lane use, and internal capture rates.

Traffic volumes in the MWCOG TPB regional model[70] informed the development of an average annual growth rate and background growth for the Local Study Area's roadways. Comparison with historic Average Daily Traffic (ADT) rates ensured consistency. Based on this information, future traffic forecasts with an assumed 0.5 percent annual background growth were developed. The analysis assumed that the number of Amtrak passengers seeking to drive to WUS would decline by 15 percent by 2040 due to changing travel behavior and the continued urbanization of the Washington, DC region.

WUS-related vehicle trips were distributed through the street network based on Amtrak and MWCOG data on WUS user origins and destinations, current and future travel patterns in the region, and consultation with DDOT. Based on this information, it was assumed that 56 percent of the trips would originate from the District, 21 percent from Virginia, and 23 percent from Maryland (**Figure 5-2**).

Local private and for-hire vehicle directional distribution to and from WUS is heavily skewed because most regional highway connections lie to the west of WUS. For buses, the directional distribution is more balanced and features heavier volumes to the east of WUS[71] (shown in **Table 5-7**).

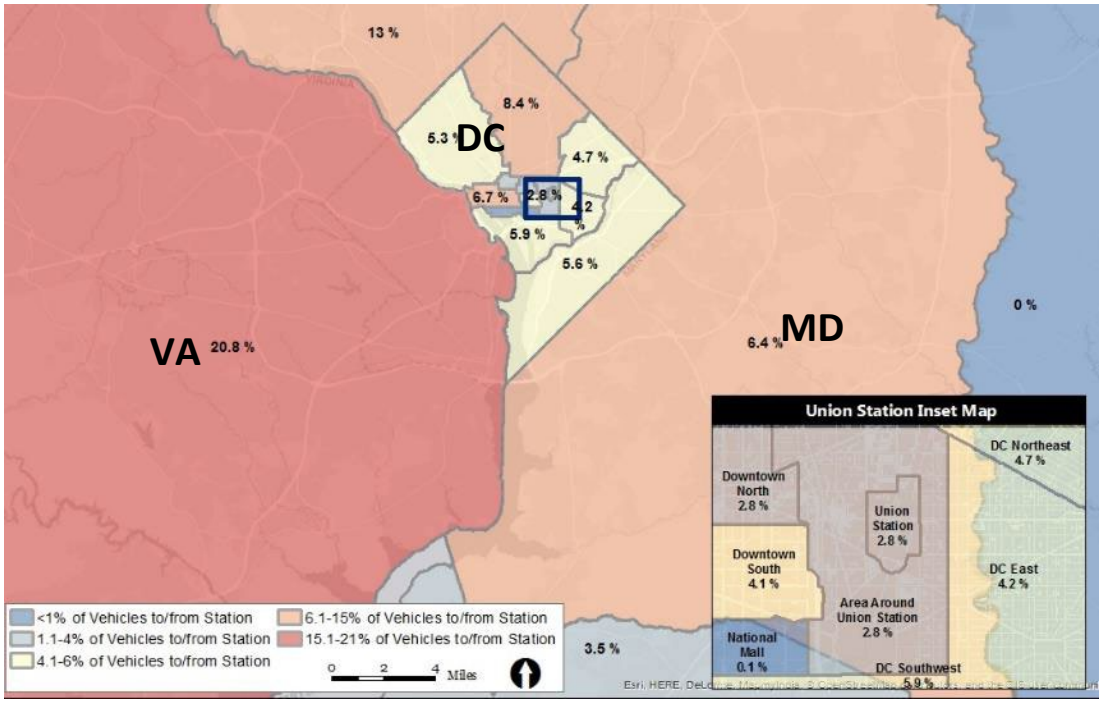
Table 5-7. Directional Distribution by Trip Type to and from WUS

	Westbound	Eastbound
Cars/Taxis In	20%	80%
Cars/Taxis Out	80%	20%
Buses In	60%	40%
Buses Out	40%	60%

[70] Transportation Planning Board. 2016. Model Version 2.3.66.

[71] These directional distributions were developed in concert with DDOT.

Figure 5-2. Regional Distribution for New WUS-related Trips



Using the estimated traffic volume, a level of service (LOS) capacity analysis was performed using:

- Methodologies based on the *Highway Capacity Manual* (HCM) 2010 (using Synchro 11 software);
- Historic peak-hour traffic volumes extrapolated to 2040 using a network-wide 0.5 percent growth rate;
- Projected WUS-related and air rights-related (Federal and private) peak-hour trips.

The Preferred Alternative analysis assumed that lane use and traffic controls would be the same in 2040 as in 2022, except for the addition of bicycle lanes replacing vehicle travel lanes on K Street between First Street and Second Street NE.[72] The Internal capture rate[73] was estimated for land use generators based on ITE guidance and in coordination with the private air rights developer. Because of the density of uses within WUS and the potential future private and Federal air rights developments, there likely would be meaningful levels of both internal capture and re-matching of pick-up and drop-off traffic activity.

[72] This assumption was added to the network based on guidance from DDOT that its implementation was potentially imminent within the development time of the SDEIS and because of its meaningful implications for operations adjacent to WUS.

[73] Internal capture rate is the portion of trips generated by a mixed-use development that both begin and end within the development.

5.4.1.4 Vehicle Flows

Vehicle demand from land use and transit generators was estimated by translating person-trips to vehicle trips. The distribution of trips was determined by the location of key WUS entrances and elements. The vehicle trips and distribution informed the Synchro Model and analysis. The modeling was further informed by the anticipated redistribution and growth of transit services in the local roadway network.

The Synchro analysis considered the various vehicular flows to and from WUS. These flows included parking demand, for-hire vehicle demand, and private pick-up and drop-off demand, as well as intercity, tour/charter, and sightseeing bus movements within the Local Study Area.

The Preferred Alternative was tested for how it would handle anticipated vehicle volumes. Queueing and delay immediately around WUS and potential impacts on the broader transportation network were considered.

5.4.1.5 Pedestrian Flows

Pedestrian flows or foot traffic to and from land use and transportation generators inside WUS were modeled into an origin-destination matrix. Also considered was the potential for the future redistribution of existing pedestrian flows around WUS because of pedestrian access improvements. Pedestrian facilities immediately adjacent to WUS (sidewalks, queueing areas, etc.) were also considered.

The distribution of pedestrian trips between a transit or land use generator and a door was determined based on existing pedestrian flows, shortest-distance estimates, and the existing distribution of bus ridership.

5.4.1.6 Bicycle Flows

Bicycle flows to and from WUS were estimated based on land use and transportation generator mode splits. The direction of bicyclist demands as they relate to WUS entrances were modeled into an origin-destination matrix. Bicycle activity at WUS was considered both in terms of absolute volume of demand associated with bicycles regardless of type (privately-owned, docked bikeshare, and dockless bikeshare) and in terms of the number of bikeshare docks that may be needed to accommodate levels of demand.

5.4.1.7 Summary of Passenger Flows

Table 5-8 shows multimodal passenger flows in the Preferred Alternative obtained using the methodologies described above.

Table 5-8. Summary of Peak Multimodal Circulation Passenger Volumes in Preferred Alternative

Mode	AM Passengers		PM Passengers	
	In	Out	In	Out
Intercity Rail[74]	2,988	3,291	2,614	3,903
MARC[75]	2,565	12,360	9,290	4,726
VRE	908	2,236	1,061	1,127
WMATA Metrorail	8,647	10,085	10,052	7,851
DC Streetcar	418	812	718	430
Intercity and Tour/Charter Buses	325	220	660	1,205
Pedestrians	5,566	12,372	10,339	6,427
Bicycles	130	179	177	152
City and Commuter Buses	887	1,721	1,507	1,042
Auto[76]	1,760	1,705	1,621	1,691

5.4.2 Operational Impacts

Operational impacts are long-term or permanent impacts that would result from the operation of the Project after construction is complete in the planning horizon year of 2040. The following mode-specific impacts are assessed:

- Amtrak, VRE, and MARC commuter railroads: Increases or decreases in, and ability to meet, expected service levels and ridership;
- WMATA Metrorail: Increases or decreases in passenger demand, impacts on passenger flow, capacity issues that may result from increases;
- DC Streetcar/equivalent westbound transit line: Increases or decreases in passenger demand and capacity issues that may result from increases;
- Intercity, tour, and charter bus: Increases or decreases in service capacity level and ridership, ability to meet future service capacity levels;
- Loading: Availability and accessibility of loading docks and ability to meet WUS needs;
- Pedestrian and bicycle activity: Increases or decreases in pedestrian and bicycle activity, ability to meet activity demands, and impacts on safety;

[74] Includes future Amtrak Express, Amtrak Corridor, Amtrak Long Distance, and Metropolitan service.

[75] Includes MARC services that terminates at WUS and through-running service to Virginia.

[76] Includes passenger volumes, not vehicular volumes.

- WMATA Metrobus, DC Circulator, and commuter buses: Increases or decreases in passenger demand, impacts on access to transit buses, and qualitative assessment of bus speeds and reliability;
- Parking and rental cars: Increases or decreases in space available for parking (including from rental car companies); [77]
- Ride-for-hire circulation: Increases or decreases in traffic volumes on nearby streets, and ability to meet demands at the WUS curbside space;[78]
- Private pick-up and drop-off activity: Increases or decreases in traffic volumes on nearby streets, and ability to meet demands at the WUS curbside space;[79] and
- Vehicular traffic: Increases and decreases in traffic volumes on nearby streets, LOS impacts, and queueing impacts at key intersections. LOS, increases in average delay, and queueing are the three measures of effectiveness (MOE) on which the assessment of traffic impacts is based.

5.4.3 Construction Impacts

Construction impacts are those impacts from constructing the Project that would cease when the Project is complete. The potential impacts from the construction of the Preferred Alternative were assessed for each transportation mode. Because construction planning is still in its initial stages, the impact analysis is qualitative. In the Preferred Alternative, construction of the Project would take place in four phases. The analysis focuses particularly on Phase 4 of construction (beginning 8 to 9 years after the start of construction) because Phase 4 has the greatest potential to affect transportation conditions in the Local Study Area. Demolition of the existing bus facility and parking garage would occur in Phase 4 and the west ramp would be demolished. This would disrupt bus, parking, and for-hire operations. Phase 4 is also the longest construction phase.

5.5 Impacts of the Preferred Alternative

This section presents the impacts of the Preferred Alternative on the various transportation modes at WUS. Direct and indirect operational impacts as well as construction impacts are considered. For each

[77] The parking impact analysis addresses parking as a resource for which there is a demand. Therefore, a reduction in parking availability is considered an adverse impact on parking. A reduction in parking availability may also have adverse or beneficial consequences for other resources or transportation modes. Such consequences are incorporated into the impact analyses for those other resources or transportation modes.

[78] A single for-hire vehicle generates two trips: one arriving and one departing from WUS, regardless of whether it is picking up or dropping off a passenger. For the purposes of the impact analysis, a single for-hire pick-up or drop-off was estimated to produce 1.5 trips due to linking of trips in the WUS circulation network.

[79] A single private pick-up/drop-off trip generates two trips: one arriving and one departing from WUS, regardless of whether it is picking up or dropping off a passenger. For the purposes of the impact analysis, a single private pick-up or drop-off is estimated to produce 2 trips because no linking is assumed.

mode, impacts are first summarized in bold lettering, followed by a supporting description and analysis. The operational impacts of the Preferred Alternative are assessed relative to the No-Action Alternative. A brief assessment of the impacts relative to existing conditions is also provided. The organization of this section differs from that of the other *Impacts* sections in this report in that the assessment relative to existing conditions is provided for each mode rather than for the alternative as a whole. This organization is due to the high number of modes being evaluated.

5.5.1 Direct Operational Impacts

5.5.1.1 Commuter and Intercity Railroads

Relative to the No-Action Alternative, the Preferred Alternative would have a major beneficial direct operational impact on commuter and intercity railroad service, as it would support increased service with the ability to accommodate substantially more passengers than the No-Action Alternative.

As described in Appendix B**,** *Washington Union Station Terminal Infrastructure EIS Report,* of the 2020 DEIS, the reconstruction of the tracks and platforms included in the Preferred Alternative would allow for a substantial expansion of rail capacity at WUS. The new tracks and platforms would support simultaneous boarding of trains, quicker turnaround times for trains, and potential double berthing.[80] The Preferred Alternative would make these procedures possible by providing wider platforms that can safely accommodate more passengers; longer usable platform edges that would increase the amount of space that can be effectively used for passenger activity;[81] and greater redundancy in the track system through the redesign of critical interlockings. These changes would allow for longer and more frequent trains because trains could unload and load passengers more quickly. [82]

Alongside resulting additional capacity, Amtrak developed an operating plan that would accommodate the growth in Amtrak, MARC, and VRE ridership estimated by *NEC FUTURE* while accounting for physical constraints at WUS, including capacity constraints of the rail terminal and the First Street Tunnel. This section describes the increased volumes and ridership associated with this plan that the Preferred Alternative would accommodate. This operating plan would allow for two new services: a new low-cost intercity service called the "Metropolitan," and MARC through-running trains to Virginia (**Table 5-9**), in addition to the existing Amtrak Acela, Amtrak Northeast Regional, Amtrak Long Distance, and MARC and VRE commuter rail services.

[80] "Double berthing" is when two trains are lined up, one in front of the other, on the same track. The incorporation of double berthing into the track and platform plan is described in Appendix B, *Washington Union Station Terminal Infrastructure EIS Report*, of the 2020 DEIS.

[81] While some platforms may retain the same total lengths as today, they would differ greatly in how much of that length is actively used. Portions of platforms are currently unused due to lack of accessibility, insufficient width, and other issues.

[82] These improvements to the tracks and platforms would be combined with the new concourse spaces and new vertical circulation elements to provide improved overall passenger circulation throughout WUS.

Table 5-9. 2040 Rail Service at WUS in Preferred Alternative

Service	Description
Amtrak Express	Higher speed intercity service
Amtrak Corridor	Intercity service providing more stops than Express service
Metropolitan	Unreserved intercity service providing lower cost option and access to locations not currently served by intercity rail. The operator has not yet been identified.
MARC	Commuter service on three lines (Brunswick, Camden, and Penn) in Maryland
VRE	Commuter service on two lines (Fredericksburg and Manassas) in Virginia
MARC Through-Running	Commuter service connecting Maryland and Virginia. The operator has not yet been identified.

The Metropolitan service, introduced in the *NEC FUTURE FEIS*, is a proposed unreserved intercity service between Washington, DC and Boston. This service would be less expensive than most Northeast Regional service and would make more frequent intermediate stops. As planned, it would provide intercity service to new markets and attract riders who might otherwise drive or take the bus, potentially reducing vehicular traffic along the northeast corridor. It would also provide some commuter service for longer distance commuters. *NEC FUTURE* did not identify an operator for this service.

MARC Through-Running would provide regional commuter rail service between the District, Maryland, and Virginia, with trains connecting from the MARC Penn Line to the VRE Fredericksburg and Manassas lines. For the purposes of this report, this new service is labeled as "MARC Through-Running;" however, MARC and VRE have not yet reached an agreement on how this service would be operated.

Intercity Railroad Service

Relative to the No-Action Alternative, the Preferred Alternative would have a major beneficial direct operational impact on intercity railroad service. Anticipated daily and peak-hour train volumes for intercity service under the Preferred Alternative are shown in **Table 5-10** and **Table 5-11**. Estimated daily intercity ridership are shown in **Table 5-12**. No-Action Alternative and existing conditions data are also provided for comparison.

Table 5-10. Daily Intercity Train Volumes by Service

Service	Preferred Alternative	No-Action Alternative	Existing Conditions
Amtrak Express	114	60	32
Amtrak Corridor	46	60	56
Amtrak Long Distance	12	24	28
Metropolitan	116	-	-
Total	**288**	**144**	**116**

Table 5-11. Peak Hour Intercity Train Volumes by Service

Service	Preferred Alternative	No-Action Alternative	Existing Conditions
Amtrak Express	8	6	4
Amtrak Corridor	3	8	8
Amtrak Long Distance	1	3	4
Metropolitan	8	0	0
Total	**20**	**17**	**16**

Table 5-12. Intercity Daily Ridership by Service

Service	Preferred Alternative	No-Action Alternative	Existing Conditions
Amtrak Express	10,800	6,000	4,500
Amtrak Corridor and Metropolitan	14,800	11,600	8,700
Amtrak Long Distance	6,400	4,200	3,200
Total	**32,000**	**21,800**	**16,400**

In the Preferred Alternative, Amtrak would operate 288 trains per day (144 in each direction), including 20 during both peak hours (8:00 AM to 9:00 AM and 4:30 PM to 5:30 PM). This would amount to a substantial increase in intercity service (100 percent above the No-Action Alternative). Peak hour increases in train volumes would be more modest, with train volumes increasing by 18 percent in the AM and PM peaks.

In the Preferred Alternative, increased intercity train service could accommodate 47 percent more daily passengers than in the No-Action Alternative (**Table 5-12**). Peak-hour passenger volumes (8:00 AM to 9:00 AM and 4:30 PM to 5:30 PM), shown in **Table 5-13** and **Table 5-14**, would increase by 276 percent in the AM peak and 127 percent in the PM peak.

Table 5-13. AM Peak Intercity Ridership by Service

Service	Preferred Alternative	No-Action Alternative	Existing Conditions
Amtrak Express	1,700	528	406
Amtrak Corridor	2,117	878	660
Amtrak Long Distance	-	265	199
Metropolitan	2,462	-	-
Total	**6,279**	**1,671**	**1,265**

Table 5-14. PM Peak Intercity Ridership by Service

Service	Preferred Alternative	No-Action Alternative	Existing Conditions
Amtrak Express	1,276	543	408
Amtrak Corridor	2,369	2,326	1,749
Amtrak Long Distance	-	-	-
Metropolitan	2,872	-	-
Total	**6,517**	**2,869**	**2,157**

In contrast to the No-Action Alternative, where increased train and passenger volumes would further stress the existing, constrained infrastructure at WUS, the Preferred Alternative would provide WUS with the infrastructure needed to adequately accommodate more trains and more passengers, including improved tracks, widened platforms, additional baggage handling areas and lounge space, improved check-in areas, and more concourse space.

Comparison to Existing Conditions

Relative to existing condition, the Preferred Alternative would also have a major beneficial direct operational impact on intercity railroad service. In the Preferred Alternative, Intercity train services could accommodate 95 percent more passengers than under existing conditions (**Table 5-12**). AM peak (8:00 AM to 9:00 AM) and PM peak (4:30 PM to 5:30 PM) passenger volumes would increase by 396 percent and 202 percent, respectively (**Table 5-13** and **Table 5-14**).

Train volumes would also substantially increase relative to existing conditions. In the Preferred Alternative, daily intercity train volumes would increase by 148 percent relative to existing conditions (**Table 5-10**). Peak hour increases in train volumes would be more modest, at 25 percent in the AM and PM peaks (**Table 5-11**).

MARC

Relative to the No-Action Alternative, the Preferred Alternative would have a major beneficial direct operational impact on MARC commuter service. The Preferred Alternative would allow for a substantial increase in MARC commuter rail service and passenger volumes. It would provide WUS with the infrastructure needed to adequately accommodate these increases. In particular, consistent with *NEC FUTURE* planning, it would allow MARC to introduce through-running service connecting Maryland and Virginia.

Table 5-15 and **Table 5-16** show MARC train volumes in the Preferred Alternative, along with No-Action Alternative volumes and existing ones for comparison. **Table 5-17** shows all-day and peak-hour ridership levels.

Table 5-15. All-Day MARC Train Volumes by Line

Service	Preferred Alternative	No-Action Alternative	Existing Conditions
Penn Line	114	58	55
Camden Line	60	24	21
Brunswick Line	76	24	19
Total	**250**	**106**	**95**

Table 5-16. Peak MARC Train Volumes by Line

Service	Preferred Alternative	No-Action Alternative	Existing Conditions
Penn Line	14	7	7
Camden Line	8	4	2
Brunswick Line	12	4	5
Total	**34**	**15**	**14**

Table 5-17. All-Day and Peak MARC Ridership

Service	Preferred Alternative	No-Action Alternative	Existing Conditions
MARC – All-Day	70,700	37,900	28,100
MARC – AM Peak	9,993	4,093	3,032
MARC Through-Running – AM Peak	4,932	-	-
Total MARC AM Peak	14,925	4,093	3,032
MARC – PM Peak	7,768	4,605	3,411
MARC Through-Running – PM Peak	6,248	-	-
Total MARC PM Peak	14,016	4,605	3,411
MARC Peak Total	**28,941**	**8,698**	**6,443**

Through the entire day, MARC would operate 114 Penn Line trains, 60 Camden Line trains, and 76 Brunswick Line trains for a total of 250 trains, or an increase of 136 percent relative to the No-Action Alternative (**Table 5-15**). In peak hours (8:00 AM to 9:00 AM and 4:30 PM to 5:30 PM), MARC would operate 34 trains (17 in each direction); this would represent an increase of 127 percent relative to the No-Action Alternative. Fourteen of the peak-hour trains would be Penn Line trains, eight Camden Line trains, and 12 Brunswick Line trains (**Table 5-16**). Of the 14 Penn Line trains, it is anticipated that eight would continue to Virginia.

In the Preferred Alternative, MARC ridership would increase substantially over the No-Action Alternative (**Table 5-17**). Total daily ridership would increase by 87 percent. Peak hour ridership would increase by 265 percent in the AM peak and 204 percent in the PM peak. Much of the peak-hour increases would be a result of the introduction of through-running service.

In contrast to the No-Action Alternative, where increases in train and passenger volumes would further stress already constrained infrastructure, the track, platform, and concourse elements in the Preferred Alternative would support and accommodate these increased volumes.

Comparison to Existing Conditions

Relative to existing conditions, the Preferred Alternative would also have a major beneficial direct operational impact on MARC commuter service. In the Preferred Alternative, MARC ridership would increase substantially compared to existing conditions. Total ridership would increase by 152 percent relative to existing conditions. Peak hour ridership would increase by 392 percent in the AM peak and 311 percent in the PM peak.

Train volumes would also increase relative to existing conditions. All-day train volumes would increase by 163 percent while peak hour train volumes would increase by 143 percent in both the AM and PM peaks.

VRE

Relative to the No-Action Alternative, the Preferred Alternative would have a major beneficial direct operational impact on VRE commuter service. The Preferred Alternative would allow for a substantial increase in VRE commuter rail service and passenger volumes. It would provide WUS with the infrastructure needed to adequately accommodate these increases, including through-running service connecting Maryland and Virginia. These increases would be consistent with planned increases envisioned in the DC to Richmond Southeast High Speed Rail (DC2RVA) and Long Bridge FEISs and supported by ongoing projects between WUS and Alexandria.[83]

VRE train volumes would increase relative to the No-Action Alternative, as shown in **Table 5-18** and **Table 5-19**. All-day train volumes would increase by 171 percent. Peak hour train volumes would increase by 300 percent.

Table 5-20 shows all-day and peak VRE ridership in the Preferred Alternative. Ridership would increase substantially over the No-Action Alternative. Total daily ridership would increase by 178 percent. Peak hour ridership would increase by 334 percent in the AM peak and 299 percent in the PM peak.

In contract to the No-Action Alternative, in which increases in train and passenger volumes would further stress already constrained infrastructure, in the Preferred Alternative, the new track, platform, and concourse elements would accommodate these increased volumes.

[83] FRA. *DC to Richmond Southeast High Speed Rail Tier II Final Environmental Impact Statement*. 2019. Accessed from https://www.dc2rvarail.com/files/9515/5913/5305/Part01_Cover_DC2RVA_FEIS.pdf. Accessed on December 23, 2022; FRA. *Long Bridge Final Environmental Impact Statement/Record of Decision. 2020*. Accessed from https://railroads.dot.gov/elibrary/long-bridge-project-combined-final-environmental-impact-statementrecord-decision-and-final. Accessed on December 23, 2022.

Table 5-18. All-Day VRE Train Volumes by Service

Service	Preferred Alternative	No-Action Alternative	Existing Conditions[1]
Fredericksburg Line	46	17	16
Manassas Line	46	17	16
All-Day Total	**92**	**34**	**32**

1. This number refers to the number of revenue trains. VRE operates a total of 34 trains on the infrastructure.

Table 5-19. Peak VRE Train Volumes by Service

Service	Preferred Alternative	No-Action Alternative	Existing Conditions
Fredericksburg Line	8	2	2
Manassas Line	8	2	2
Total	**16**	**4**	**4**

Table 5-20. All-Day and Peak Hour VRE Ridership by Service

Service	Preferred Alternative	No-Action Alternative	Existing Conditions
VRE All-Day	13,600	4,900	3,900
VRE – AM Peak	3,144	724	557
VRE – PM Peak	2,188	549	422
Total Peak Hour	**5,332**	**1,273**	**979**

Comparison to Existing Conditions

Relative to existing conditions, the Preferred Alternative would also have a major beneficial direct operational impact on VRE commuter service. In the Preferred Alternative, VRE ridership would increase substantially compared to existing conditions. Total daily ridership would increase by 249 percent. Peak hour ridership would increase by 464 percent in the AM peak and 418 percent in the PM peak. Train volumes would also increase relative to existing conditions. All-day train volumes would increase by 188 percent while peak hour train volumes would increase by 300 percent in both the AM and PM peaks.

Private Train Cars

Relative to the No-Action Alternative, the Preferred Alternative would have no direct operational impact on private train car operations.

Currently, Amtrak allows private train cars to be stored at WUS. Under the reconfiguration of the rail terminal in the Preferred Alternative, Amtrak has identified space for eight (8) private train cars to be stored at a time. Therefore, private car storage could continue.

Comparison to Existing Conditions

Impacts relative to existing conditions would be the same as relative to the No-Action Alternative because there would be no difference between the two baselines with regard to private train cars.

5.5.1.2 WMATA Metrorail

Relative to the No-Action Alternative, the Preferred Alternative would have a minor adverse direct operational impact on Metrorail operations because of increased demand that would aggravate train overcapacity and station circulation issues at the WMATA platform level. This impact would be minor because the congestion would be expected to dissipate in the system's core.

Increased train service and ridership in the Preferred Alternative, as well as the reduction in parking capacity and new retail uses, would generate increased demand for Metrorail at WUS.[84] **Table 5-21** and **Table 5-22** show modeled activity in the AM peak and PM peak**,** respectively, along with corresponding data for existing conditions and the No-Action Alternative. When the projected V/C ratio would exceed 100 percent, measures would be needed to address overcrowding. [85]

Table 5-21. AM Peak WUS-related Metrorail Activity[86]

	Preferred Alternative		No-Action Alternative		Existing Conditions	
	Shady Grove	Glenmont	Shady Grove	Glenmont	Shady Grove	Glenmont
Passengers Arriving at WUS	14,328	4,837	13,651	4,250	8,499	5,071
V/C Arriving at WUS[87]	84%	28%	80%	25%	57%	34%
WUS Boardings	8,405	1,680	5,202	1,010	2,802	528
WUS Alightings	5,106	3,541	4,128	2,803	923	3,644
Through Ridership[88]	9,222	1,296	9,523	1,447	7,576	1,427
Ridership Departing WUS	17,627	2,976	14,725	2,457	10,378	1,955
V/C Departing WUS	**103%**	17%	86%	14%	69%	13%
Excess Demand	484	0	0	0	0	0

[84] The introduction of MARC through-running service to Virginia would likely reduce demand on the Red Line at Union Station. For the purposes of the present analysis, it was projected that by 2040 an estimated 620 AM peak and 640 PM peak passengers would travel through WUS on the Red Line, with an origin-destination at two stations served by commuter rail. With the through-running service, some ridership may switch from Metrorail to MARC. For the purposes of a conservative estimate and due to limited information about the broader trip-making effects of MARC through-running service, no such mode switching has been assumed.

[85] WMATA capacity standards are based on WMATA's operating manual. The capacity reported in this report is less than the "crush load" of WMATA trains. Capacity represents the level at which WMATA believes they can operate effectively without delays to trains and passengers due to overcrowding.

[86] Estimates of WMATA peak hour capacity are consistent with TPB Constrained Long-Range Transportation Plan 2040 elements and direction from WMATA (all alternatives).

[87] Red Line hourly nominal capacity at peak hour is 19,200 passengers (trains every 3 minutes, 120 passengers per car, and 100 percent 8-car train operations). However, for this analysis, capacity was curtailed due to peaking factors. As a result, the initial V/C upon arrival at WUS is based on a 1.12 multiplier of actual volumes in the AM peak and 1.22 multiplier of actual volumes in the PM peak.

[88] "Through ridership" refers to riders who neither board nor alight at WUS but ride the Red Line train through the WUS Metrorail Station.

Table 5-22. PM Peak WUS-related Metrorail Activity

	Preferred Alternative		No-Action Alternative		Existing Conditions	
	Shady Grove	Glenmont	Shady Grove	Glenmont	Shady Grove	Glenmont
Passengers Arriving at WUS	3,324	18,226	3,107	16,848	2,592	9,948
V/C Arriving at WUS	21%	**116%**	20%	**107%**	19%	72%
WUS Boardings	3,248	4,603	2,559	3,661	3,265	918
WUS Alightings	1,677	8,385	1,154	6,126	582	3,090
Through Ridership	1,647	9,841	1,953	10,722	2,010	6,858
Ridership Departing WUS	4,895	14,444	4,512	14,383	5,275	7,776
V/C Departing WUS	31%	92%	29%	91%	38%	56%
Excess Demand	0	2,488	0	1,110	0	0

By 2040, volumes in the Preferred Alternative would exceed capacity in the Shady Grove direction during the AM peak (departing WUS) and in the Glenmont direction during the PM peak (arriving at WUS).

Relative to the No-Action Alternative, in the AM peak, the Preferred Alternative would cause the V/C ratio leaving WUS toward Shady Grove to reach 103 percent, against 86 percent in the No-Action Alternative, reflecting an estimated excess demand of 484 passengers. Based on the geographic distribution of WMATA peak ridership demand, overcapacity conditions are anticipated to dissipate within the Red Line core. [89]

In the PM peak, capacity exceedance toward Glenmont (116 percent arriving) would be greater in the Preferred Alternative than in the No-Action Alternative (107 percent). The Preferred Alternative would aggravate the level of crowding, generating an additional excess demand of approximately 1,378 passengers, for a total excess demand of around 2,488.

In the PM peak departing from WUS toward Glenmont, WMATA's 100 passengers per car (84 percent of capacity) planning threshold would be exceeded, with a V/C ratio of 92 percent. This would also be the case in the No-Action Alternative, with 91 percent V/C ratio. The Preferred Alternative would cause no additional exceedance of this threshold relative to the No-Action Alternative.

Relative to the No-Action Alternative, the increase in Metrorail ridership at WUS in the Preferred Alternative would further adversely affect passenger circulation at the WMATA platform level. The construction of the First Street Concourse and the reconfiguration of Metrorail access to the rail platform level of Concourse A in the Preferred Alternative would improve circulation between the

[89] The Red Line core, as defined by WMATA, consists of the line segment between Dupont Circle and WUS. On other side of those stations, average ridership volumes noticeably decrease.

WMATA mezzanine and WUS rail platform levels.[90] However, vertical circulation between the WMATA platform and the WMATA mezzanine would remain as in the No-Action Alternative. This connection would be a constraint on circulation in the No-Action Alternative and would remain one in the Preferred Alternative. It is likely that in the Preferred Alternative, circulation conditions on the WMATA platform for passengers seeking to access the North Mezzanine would further degrade compared to the No-Action Alternative as a result of increased volumes.

Comparison to Existing Conditions

Relative to existing conditions, the Preferred Alternative would have a major adverse direct operational impact on Metrorail operations at WUS. The increase in overcrowding and need for extra capacity would be substantially greater compared to existing conditions than to the No-Action Alternative.

In the AM peak, the Preferred Alternative would cause the V/C ratio leaving WUS toward Shady Grove to reach 103 percent, against 69 percent in existing conditions. The Preferred Alternative would increase the overall demand in the AM peak in the Shady Grove direction by 7,249 passengers. In the PM peak, the Preferred Alternative V/C ratio toward Glenmont would be 116 percent arriving at WUS, against 72 percent in existing conditions. The Preferred Alternative would increase overall demand in the PM peak by 8,278 passengers.

The increase in Metrorail ridership at WUS would also adversely affect passenger circulation on the Metrorail platform relative to existing conditions. Passenger circulation is an existing issue at the Metrorail station, with WMATA indicating that it can take up to 8 minutes for passengers to clear the two sets of escalators from the platform level. The construction of the First Street Concourse and the reconfiguration of Metrorail access to the rail platform level of Concourse A in the Preferred Alternative would accommodate circulation between the Metrorail mezzanine and the WUS rail platforms.[91] However, vertical circulation between the Metrorail platform and the Metrorail mezzanine would remain unchanged compared to existing conditions and the existing constrained conditions would further degrade in the Preferred Alternative.

5.5.1.3 DC Streetcar[92]

Relative to the No-Action Alternative, the Preferred Alternative would result in a minor beneficial direct operational impact on DC Streetcar operations. The benefits that increased ridership would generate would be partially offset by greater operational delays.

[90] Pedestrian flow analysis within WUS indicated that the new vertical circulation elements in Concourse A would accommodate peak volumes associated with WMATA Metrorail passengers.

[91] Pedestrian flow analysis within WUS indicated that the new vertical circulation elements in Concourse A would accommodate peak volumes associated with WMATA Metrorail passengers.

[92] As noted above, the impact analysis for impacts to DC Streetcar operations assumes an extension of the existing line in both the eastbound and the westbound directions. Although the District has indefinitely postponed extending the Streetcar line to the west, it is assumed that by 2040, an equivalent transit line would be in place between WUS and Georgetown. References to a westbound Streetcar direction refer to this equivalent line.

Table 5-23 shows the projected impacts of the Preferred Alternative on streetcar operations at WUS in 2040, along with the corresponding data for the No-Action Alternative. The Preferred Alternative would not cause capacity to be exceeded on the DC Streetcar. Relative to the No-Action Alternative, passenger volumes departing WUS would increase by 361 in the westbound direction and 96 in the eastbound direction in the AM peak. In the PM peak, passenger volumes would increase by 44 in the westbound direction and 148 in the eastbound direction.

Table 5-23. Streetcar Volumes

	Preferred Alternative				No-Action Alternative			
	AM Peak		PM Peak		AM Peak		PM Peak	
	WB	EB	WB	EB	WB	EB	WB	EB
Car Capacity (Passengers/Car)	157	157	157	157	157	157	157	157
Cars per Run	1	1	1	1	1	1	1	1
Frequency (Runs per Hour)	12	6	12	6	12	6	12	6
Peak Capacity Departing WUS	1,884	942	1,884	942	1,884	942	1,884	942
Prior Segment Ridership	627	351	249	609	475	274	159	378
V/C Arriving at WUS[93]	67%	19%	26%	32%	50%	15%	17%	20%
Alightings at WUS	307	111	169	549	155	34	79	318
Through Volume	320	240	80	60	320	240	80	60
Boardings at WUS	645	167	87	343	284	71	43	195
Departing Volume	965	407	167	403	604	311	123	255
V/C Departing WUS	51%	43%	9%	43%	32%	33%	7%	27%

WB – westbound; EB - eastbound

The Preferred Alternative would result in greater use of the DC Streetcar than the No-Action Alternative while leaving sufficient room for further growth, a beneficial impact. This beneficial impact would be minor because greater traffic congestion on H Street (see **Section 5.5.2.1**, *Direct Operational Impacts, Vehicular Traffic*) may create operational delays that would partially offset the benefits of increased ridership.

Comparison to Existing Conditions

Because of the different operational conditions of the Streetcar in existing conditions, it is not possible to compare the impacts to existing conditions. Under existing conditions, the DC Streetcar terminates at WUS, continuing east along H Street/Benning Road NE to Oklahoma Avenue. This service travels every 12 minutes. In the No-Action Alternative and the Preferred Alternative, the DC Streetcar would continue

[93] Vertical capacity is calculated for the relevant segment approaching WUS. For Streetcar arriving from/departing to the west, the capacity is larger because of higher assumed frequencies. For Streetcar arriving from/departing to the east, the capacity is lower because of lower assumed frequencies.

east to the Benning Road Metrorail Station, with an extension west to Georgetown as well, making it a substantially different transportation element.

5.5.1.4 Intercity, Tour/Charter, and Sightseeing Buses

Relative to the No-Action Alternative, the Preferred Alternative would have a moderate beneficial direct operational impact on intercity, tour/charter, and daily sightseeing buses because of the improved passenger facilities and ability to accommodate future growth to services. The Preferred Alternative would have a moderate adverse direct operational impact on hop-on/hop-off sightseeing buses, which would no longer be able to use the front of WUS.

In the Preferred Alternative, intercity buses, tour/charter buses, and daily sightseeing buses,[94] would be accommodated in a new, purpose-built facility adjacent to the WUS train hall. This facility would be integrated into the overbuild deck and directly open onto the train hall's lower mezzanine, where waiting areas, information displays, and other bus passenger amenities would be located. Through the train hall, bus passengers would have direct access to the multimodal connections available at WUS, including rail, Metrorail, and the pick-up and drop-off facility. This would result in a substantial improvement in passenger experience relative to the No-Action Alternative, which would maintain the existing bus facility.

Intercity buses, tour/charter buses, and daily sightseeing buses would reach the new facility via the new east intersection on H Street NE. Exit would be via the new west intersection.[95] Buses would be able to enter and exit the facility from either the eastbound or westbound side of H Street.

All intercity and tour/charter buses that serve WUS would use the facility. Based on FRA analysis, the 38-39 slip facility would be able to accommodate all regular demand and all peak intercity demand during holidays or other times of high bus activity. During such periods, however, tour/charter bus activity may cause the facility's capacity to be exceeded. In these circumstances, buses could make use of the pick-up and drop-off area on the H Street deck level, next to the train hall. Approximately 15 buses could be accommodated in this area. It is expected that this spillover area would be used no more than approximately 5 to 10 days a year.

The capacity of the new bus facility would be optimized through a "dynamic management" approach.[96] This approach would allow for sharing of slips across different carriers during peak periods, increasing the functional capacity of the slips.[97] The dynamic management approach would introduce a complexity to the use of the bus facility that bus operators would need to adapt to and manage. This consideration makes the anticipated beneficial impact moderate. Proposed measures regarding the planning of the

[94] Daily sightseeing buses are coach-style buses that provide scheduled tours of Washington-area sites and currently depart from the existing WUS bus facility.

[95] For redundancy purposes, the new east ramp would also permit buses to exit to the front of WUS, should construction or disruption on H Street temporarily preclude using the new intersections.

[96] The 2020 DEIS referred to this approach as "active management," but FRA understands that the industry's current terminology is "dynamic management," which is the term used in this document.

[97] See the **Appendix S1,** *Multimodal Refinement Report* for more discussion of the dynamic management approach.

bus facility to address bus carriers' feedback on the new operating model are identified in **Section 5.7**, *Avoidance, Minimization, and Mitigation Evaluation*.

The overall growth in intercity demand is assumed to be 48 percent for the purposes of this analysis. This growth rate is a conservative estimate of future demand based on the highest available estimates of 2040 growth in bus operations. [98] Under this assumption, in 2040, the Preferred Alternative would generate an estimated 41 AM and 79 PM peak-hour intercity, tour/charter and daily sightseeing bus movements (**Table 5-24**). Relative to the No-Action Alternative, this would be an increase of 46 percent (13 trips) in the AM peak and a doubling (40 trips) in the PM peak.

Table 5-24. Peak-hour Bus Trips

	Preferred Alternative		No-Action Alternative		Existing Conditions	
	AM Peak	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
Ins	19	36	14	20	11	14
Outs	22	43	14	19	10	14
Total	**41**	**79**	**28**	**39**	**21**	**28**

In the Preferred Alternative, hop-on/hop-off sightseeing buses would no longer be accommodated at the front of WUS, and they could not be accommodated in the bus facility. This loss of service at the front of WUS would be an adverse impact on hop-on/hop-off sightseeing buses operations. This impact would be moderate because hop-on/hop-off sightseeing buses frequently operate on city curbsides, and, as such, have multiple potential options for relocation. Union Station Redevelopment Corporation (USRC), the Project Sponsor, would identify an alternative curbside location in coordination with DDOT before the current location becomes unavailable.

Comparison to Existing Conditions

In general, the impacts of the Preferred Alternative on bus operations would be the same relative to existing conditions as relative to the No-Action Alternative because the bus facility would remain the same in both baselines. Relative to existing conditions, bus trips would increase by 20 trips (95 percent) in the AM peak and 51 trips (182 percent) in the PM peak.

5.5.1.5 Loading

Relative to the No-Action Alternative, the Preferred Alternative would have no adverse direct operational impacts on loading space availability at WUS. Demand would increase but it would be met through continued use of the existing docks and the provision of a new dock on Second Street NE.

In the Preferred Alternative, use of the existing east and west loading docks would continue. A new loading dock (north dock) between Second Street and K Street NE with access from Second Street NE would be constructed. Relative to the No-Action Alternative, the demand for loading dock slips at WUS

[98] **Appendix S1,** *Multimodal Refinement Report.*

would increase an estimated 75 percent because of the greater amount of retail and the increase in multimodal operations. Between the existing loading docks and the new north dock, there would be sufficient capacity to accommodate the expected volume of vehicles and materials.

The east dock would continue to accommodate up to six vehicles per hour, while the west dock would accommodate only Package Express loading due to the potential reconfiguration of access from the Metrorail station to WUS. The new north loading dock would have 6 berths and 2 trash compactors.

The heaviest loading dock activity would continue to be in the midday hours, outside of both the AM and PM peaks. The AM peak would include 30 loading movements across all three docks and the PM peak would include eight loading movements across all three docks. The heaviest volumes would occur between 10:00 AM to 11:00 AM, with 40 total loading movements.

Construction of the north dock would introduce new truck activity along Second Street NE relative to the No-Action Alternative. Truck activity would be distributed throughout the day, with the highest volumes outside of the rush hour periods. It would not spill into adjacent residential streets due to existing truck restrictions on those streets. Trucks serving this dock would comply with District law, which prohibits backing up in the public right-of-way, and the District Design and Engineering Manual.[99]

Comparison to Existing Conditions

The impact of the Preferred Alternative on loading relative to existing conditions would be the same as relative to the No-Action Alternative. There would be no difference between the two baselines with regard to loading dock conditions.

5.5.1.6 Pedestrians

Relative to the No-Action Alternative, the Preferred Alternative would have a major beneficial direct operational impact on pedestrian circulation inside WUS. Additional access points to WUS would disperse pedestrian traffic and make access to WUS easier. Outside of WUS, the Preferred Alternative would have a minor adverse direct operational impact on pedestrian circulation because of increased queueing at certain crossings near the station.

As shown in **Table 5-25**, interior passenger volumes at WUS would increase in the Preferred Alternative relative to the No-Action Alternative. In both the AM and PM peaks, volumes would be approximately 50 percent greater. The largest generator of internal pedestrian trips would be passengers transferring between commuter rail and Metrorail.

Table 5-25. Interior Pedestrian Volumes

	Preferred Alternative		No-Action Alternative		Existing Conditions	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Total	71,734	92,356	47,703	61,416	35,867	46,178

[99] DDOT. 2019. *Design and Engineering Manual.* Accessed from https://ddot.dc.gov/page/design-and-engineering-manual. Accessed on March 11, 2023.

By providing new concourse space and access points, widened concourse areas and platforms, more vertical circulation elements from platforms and between station levels, and a new concourse and expanded gates from which to access trains, the Preferred Alternative would facilitate the movement of passengers and visitors through and in and out of WUS, avoiding the congestion and conflicts that would occur in the No-Action Alternative, where existing, already congested circulation spaces and entry points would have to accommodate a growing number of people. For this reason, despite the increase in pedestrian volumes relative to the No-Action Alternative, the Preferred Alternative would result in a major beneficial impact on pedestrian conditions in WUS.

Outside WUS, pedestrian volumes from passengers accessing their destinations on foot would increase relative to No-Action Alternative volumes, by about 61 percent in the AM peak and 55 percent in the PM peak (**Table 5-26**).

Table 5-26. Exterior Pedestrian Volumes

	Preferred Alternative		No-Action Alternative		Existing Conditions	
	AM Peak	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
Ins	5,566	10,339	3,753	6,587	3,419	6,736
Outs	12,372	6,427	7,370	4,232	4,927	3,654
Total	**17,938**	**16,766**	**11,123**	**10,819**	**8,346**	**10,390**

To assess the potential impacts of these increases on pedestrian circulation, two signalized pedestrian crossings at the First Street NE / Columbus Circle NE / Union Station Drive intersection were evaluated: the east-west crossing of First Street NE and the east-west crossing of Union Station Drive. The analysis compared the anticipated volumes to the cycle times of the traffic signal to calculate the maximum queue of pedestrians during each peak hour. **Table 5-27** presents the results.

Table 5-27. Pedestrian Analysis

Intersection Name	Direction	Cycle Time (sec)	Preferred Alternative Peak Hour Volumes (No-Action Alternative Peak Hour Volumes)		Cycles Per Peak Hour		Preferred Alternative Maximum Queue in Peak Hour (No-Action Alternative Maximum Queue in Peak Hour)	
			AM	**PM**	**AM**	**PM**	**AM**	**PM**
First Street NE NB at Massachusetts Avenue NE	**EB**	110	767 (598)	1,941 (1,402)	33	33	26 (21)	68 (49)
Union Station Drive NE and Columbus Monument Drive NE (West Corner)	**NB**	110	613 (478)	221 (160)	33	33	22 (17)	8 (6)
First Street NE NB at Massachusetts Avenue NE	**WB**	110	543 (389)	590 (461)	33	33	20 (14)	21 (16)

Intersection Name	Direction	Cycle Time (sec)	Preferred Alternative Peak Hour Volumes (No-Action Alternative Peak Hour Volumes)		Cycles Per Peak Hour		Preferred Alternative Maximum Queue in Peak Hour (No-Action Alternative Maximum Queue in Peak Hour)	
			AM	PM	AM	PM	AM	PM
Union Station Drive NE and Columbus Monument Drive NE (West Corner)	**SB**	110	376 (270)	513 (401)	33	33	13 (9)	18 (14)

In the Preferred Alternative, projected queues at each crossing would be longer than they would be in the No-Action Alternative. However, queues would remain manageable, as they could remain contained within the available sidewalk space at these locations.

Anticipated increases in vehicular traffic near WUS, including pick-up and drop-off activities, along with increases in pedestrian volumes, may result in more conflicts between pedestrians and vehicles.

Based on the projected number and distribution of new multimodal trips, the following locations would be most affected: G Street NE between North Capitol Street and First Street NE; First Street NE between G Street NE and K Street NE; H Street NE between the west intersection and east intersection; and Second Street NE between F Street NE and K Street NE.

The Preferred Alternative would also improve pedestrian connectivity outside the station by providing a pedestrian ramp (shared with bicycles) along the west side of WUS, which would connect the front of the station and First Street NE to the deck-level development and H Street. This ramp would be consistent with the potential construction of a "greenway" from H Street to the Metropolitan Branch Trail as part of future public or private projects. There would also be shared pedestrian-bicycle access from the east side of WUS to the new bus facility along the east side of the station. When the normal WUS vehicular circulation system is disrupted (for instance during major maintenance activities), the west ramp and the east ramp may be used by pick-up and drop-off vehicles or buses, respectively. During those times, on the west ramp, pedestrian circulation would be maintained alongside vehicle travel. On the east ramp, pedestrian access would be suspended; access via the interior of WUS would remain available.

Considering the pedestrian improvements associated with the Preferred Alternative, adverse impacts from crowding and potential conflicts would be minor. **Section 5.7**, *Avoidance, Minimization, and Mitigation Evaluation*, identifies specific measures pertaining to outside pedestrian circulation.

Comparison to Existing Conditions

The impacts of the Preferred Alternative relative to existing conditions would be similar to those relative to the No-Action Alternative. The major beneficial impact that would result from the provision of more circulation space and access points would be somewhat greater because it would represent a greater

improvement relative to existing conditions than relative to the No-Action Alternative, which already incorporates some changes beneficial to pedestrians. The increase in pedestrian volumes inside WUS would also be greater relative to existing conditions (about 115 percent in the AM and 61 percent in the PM peak).

Impacts on outside pedestrian circulation would be the same relative to existing conditions as relative to the No-Action Alternative since they are a function of a feature – sidewalk queueing space for pedestrians – that would be the same in both baselines.

5.5.1.7 Bicycle Activity

Relative to the No-Action Alternative, the Preferred Alternative would result in a major beneficial direct operational impact on bicycle activity. Anticipated demand for private bicycle parking and storage would be accommodated by the provision of about 100 Bikeshare spaces and up to 900 bicycle storage spots. However, this benefit would be partially offset by increased conflicts with pedestrians and vehicles.

In the Preferred Alternative, WUS would generate a total of 638 peak-hour bicycle trips, with 309 trips in the AM peak and 329 trips in the PM peak (**Table 5-28**).[100] These volumes would represent an increase of 102 AM trips (49 percent) and 88 PM trips (37 percent) over the No-Action Alternative.

Table 5-28. Peak-hour Bicycle Trips

	Preferred Alternative		No-Action Alternative		Existing Conditions	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Ins	130	177	89	124	67	93
Outs	179	152	118	117	89	88
Total	**309**	**329**	**207**	**241**	**156**	**181**

The Preferred Alternative would provide approximately 100 Bikeshare spaces and up to 900 bicycle storage spaces. New bicycle storage facilities would be established adjacent to the H Street Concourse entrances at First and Second Streets NE and in the undercroft of the west and east ramps. With the new bicycle facilities, the Preferred Alternative would fully accommodate the increased volumes in bicycle trips and would make possible future growth in station-bicycle connections. This would not occur in the No-Action Alternative.

The Preferred Alternative would also improve bicycle connectivity near WUS by providing a bicycle ramp (shared with pedestrians) along the west side of WUS, which would connect the front of the station and First Street NE to the deck-level development and H Street. This ramp would be consistent with the potential construction of a "greenway" from H Street to the Metropolitan Branch Trail as part of future public or private projects and would not preclude that facility from being constructed in the future. There would also be shared bicycle-pedestrian access from the east side of WUS to the new bus facility

[100] These trips include trips taken on e-bicycles or e-scooters.

along the east side of the station. When the normal WUS vehicular circulation system is disrupted (for instance during major maintenance activities), the west ramp and the east ramp may be used by pick-up and drop-off vehicle or buses, respectively. During those times, on the west ramp, bicycle circulation would be maintained alongside vehicle travel. On the east ramp, bicycle access would be suspended.

Greater vehicular, pedestrian, and bicycle volumes in the Preferred Alternative would increase the risk of conflicts between bicycles and vehicles. The access for the new First Street ramp into WUS, which would be signalized, would introduce a new conflict to the First Street cycle track. Bicycle facility improvements planned by DDOT (on Louisiana Avenue NE and K Street NE, for instance) would improve safety. However, increased vehicular and pedestrian activity from pick-ups and drop-offs as well as from the new pedestrian entrances at H Street on First and Second Streets would increase the risk of conflicts. **Section 5.7**, *Avoidance, Minimization, and Mitigation Evaluation*, identifies specific measures that would help minimize the risk of conflict.

Altogether, the improvements that would result from the Preferred Alternative would amount to a major beneficial direct operational impact on bicycle access and activity relative to the No-Action Alternative.

Comparison to Existing Conditions

The impacts of the Preferred Alternative relative to existing conditions would be similar to those relative to the No-Action Alternative. The Preferred Alternative would generate 153 additional AM peak trips (98 percent increase) and 148 additional PM peak trips (82 percent increase) relative to existing conditions. The bicycle parking and storage facilities included in the Preferred Alternative could accommodate up to 900 bicycles, in addition to 100 additional Bikeshare spots, more than enough to cover the anticipated increase, with ample room for further growth. In other respects, the two baselines are the same and the impacts of the Preferred Alternative would be the same.

5.5.1.8 City and Commuter Buses

Relative to the No-Action Alternative, the Preferred Alternative would have a minor adverse direct operational impact on city and commuter buses, including the DC Circulator. Increases in WUS-generated ridership would incrementally contribute to the overcrowding of some city buses and increases in traffic congestion would incrementally contribute to delays experienced by all city and commuter buses. These impacts would be partially offset by the Preferred Alternative's relocation of some city bus routes to the front of WUS and planned bus priority projects in the District.

The Preferred Alternative would increase usage of city and commuter buses (including DC Circulator Metrobus, MTA, and LCT buses) that serve WUS, as shown in **Table 5-29.**

Table 5-29. Combined Peak-hour City and Commuter Bus Ridership

	Preferred Alternative		No-Action Alternative		Existing Conditions	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Capacity	7,837	7,471	7,837	7,471	7,837	7,471
Volume Prior to WUS	4,298	4,516	3,887	3,863	3,723	3,593
V/C Arriving	55%	60%	50%	52%	48%	48%
Alightings for WUS	887	1,507	476	854	394	719
Through Volume	3,411	3,009	3,411	3,009	3,329	2,874
Boardings from WUS	1,721	1,042	829	612	717	501
Total Volume	**5,132**	**4,051**	**4,240**	**3,621**	**4,046**	**3,375**
V/C Departing	65%	54%	54%	48%	52%	45%

Compared to the No-Action Alternative, there would be an additional 411 alightings (86 percent) and 892 boardings (108 percent) at WUS in the AM peak from and on city and commuter buses. There would be an additional 653 alightings (76 percent) and 430 boardings (70 percent) in the PM peak. Considered collectively, city and commuter buses would continue to operate under capacity in both peaks.

The same individual Metrobus routes that would be over capacity in the No-Action Alternative would be over capacity in the Preferred Alternative (see **Table 5-30**). Because of the increase in ridership, the overcrowding would be worse, but the Preferred Alternative would not cause more Metrobus or DC Circulator lines to run above capacity than would the No-Action Alternative.

Table 5-30. Bus Routes Over Capacity

	Metrobus Route	Direction	Preferred Alternative	No-Action Alternative	Existing Conditions
AM Peak	**80**	**SB**	Over Capacity	Over Capacity	
	D4	**WB**	Over Capacity	Over Capacity	
	D6	**WB**	Over Capacity	Over Capacity	
	P6	**NB**	Over Capacity	Over Capacity	
	P6	**SB**	Over Capacity	Over Capacity	
	X1	**WB**	Over Capacity	Over Capacity	
	X2	**WB**	Over Capacity	Over Capacity	Over Capacity
	X9	**EB**	Over Capacity	Over Capacity	Over Capacity
	X9	**WB**	Over Capacity	Over Capacity	Over Capacity
PM Peak	**96**	**EB**	Over Capacity	Over Capacity	
	D6	**EB**	Over Capacity	Over Capacity	
	P6	**NB**	Over Capacity	Over Capacity	
	X2	**EB**	Over Capacity	Over Capacity	Over Capacity

	Metrobus Route	Direction	Preferred Alternative	No-Action Alternative	Existing Conditions
	X2	**WB**	Over Capacity	Over Capacity	Over Capacity
	X9	**EB**	Over Capacity	Over Capacity	Over Capacity
	X9	**WB**	Over Capacity	Over Capacity	Over Capacity

Increases in vehicle delay and queueing on street near WUS would likely affect bus reliability and speeds due to the overall degradation in traffic operations. As an illustration of this impact, **Table 5-31** shows which bus routes would pass through at least two intersections in the Local Study Area that would degrade to LOS F relative to the No-Action Alternative; these buses may experience slightly greater delays than in the No-Action Alternative. However, these traffic-related delays may be reduced due to ongoing DDOT planning efforts as part of the Bus Priority Program.[101] Bus priority treatments, which may include dedicated lanes or other measures to improve bus speed and reliability, are planned for North Capitol Street, H Street NE/NW, and Massachusetts Avenue NE/NW.[102] Additionally, the inclusion of transit buses in the front of WUS would also reduce impacts from congestion, as loading and unloading activities would be on a dedicated curbside off of District streets. Conflicts with drop-off traffic in the outer lanes at the front of WUS would need to be managed, however.

Table 5-31. Bus Routes Passing through LOS F Intersections in Preferred Alternative[103]

AM Peak	D4, D8, X2, X9, 80 NM Circulator LCT MTA 220, MTA 230, MTA 240, MTA 250, MTA 260, MTA 735
PM Peak	X2, X9, 80 LCT MTA 220, MTA 230, MTA 240, MTA 250, MTA 260, MTA 735

Combined, increased overcrowding and delays on some bus lines would amount to a minor adverse direct operational impact on city and commuter buses. **Section 5.7**, *Avoidance, Minimization, and Mitigation Evaluation*, identifies specific measures that would help minimize impacts on city and commuter buses.

In the Preferred Alternative, the new bus facility would not accommodate the Georgetown – Union Station (GT-US) DC Circulator or the Gallaudet University shuttle that make use of the existing facility. In existing conditions, the DC Circulator has four slips for operations. Based on observations conducted for

[101] DDOT. *Bus Priority.* Accessed from https://ddot.dc.gov/page/bus-priority. Accessed on January 22, 2023.

[102] DDOT. *Corridor Map.* Accessed from https://ddot.dc.gov/node/1499316. Accessed on January 22, 2023.

[103] This table does not include services that have been suspended since the start of the COVID-19 pandemic in 2020 and have not been reinstated as of November 2022.

the Project, typically only two slips are occupied: one for active loading and unloading and one for bus staging. The DC Circulator would need to find a new stop location near WUS.

The shuttle serving Gallaudet University would be relocated to the H Street deck pick-up and drop-off area, adjacent to the train hall. Riders could wait for the shuttle in the train hall. In the rare instances when that area is used for temporary special event charter bus operations, the shuttle would be temporarily relocated to other roads on the H Street deck or H Street itself, with adequate wayfinding and signage provided. Because of the short dwell time and limited number of trips, no impact to traffic operations would occur because of this relocation.

Comparison to Existing Conditions

Compared to existing conditions, in the Preferred Alternative there would be an additional 493 alightings (118 percent) and 1,004 boardings (136 percent) at WUS in the AM peak from and on city and commuter buses. There would be an additional 788 alightings (105 percent) and 541 boardings (102 percent) in the PM peak. Because of the increase in ridership, six Metrobuses in the AM peak and three Metrobuses in the PM peak that operate under capacity in existing conditions would operate over capacity (see **Table 5-30**). Impacts on DC Circulator and Gallaudet University shuttles would be the same relative to existing conditions and the No-Action Alternative because there is no difference between the two baselines in this regard.

5.5.1.9 Vehicular Parking and Rental Cars

Relative to the No-Action Alternative, the Preferred Alternative would have a moderate adverse direct operational impact on parking at WUS because of a reduction in parking capacity. There would be a minor adverse direct operational impact on rental car operations.

In the Preferred Alternative, all parking and rental car activity would be in a new below-ground parking facility with access via G Street NE and First Street NE. The new facility would have a capacity of up to 550 spaces, approximately 1,900 fewer spaces (a 77 percent reduction) than the existing parking garage, which would continue to be used in the No-Action Alternative. The new facility would provide Electric Vehicle (EV) charging capacity for parked vehicles. The number of charging spots would be determined during design.

The new parking facility would not fully accommodate projected future demand as estimated by FRA. [104] As such, it would amount to an adverse impact. It is anticipated the limitation of parking supply would create an incentive for WUS users to use different modes to reach the station.[105] In some cases, they could also drive to a different station, such as New Carrollton, Maryland. Furthermore, based on regional modeling estimates and recent District planning, relatively fewer passengers or visitors are

[104] **Appendix S1,** *Multimodal Refinement Report*

[105] The impacts of the reduction in parking capacity on other modes of travel are incorporated in the impact analyses conducted for those modes

expected to be driving to and parking at WUS by 2040.[106] Therefore, the adverse impact would be moderate.

Because of the reduction in parking capacity, WUS activity in the Preferred Alternative would generate fewer peak-hour parking trips than would be the case in the No-Action Alternative, as shown in **Table 5-32**. In the AM peak, the reduction between the No-Action Alternative and the Preferred Alternative would be 117 trips (62 percent reduction). In the PM peak, it would be 215 trips (72 percent reduction). These trips were incorporated in the traffic impact analysis documented below.

Table 5-32. Peak-Hour Parking Trips

	Preferred Alternative		No-Action Alternative		Existing Conditions	
	AM Peak	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
Ins	52	22	127	102	104	53
Outs	20	62	62	197	24	154
Total	**72**	**84**	**189**	**299**	**128**	**207**

Increased WUS activity would generate more rental car trips relative to the No-Action Alternative, as shown in **Table 5-33**. In both the AM and PM peak hours, the number of car-rental trips would more than double relative to the No-Action Alternative (105 against 46 in the AM peak and 92 against 45 in the PM peak). This substantial change would be due to the large increase in intercity train volumes concentrated in the peak hours. As with parking trips, these trips were incorporated in the traffic impact analysis.

Table 5-33. Peak-Hour Rental Car Trips

	Preferred Alternative		No-Action Alternative		Existing Conditions	
	AM Peak	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
Ins	57	37	28	17	26	13
Outs	48	55	18	28	15	23
Total	**105**	**92**	**46**	**45**	**41**	**36**

In the Preferred Alternative, the below-ground parking facility would include space for rental cars. However, because the size of the space (room for approximately 100 cars) would be less than the demand estimate (approximately 230 cars)[107], there would be an adverse impact on rental car operations. This adverse impact would be minor, as the facility operates in a constrained condition

[106] The Metropolitan Washington Council of Government (MWCOG) Transportation Planning Board (TPB) Regional Model estimates a 10 percent reduction in single-occupancy vehicle trips in the WUS area to 2040, based on the 2040 Cooperative Forecast developed for the 2040 Constrained Long-Range Plan. At the same time, DDOT's *Move DC* plan calls for a 13 percent reduction in automobile trips in the District relative to a projected future 2040 baseline.

[107] **Appendix S1,** *Multimodal Refinement Report.*

today and would continue to do so in the No-Action Alternative. Facility operators have experience with strategies to manage vehicle storage and use in those conditions.

Comparison to Existing Conditions

The impacts of the Preferred Alternative on parking and rental car activity would be the same relative to existing conditions as relative to the No-Action Alternative since the existing parking garage and rental car facility would be in use in both baselines. The reduction in parking capacity would be the same relative to existing conditions as to the No-Action Alternative.

The Preferred Alternative would generate fewer peak-hour parking trips than in existing conditions. In the AM peak, the Preferred Alternative would generate 56 fewer parking trips (44 percent reduction). In the PM peak, the reduction would be 123 parking trips (59 percent reduction). With regard to rental cars, in the AM peak, the number of trips would increase by 64 (156 percent) relative to existing conditions. In the PM peak, trips would increase by 56 (156 percent).

5.5.1.10 For-hire Vehicles[108]

Relative to the No-Action Alternative, the Preferred Alternative would have a moderate beneficial direct operational impact on for-hire vehicle activity because of the provision of new locations for pick-ups and drop-offs. These locations would adequately accommodate the anticipated growth in for-hire trips, manage congestion at the front of the historic station building, and provide new capacity to manage queueing.

The following five pick-up and drop-off locations would be provided in the Preferred Alternative:

- **Front of WUS:** For-hire vehicles would have two means of access depending on trip purpose: from Columbus Circle for all for-hire vehicles (drop-off only) and, for taxis, from the below-ground facility up the east ramp, via the entrances at G Street and First Street (pick-up only). Egress from the front of WUS would continue to occur at the intersection of Massachusetts Avenue, E Street NE, and First Street NE. In the Preferred Alternative, a projected 35 percent of for-hire drop-off and pick-up activity in the AM and 32 percent of for-hire drop-off and pick-up activity in the PM would occur in front of WUS. For-hire pick-ups would continue to have dedicated lanes closest to WUS's entrance.
- **Adjacent to the north-south train hall on the deck level**: For-hire vehicles would access this location via the new west intersection on H Street NE, with egress via the east intersection to H Street NE. In the Preferred Alternative, a projected 19 percent of for-hire drop-off and pick-up activity in the AM and 21 percent of for-hire pick-up activity in the PM would occur at this location.

[108] In the District and in this SDEIS, "for-hire vehicles" refers to all vehicles where the passenger pays for a ride, including taxis, livery/car services, and transportation networking companies (TNCs), such as Uber and Lyft.

- **New H Street Concourse entrance on First Street NE**: This location would serve the new WUS entrance on First Street NE and consist of a curbside pick-up and drop-off area on the west side of the street, north of H Street NE. For-hire vehicles would reach it via southbound First Street NE. In the Preferred Alternative, a projected 5 percent of for-hire drop-off and pick-up activity in the AM and 5 percent of for-hire drop-off and pick-up activity in the PM would use this location.
- **New H Street Concourse entrance on Second Street NE**: This location would serve the new WUS entrance on Second Street NE. It would consist of space for curbside pick-up and drop-off on both sides of the street. The west side location would be reached via southbound Second Street NE. Vehicles would reach the east side location via northbound Second Street NE. In the Preferred Alternative, a projected 3 percent of for-hire drop-off and pick-up activity in the AM and 3 percent of for-hire drop-off and pick-up activity in the PM would use this location.
- **Below-ground Facility:** This facility would provide a below-ground space incorporating queueing, staging, and pick-up and drop-off spaces for for-hire vehicles. This facility could include unique staging and pick-up and drop-off areas for both taxis and transportation networking companies (TNCs) to meet their different operational needs. This facility would have ingress and egress at First Street NE, G Street NE, and egress only at the east ramp to the front of WUS. In the Preferred Alternative, a projected 38 percent of for-hire drop-off and pick-up activity in the AM and 39 percent of for-hire drop-off and pick-up activity in the PM would use this location. The ability to accommodate EV charging for vehicles would be evaluated in future design.

The provision of these additional locations would have a beneficial impact on for-hire vehicle operations, as it would provide more room and flexibility for both drivers and passengers. As explained below (**Section 5.5.1.12,** *Vehicular Traffic*), volumes associated with for-hire as well as private pick-up and drop-off activity on the deck level and in front of WUS could create queueing and congestion; consequently, this beneficial impact would remain moderate.

Table 5-34 shows the anticipated number of WUS-related for-hire trips in the Preferred Alternative.[109] Relative to the No-Action Alternative, the Preferred Alternative would generate an estimated 632 additional peak-hour for-hire trips in the AM peak hour (121 percent increase) and 374 in the PM peak hour (43 percent increase). The principal source of additional peak-hour for-hire trips would be the increase in intercity rail activity. For-hire trips were considered in the traffic impact analysis.

[109] A single for-hire pick-up or drop-off operation creates both an in and an out trip as the vehicle arrives and then departs WUS. A single for-hire vehicle pick-up or drop-off is assumed to generate 1.5 trips to reflect the linking of trips in the WUS circulation network.

Table 5-34. Peak-hour For-hire Trips

	Preferred Alternative		No-Action Alternative		Existing Conditions	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Ins	578	618	262	431	197	324
Outs	578	618	262	431	197	324
Total	**1,156**	**1,236**	**524**	**862**	**394**	**648**

Comparison to Existing Conditions

The beneficial impacts of the Preferred Alternative on for-hire vehicle activities would be the same relative to existing conditions as relative to the No-Action Alternative since pick-up and drop-off locations would be the same in both baselines. The increase in trips would be proportionately greater. Relative to existing conditions, the Preferred Alternative would generate an estimated 762 additional AM peak-hour for-hire trips (193 percent increase) and 588 additional PM peak-hour for-hire trips (91 percent increase).

5.5.1.11 Private Pick-up and Drop-off[110]

Relative to the No-Action Alternative, the Preferred Alternative would have a moderate beneficial direct operational impact on private pick-up and drop-off activities because of the provision of new locations for these activities. These locations would adequately accommodate the anticipated growth in private pick-up and drop-off trips.

The same five locations used by for-hire vehicles would be available for private pick-up and drop-off activity for individuals to pick up WUS passengers that they know. However, private vehicles would not be allowed to use the east ramp to access the front of WUS from the below-ground facility and only drop-offs would be permitted in front of the station. The anticipated distribution of private pick-up and drop-off activity in the AM would be 17.5 percent at front of WUS; 32.5 percent next to the train hall; 5 percent on First Street NE; 3 percent on Second Street NE; and 42 percent in the below-ground facility. The anticipated distribution of activity in the PM would be 19 percent at front of WUS; 31 percent next to the train hall; 5 percent on First Street NE; 3 percent on Second Street NE; and 42 percent in the below-ground facility.

The provision of additional locations for private pick-up and drop-off would result in a beneficial impact, as it would provide more room and flexibility for both drivers and passengers. As explained below (**Section 5.5.1.12,** *Vehicular Traffic*), volumes associated with private pick-up and drop-off as well as for-hire activity on the deck level and in front of WUS could create queueing and congestion; consequently, this beneficial impact would remain moderate.

[110] "Private pick-up and drop-off" refers to pick-up and drop-off happening at WUS where the WUS passenger is in the car of a friend, family member, or acquaintance and has not paid for the ride.

Table 3-35 shows the anticipated number of WUS-related peak-hour private pick-up and drop-off trips in the Preferred Alternative.[111] Relative to the No-Action Alternative, the Preferred Alternative would generate an estimated 678 additional AM peak-hour trips (78 percent) and 480 additional PM peak hour trips (51 percent). The principal source of increased peak-hour private pick-up/drop-off trips would be the increase in intercity rail activity. The impacts of these trips are considered in the traffic impact analysis.

Table 5-35. Peak-hour Private Pick-up and Drop-off Trips

	Preferred Alternative		No-Action Alternative		Existing Conditions	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Ins	775	714	436	474	328	356
Outs	775	714	436	474	328	356
Total	**1,550**	**1,428**	**872**	**948**	**656**	**712**

Comparison to Existing Conditions

The beneficial impacts of the Preferred Alternative on private pick-up and drop-off activity would be the same relative to existing conditions as relative to the No-Action Alternative since pick-up and drop-off locations would be the same in both baselines. The increase in trips would be proportionately greater. Relative to existing conditions, the Preferred Alternative would generate an estimated 894 additional private pick-up and drop-off trips in the AM peak hour (136 percent) and an estimated 716 additional private pick-up and drop-off trips in the PM peak hour (100 percent).

5.5.1.12 Vehicular Traffic

Relative to the No-Action Alternative, the Preferred Alternative would have major adverse direct operational impacts on traffic operations at several intersections near WUS due to increased traffic volumes. During at least one of the peak periods, out of 35 intersections in the Local Study Area, six intersections would degrade to LOS F; 18 would experience an increase in queue length of more than 150 feet; and 18 would experience an increase in average delay of more than 5 seconds.[112]

Trips Generation and Circulation

WUS-related vehicular activity in the Preferred Alternative would be primarily distributed across six locations:

- The pick-up/drop-off area at the front of WUS;

[111] A single private pick-up or drop-off vehicle generates two trips: one in and one out as the vehicle arrives and then departs WUS.

[112] The Preferred Alternative analysis scenario assumes a more constrained cross-section to K Street NE due to new bicycle facilities than the No-Action Alternative. As a result, the overall level of traffic degradation as analyzed here is conservative.

- The new bus facility and new pick-up/drop-off location accessed from H Street NE;
- The new curbside drop-off location on First Street NE (serving the new H Street Concourse);
- The new curbside drop-off location on Second Street NE (serving the new H Street Concourse);
- The ingress and egress ramp to the below-ground facility on G Street NE; and
- The ingress and egress ramp to the below-ground facility on First Street NE.

Parking and rental car activity would converge on G Street and First Street to access the below-ground facility. Private and for-hire pick-up and drop-off activity would be spread across all locations.

Table 5-36 shows the anticipated distribution of WUS-related vehicular trips by access point and type of trip in the Preferred Alternative. Approximately 70 percent of WUS-related traffic is expected to travel to and from points west of WUS and 30 percent traveling to and from points east. Deck-level circulation patterns in the Preferred Alternative are described in **Appendix S2**, *Description of Alternative F*.

Table 5-36. Trip Distribution by Access Point and Trip Type in Preferred Alternative

	First Street	Second Street	Front of WUS	H Street	Below-ground Facility
For-hire Pick-up/Drop-off	5%	3%	35% (AM) 32% (PM)	19% (AM) 21% (PM)	38% (AM) 39% (PM)
Private Pick-up/Drop-off	5%	3%	18% (AM) 19% (PM)	32% (AM) 31% (PM)	42% (AM) 42% (PM)
Parking	0%	0%	0%	0%	100%
Rental Cars	0%	0%	0%	0%	100%

Table 5-37 and **Table 5-38** show AM and PM peak WUS-related traffic volumes in the Preferred Alternative, along with the corresponding information for the No-Action Alternative and existing conditions. Compared to the No-Action Alternative, the Preferred Alternative would generate 1,252 additional AM peak trips (77 percent increase) and 686 additional PM peak trips (32 percent increase). These volume increases would result in major adverse impacts to traffic operations at some study intersections, as described below (*Intersection Analysis*).

Table 5-37. AM Peak-hour Traffic Volumes

	Preferred Alternative			No-Action Alternative			Existing Conditions		
	Total Trips	In	Out	Total Trips	In	Out	Total Trips	In	Out
Parking	72	52	20	189	127	62	128	104	24
Private Pick-Up/Drop-Off	1,550	775	775	872	436	436	656	328	328
For-hire Vehicles	1,156	578	578	524	262	262	394	197	197
Car Rental	105	57	48	46	28	18	41	26	15
Total Trips	**2,883**	**1,462**	**1,421**	**1,631**	**853**	**778**	**1,219**	**655**	**564**

Table 5-38. PM Peak-hour Traffic Volumes

	Preferred Alternative			No-Action Alternative			Existing Conditions		
	Total Trips	In	Out	Total Trips	In	Out	Total Trips	In	Out
Parking	84	22	62	299	102	197	207	53	154
Private Pick-Up/Drop-Off	1,428	714	714	948	474	474	712	356	356
For-hire Vehicles	1,236	618	618	862	431	431	648	324	324
Car Rental	92	37	55	45	17	28	36	13	23
Total Trips	**2,840**	**1,391**	**1,449**	**2,154**	**1,024**	**1,130**	**1,603**	**746**	**857**

During the occasional periods when the WUS circulation system is disrupted (for instance during major maintenance activities), the east and west ramps would be used by buses and pick-up and drop-off vehicles, respectively. Buses would descend down the east ramp into the circulation area at the front of WUS; they would make use of the middle lanes to exit the station. Pick-up and drop-off vehicles would go down the west ramp and stop alongside the colonnade, as occurs today during periods of construction; they would exit WUS via Columbus Circle. WUS operational personnel would direct and manage the pick-up and drop-off activities as needed.

Comparison to Existing Conditions

Relative to existing conditions, the difference would be 1,664 additional AM peak trips (136 percent) and 1,237 additional PM peak trips (77 percent).

Curbside Analysis

The anticipated vehicular volumes associated with for-hire and private pick-up and drop-off activities on the deck level and on First and Second Streets NE may create conflicts and could lead to queues. At deck level, queueing analysis indicates that the approximately 550 feet of curbside space adjacent to the

east-west train hall would accommodate for-hire vehicles and private pick-up and drop-off without spill-back onto H Street NE.

No queue would form at the First Street or Second Street pick-up and drop-off areas. On First Street NE, there would be an estimated 135 pick-ups and drop-offs in the AM peak and 133 in the PM peak. On Second Street NE, there would be 81 pick-up and drop-offs in the AM peak and 80 in the PM peak. The available pick-up and drop-off areas provided in the Preferred Alternative along these corridors would be sufficient to accommodate these volumes. In the below-ground facility accessed from G Street and First Street, 1,090 pick-up and drop-offs would occur in the AM peak and 1,081 would occur in the PM peak. This facility is designed to accommodate an adequate amount of queueing and circulation space to operate effectively with these volumes.

Intersection Analysis

The impacts of the Preferred Alternative on traffic operations were assessed through Synchro modeling. Three indicators were used to assess the impacts of the Preferred Alternative on traffic operations at each intersection:

- Degradation of intersection LOS to F from a better LOS due to vehicle trips generated by the Project;
- Increase in average vehicle delay of more than 5 seconds; and
- Increase in 95th-percentile queue lengths of more than 150 feet for any lane group at an intersection.[113]

In the Preferred Alternative, relative to the No-Action Alternative, six intersections would degrade to LOS F in at least one peak hour. Three of the intersections that would operate at LOS F in the No-Action Alternative would improve to a better LOS in at least one peak hour (**Table 5-39**). The peak hour LOS of each intersection are shown in **Figure 5-3**.

Eighteen intersections out of 35 would experience an increase in queue length of more than 150 feet for one or more lane groups relative to the No-Action Alternative (**Table 5-40**). Of those 18 intersections, nine would experience such a queue increase in both peak hours.

Finally, in the Preferred Alternative, 18 of the 35 study intersections would experience an increase in average delay of more than 5 seconds for at least one peak hour relative to the No-Action Alternative. Ten of those 18 intersections would see such an increased delay in both peak hours (**Table 5-41**).

[113] These three factors were used to analyze the traffic impacts of the Project alternatives (including the No-Action Alternative) in the 2020 DEIS. They align with those used by DDOT in identifying traffic operations impacts as presented in the 2012 *DDOT Guidelines for Comprehensive Transportation Review (CTR) Requirements*, available at https://nacto.org/docs/usdg/comprehensive_transportation_review_ddot.pdf. In January 2022, DDOT issued updated CTR guidance with a revised impact assessment methodology based on five factors. The 2012 approach is used in this document to analyze the impacts of the Preferred Alternative in order to maintain comparability with the No-Action Alternative.

Figure 5-3. Intersection Peak Hour LOS in the Preferred Alternative

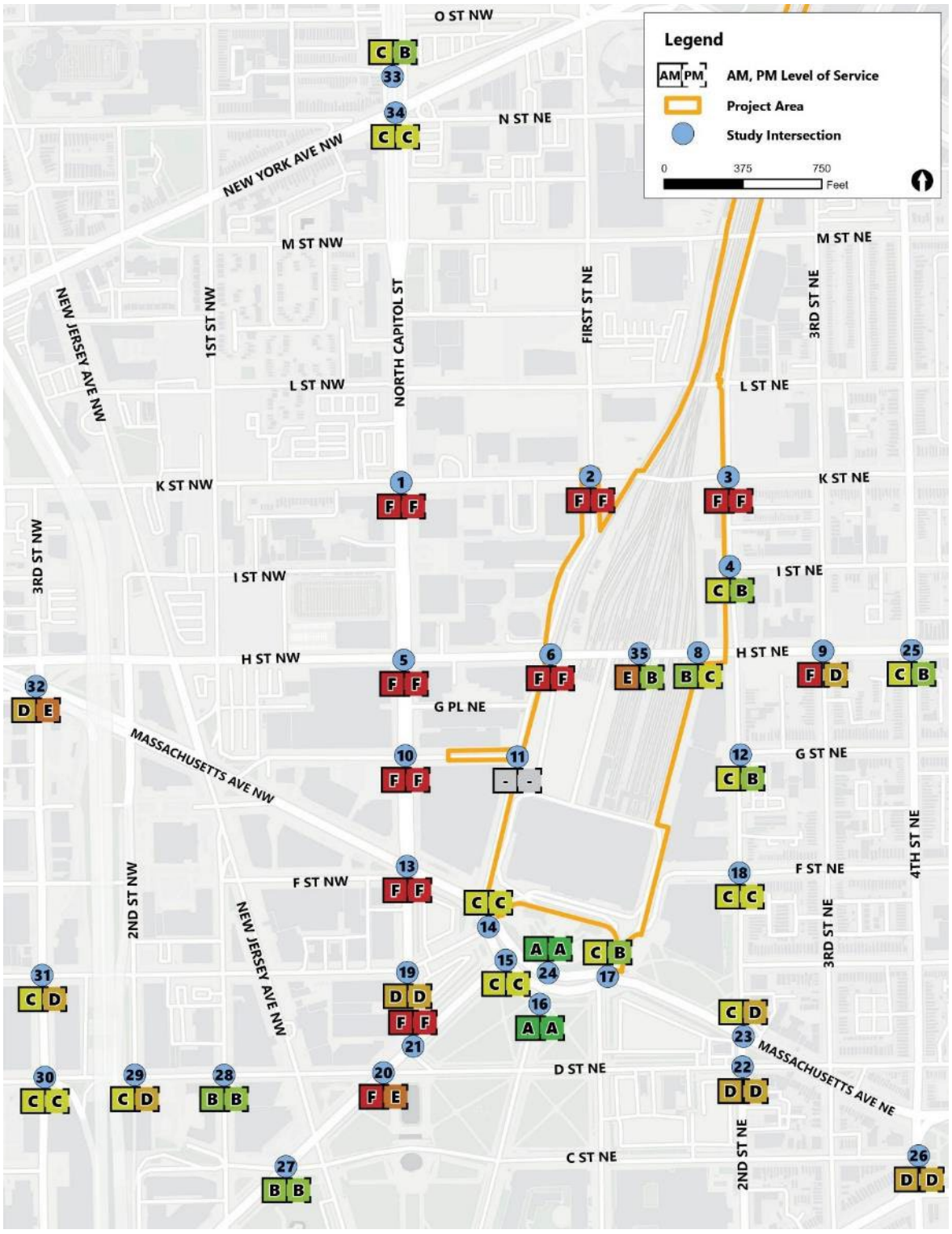


Table 5-39. Intersections with Failing LOS or Improvements from LOS F[114]

Int. No.	Intersection Name	Preferred Alternative		No-Action Alternative		Existing Conditions	
		AM LOS	PM LOS	AM LOS	PM LOS	AM LOS	PM LOS
Intersections with Failing LOS							
1	**North Capitol Street / K Street**	F	**F**	F	E	F	D
2	**First Street / K Street**	F	**F**	F	E	F	E
3	**Second Street / K Street**	**F**	**F**	D	B	C	B
5	**North Capitol Street / H Street**	F	F	F	F	C	C
6	**WUS West Intersection / H Street NE**	**F**	**F**	B	E	A	A
9	**3rd Street / H Street NE**	F	D	F	C	E	C
10	**North Capitol Street / G Street**	**F**	**F**	A	B	A	B
13	**North Capitol Street / Massachusetts Avenue**	**F**	**F**	D	D	D	D
20	**Louisiana Avenue / D Street NW**	F	E	F	E	F	F
21	**Louisiana Avenue / North Capitol Street**	F	F	F	F	F	D
Intersections with Improvements from LOS F							
8	**WUS East Intersections / H Street NE**	B	C	F	B	n/a	n/a
14	**Massachusetts Avenue / E Street / First Street NE**	C	C	F	D	E	E
32	**3rd Street / Massachusetts Avenue/ H St NW**	D	D	D	F	E	D

Gray shading indicates that the intersection would also experience LOS F in the No-Action Alternative. Bold red lettering indicates deterioration to LOS F from a better LOS in the No-Action Alternative.

[114] The intersections evaluated in this analysis include intersections of streets controlled by the Architect of the Capitol (AOC). These streets may be subject to closure by the AOC at any time.

Table 5-40. Intersections with Queue Increase Greater than 150 Feet in Preferred Alternative

Int. No.	Intersection Name	Relative to No-Action		Relative to Existing	
		AM Peak	PM Peak	AM Peak	PM Peak
		(lane groups with queue increase / total lane groups)			
1	**North Capitol Street / K Street**	2 / 7	3 / 7	6 / 8	2 / 6
2	**First Street / K Street NE**	1 / 7	3 / 6	3 / 7	5 / 7
3	**Second Street / K Street NE**	2 / 4	1 / 4	3 / 4	2 / 4
5	**North Capitol Street / H Street**	0 / 10	2 / 10	7 / 9	7 / 7
6	**WUS West Intersection / H Street NE**	1 / 8	0 / 8	4 / 6	2 / 6
8	**WUS East Intersection / H Street NE**	2 / 7	0 / 7	-	-
9	**3rd Street / H Street NE**	2 / 6	2 / 6	4 / 5	2 / 5
10	**North Capitol Street / G Street**	7 / 8	2 / 7	5 / 7	2 / 7
13	**North Capitol Street / Massachusetts Avenue**	5 / 10	4 / 10	4 / 10	4 / 10
14	**Massachusetts Avenue / E Street / First Street NE**	2 / 9	0 / 9	1 / 9	0 / 9
15	**Louisiana Avenue / Massachusetts Avenue NE**	0 / 5	1 / 5	1 / 5	1 / 5
17	**First Street / Massachusetts Avenue NE**	0 / 7	0 / 7	2 / 7	1 / 7
19	**North Capitol Street / E Street**	3 / 10	1 / 10	3 / 8	3 / 8
20	**Louisiana Avenue / D Street NW**	0 / 9	0 / 9	1 / 7	2 / 7
21	**Louisiana Avenue / North Capitol Street**	1 / 6	0 / 6	2 / 5	2 / 5
22	**Second Street / D Street NE**	0 / 4	0 / 4	1 / 4	3 / 4
23	**Second Street / Massachusetts Avenue NE**	0 / 7	0 / 6	0 / 7	3 / 5
25	**4th Street / H Street NE**	2 / 6	0 / 6	2 / 4	0 / 4
26	**Massachusetts Avenue / C Street / 4th Street NE**	0 /5	0 /5	2 / 3	3 / 3
27	**Louisiana Avenue / C Street NW**	0 / 10	1 / 10	0 / 4	0 / 4
29	**Second Street / D Street NW**	0 / 4	0 / 4	1 / 4	1 / 4
30	**3rd Street / I-395 On-ramp / D Street NW**	2 / 10	0 / 10	1 / 7	0 / 7
31	**3rd Street / E Street NW**	3 / 11	1 / 11	1 / 3	1 / 3
32	**3rd Street / Massachusetts Avenue/ H St NW**	0 / 6	0 / 6	0 / 6	2 / 6
33	**North Capitol Street (SB Ramp) / New York Avenue**	0 / 6	0 / 6	2 / 6	2 / 6
34	**North Capitol Street (NB Ramp) / New York Avenue**	0 / 6	0 / 6	2 / 6	0 / 6
35	**WUS Central Intersection / H Street NE**	2 / 8	2 / 8	-	-

Table 5-41. Intersections with Delay Increase > 5 seconds in Preferred Alternative

Int. No.	Intersection Name	Relative to No-Action		Relative to Existing	
		AM Peak	PM Peak	AM Peak	PM Peak
		(Increased Delay in seconds)			
1	**North Capitol Street / K Street**	82.2	104.7	129.2	140.2
2	**First Street / K Street NE**	110.1	240.2	181.9	258.6
3	**Second Street / K Street NE**	132.1	96.1	143.4	97.1
5	**North Capitol Street / H Street**	116.8	75.5	278.0	341.1
6	**WUS West Intersection / H Street NE**	91.3	66.4	101.8	115.7
8	**WUS East Intersection / H Street NE**	< 5*	7.8	15.8	21.5
9	**3rd Street / H Street NE**	39.6	10.2	84.3	17.4
10	**North Capitol Street / G Street**	84.2	70.5	82.9	73.8
13	**North Capitol Street / Massachusetts Avenue**	82.2	78.4	86.1	88.4
18	**Second Street / F Street NE**	< 5	< 5	6.6	< 5
19	**North Capitol Street / E Street**	26.2	10.9	29.5	< 5*
20	**Louisiana Avenue / D Street NW**	< 5*	8.9	< 5*	< 5*
21	**Louisiana Avenue / North Capitol Street**	135.1	97.8	312.9	259.2
22	**Second Street / D Street NE**	< 5	5.6	< 5*	< 5*
23	**Second Street / Massachusetts Avenue**	< 5*	< 5	< 5*	5.4
25	**4th Street / H Street NE**	< 5	< 5*	6.8	6.1
26	**Massachusetts Avenue / C Street / 4th St NE**	8.4	< 5	19.7	< 5*
31	**3rd Street / E Street NW**	< 5	9.4	6.4	16.2
32	**3rd Street / Massachusetts Avenue/ H Street NW**	6.2	< 5*	< 5*	22.2
34	**North Capitol Street (NB Ramp) / New York Ave**	< 5	14.7	5.7	14.5
35	**WUS Central Intersection / H Street NE**	55.1	< 5	-	-

*Denotes a reduction in delay

Table 5-42 provides a snapshot of each study intersection's performance relative to both the No-Action Alternative and Existing Conditions across the three indicators for traffic operations impacts in the Preferred Alternative.

Table 5-42. Preferred Alternative MOE Summary

Int. No.	Intersection Name	Relative to No-Action			Relative to Existing Conditions		
		LOS	Queuing	Delay	LOS	Queuing	Delay
1	North Capitol Street / K Street	X	X	X	X	X	X
2	First Street / K Street NE	X	X	X	X	X	X
3	Second Street / K Street NE	X	X	X	X	X	X
4	Second Street / Eye Street NE	A	A	A	A	A	A
5	North Capitol Street / H Street	A	X	X	X	X	X
6	WUS West Intersection / H Street NE	X	X	X	X	X	X
7	WUS Bus Exit / H Street NE	-	-	-	-	-	-
8	WUS East Intersection / H Street NE	A*	X	X	A	-	X
9	3rd Street / H Street NE	A	X	X	X	X	X
10	North Capitol Street / G Street	X	X	X	X	X	X
11	First Street / G Street NE	A	A	A	A	A	A
12	Second Street / G Street NE	A	A	A	A	A	A
13	North Capitol Street / Massachusetts Avenue	X	X	X	X	X	X
14	Massachusetts Avenue/ E Street / First Street NE	A*	X	A	A	X	A
15	Louisiana Avenue / Massachusetts Avenue NE	A	X	A	A	X	A
16	Delaware Avenue / Massachusetts Avenue NE	A	A	A	A	A	A
17	First Street / Massachusetts Avenue NE	A*	A	A	A	X	A
18	Second Street / F Street NE	A	A	A	A	A	X
19	North Capitol Street / E Street	A	X	X	A	X	X
20	Louisiana Avenue / D Street NW	A	A	X	A	X	A
21	Louisiana Avenue / North Capitol Street	A	X	X	X	X	X
22	Second Street / D Street NE	A	A	X	A	X	A
23	Second Street / Massachusetts Avenue NE	A	A	A	A	X	X
24	Massachusetts Avenue WB / Delaware Avenue NE	A	A	A	A	A	A
25	4th Street / H Street NE	A*	X	A	A	X	X
26	Massachusetts Avenue / C Street / 4th Street NE	A	A	X	A	X	X
27	Louisiana Avenue / C Street NW	A	X	A	A	A	A
28	First Street / D Street NW	A	A	A	A	A	A
29	Second Street / D Street NW	A	A	A	A	X	A
30	3rd Street / I-395 On-ramp / D Street NW	A	X	A	A	X	A
31	3rd Street / E Street NW	A	X	X	A	X	X
32	3rd Street / Massachusetts Avenue/ H Street NW	A*	A	X	A	X	X

Int. No.	Intersection Name	Relative to No-Action			Relative to Existing Conditions		
		LOS	Queuing	Delay	LOS	Queuing	Delay
33	North Capitol Street (SB Ramp) / New York Avenue	A*	A	A	A	X	A
34	North Capitol Street (NB Ramp) / New York Avenue	A	A	X	A	X	X
35	WUS Central Intersection / H Street NE	A	X	X	-	-	-

"A" indicates that the degradation in traffic operations, if any, is within an acceptable range. "X" indicates an unacceptable level of degradation in traffic operations. An asterisk (*) indicates an improvement in LOS relative to the No-Action Alternative.

Comparison to Existing Conditions

Relative to existing conditions, in the Preferred Alternative:

- Nine intersections would degrade to LOS F in at least one peak period.
- Twenty-four intersections would experience an increase in queue length of more than 150 feet for one or more lane groups, with 18 projected to do so in both peak hours.
- Eighteen intersections would experience delay increases of more than 5 seconds, with 13 projected to do so in both peak hours.

5.5.2 Indirect Operational Impacts

The Preferred Alternative would have minor adverse indirect operational impacts on traffic because of the trips generated by the potential Federal air rights development.

In the Preferred Alternative, the Federal air rights above the rail terminal not used for the Project would be available for potential transfer and mixed-use development. For the purposes of impact analysis, this potential development is assumed to include 310,000 square feet of office, 175,000 square feet of residential development, and 15,000 square feet of retail. **Table 5-43** shows the trips that the Federal air rights development would generate under these assumptions.

Table 5-43. Federal Air Rights Development Trip Generation in Preferred Alternative

	AM Peak			PM Peak		
	Total Trips	Inbound	Outbound	Total Trips	Inbound	Outbound
Parking	159	121	38	156	48	108
Private Pick-Up/Drop-off						
For-hire						
Car Rental						
Amtrak Express	6	5	1	6	2	4
Amtrak Corridor	0	0	0	1	1	0
MARC	73	60	13	68	16	52
VRE	38	33	5	34	6	28

	AM Peak			PM Peak		
	Total Trips	**Inbound**	**Outbound**	**Total Trips**	**Inbound**	**Outbound**
Intercity Bus	2	0	2	2	1	1
Metrorail	170	132	38	165	49	116
City/ Commuter Bus	34	26	8	33	10	23
Streetcar	19	14	5	20	7	13
Pedestrian	67	47	20	69	27	42
Bicycle	57	44	13	56	17	39

The potential Federal air rights development would increase the total number of vehicular trips generated by the Preferred Alternative by approximately 5 percent. These trips were incorporated in the traffic impact analysis presented above.

5.5.3 Construction Impacts

Construction of the Preferred Alternative would take place over approximately 13 years. Work would be conducted in four phases moving from the east side to the west side of the Project Area. Between Phases 1 and 2, there would a 12-month period (Intermediate Phase) when only column removal work in the First Street Tunnel would take place. The intensity and location of construction activities would vary with the phase. The following sections characterize the potential impacts of the construction of the Preferred Alternative on the various transportation modes at and near WUS. The discussion focuses on Phase 4 of construction. Phase 4 would have the greatest impacts on transportation because of the demolition of the parking garage and bus facility that would occur during this phase and because of the concentration of construction activities on the west side of WUS, adjacent to Metrorail's Red Line. In the Preferred Alternative, Phase 4 would begin approximately 8 years and 9 months after the start of construction and last for approximately 4 years and 3 months.

During each of the four phases, a similar sequence of activities would take place. A set of tracks would be taken out of service. Temporary tracks and connections would be constructed as needed to help maintain operations and potentially support the operation of potential work trains. Cut-off and support walls would be installed, as needed, to support excavation and keep groundwater out. Following excavation, drilled shafts would be constructed to provide deep foundations for the slabs supporting the new tracks and the columns supporting the H Street deck. As construction moves to the next phase, deck-level Project elements would be constructed.

Estimated phases durations in the Preferred Alternative are shown in **Table 5-44.** The table also shows the estimated duration of excavation activities in each phase. As explained further in the relevant sections, periods of excavation would be when some impacts are most intense or noticeable.

Table 5-44. Construction and Excavation Duration, Preferred Alternative

Phase	Overall Duration	Approximate Duration of Excavation
Phase 1	2 years, 4 months	5 months
Intermediate Phase	12 months	None
Phase 2	2 years, 8.5 months	10 months
Phase 3	2 years, 8.5 months	11 months
Phase 4	4 years, 3 months	2 years, 1 month
Total	13 years	4 years, 3 months

5.5.3.1 Commuter and Intercity Railroads

Construction of the Preferred Alternative would cause a moderate adverse impact to Intercity and Commuter rail operations. Limited train delays and cancellations may occur during the entire construction period.

Each phase of construction would involve taking a set of tracks out of service, thus reducing the number of tracks and platforms available for train service. The provision of temporary tracks and connections would largely make up for this temporary loss. A construction-period operating plan designed to maximize use of the available infrastructure would be put in place. However, railroad operations would be affected, as certain trips would be affected by planned cancellations and rescheduling. Anticipated schedule impacts by service by construction phase are shown in **Table 5-45**.

Table 5-45. Daily Train Planned Cancellations and Alterations during Construction

Service	Construction			
	Phase 1 & Intermediate Phase	**Phase 2**	**Phase 3**	**Phase 4**
Amtrak Trains Altered (out of 144 Daily)	0	2	0	1
MARC Canceled (out of 106 Daily)	0	4	0	4
VRE Canceled (out of 34 Daily)	2	2	0	0

Not all services would be affected at the same time, and none would be affected during the entire construction period. Impacts on VRE operations would occur only in the first two phases of construction while impacts on Amtrak and MARC service would occur only in Phases 2 and 4. There would be no impacts on any service during Phase 3. Amtrak, MARC, and VRE operations during the entire construction period would meet the levels defined in the 2025 operating plan developed for the Project. This operating plan is consistent with short- to medium-term operator plans (see Appendix B, *Washington Union Station Terminal Infrastructure EIS Report*, of the 2020 DEIS, Section 7.2.3).

In all phases, anticipated service cancellations would represent at most approximately 3 percent of the overall service levels at WUS. While moderate and manageable, this would reduce flexibility and increase delays. Phase 4 of construction would see an average delay to train operations[115] of 6 minutes and 12 seconds. Phase 2 would see larger delays and greater disruptions to train operations. During this phase, a total of 8 trains would be canceled daily. The average train delay would be 18 minutes and 36 seconds. These delays and cancellations would cause disruptions for passengers, most notably VRE passengers, as 6 percent of VRE trains would be canceled.

5.5.3.2 WMATA Metrorail

Construction of the Preferred Alternative would have moderate adverse impacts on WMATA Metrorail Red Line operations due to intermittent stoppages or single-tracking events.

Metrorail's Red Line runs along the western side of the Project Area. Therefore, it would be most affected during Phase 4 of construction period, which is when the First Street Concourse, the First Street entrance to the H Street Concourse, and the First Street and G Street vehicle ramps would be constructed. Additionally, in Phase 4, the existing parking garage would be demolished, and a new Track 37 would be constructed near the NoMA-Gallaudet station.

These construction activities may require schedule adjustments for safety purposes. Intermittent stoppages, single-tracking, or shutdowns may occur on weekdays, weeknights, or weekends. Such impacts would occur throughout Phase 4 (see **Table 5-44** above for the duration of Phase 4 in the Preferred Alternative), and their exact frequency or duration are not known at this stage of planning. No extended shutdowns or periods of single tracking are anticipated. This constraint is reflected in the construction scheduling.

However, should a shutdown be required, it is anticipated that service on the Red Line would be retained between Judiciary Square and Shady Grove and between NoMa-Gallaudet and Glenmont. Bus bridges would be used to provide passengers with access to the full Red Line. Even with such shutdowns, the impact would remain moderate because of the redundancy provided by the Green Line and the established regional approach to bridging WMATA construction through bus and ancillary service.

Construction of the Preferred Alternative would also require relocating of the existing WMATA fan plant and chillers. This relocation would be planned and conducted in coordination with WMATA.

During the same period, the unavailability of parking between the demolition of the existing garage and the completion of the new parking facility (See *Vehicular Parking and Rental Cars* below) would likely generate up to 350 additional daily Metrorail trips when the station is open. This would not cause noticeable overcrowding as those trips would be distributed over the entire day.

[115] This is the average delay that a scheduled train would experience due to the construction. This metric does not include canceled trains.

5.5.3.3 DC Streetcar

Construction of the Preferred Alternative would have moderate adverse impacts on DC Streetcar operations due to temporary disruptions to direct access between the WUS Streetcar station and WUS.

DC Streetcar operations would be affected during Project construction if the H Street Bridge were to be closed for safety reasons. Such closures are not likely, and if they did occur, they would be rare and brief. Construction of the Project elements and demolition of the existing parking garage may result in a loss of direct access between the WUS Streetcar station and WUS, including the Metrorail Station, during certain times. Such adverse impacts would be moderate because of their limited duration.

5.5.3.4 Intercity, Tour/Charter, and Sightseeing Buses

Construction of Preferred Alternative would have moderate adverse impacts on bus operations and bus passenger accommodations.

Impacts on intercity, tour/charter, and daily sightseeing bus operations would be concentrated in Phases 3 and 4 of construction. During Phase 3, which would last for approximately 2 years and 8.5 months, the relocation of the facility within the existing parking structure would create some disruptions, although operations would generally be able to continue. At the beginning of Phase 4, the entire existing bus facility and parking garage would be demolished. The new bus facility would not be operational until the completion of Phase 4.

Therefore, as explained in Section S.11.7.2, *Bus*, of **Appendix S2**, *Description of Alternative F*, during Phase 3 if needed and during Phase 4, a temporary bus facility or temporary bus loading zones would be established on the completed portion of the structural deck. These temporary facilities would be of sufficient size to maintain an adequate level of operations. They would likely be small during Phase 3 and established only on an as-needed basis, depending on conditions in the remaining part of the existing parking garage and bus facility. During Phase 4, which would last for approximately 4 years and 3 months, the temporary facilities would have to accommodate all intercity and charter bus service. Some or all of the temporary facilities would have to be established on the completed portion of the private air rights deck through an agreement with the private air rights developer. FRA confirmed with the private air rights developer that this approach is feasible.

Such interim bus facilities would be sufficient to maintain adequate intercity and charter bus service at WUS until the new facility is operational. They would not provide the same amenities as the new facility and, depending on their location, they may increase the distance to the front of the station. Bus carriers would have to adapt their operations to a changing environment during a few years. This would be a moderate adverse impact. Service would continue and intermodal connections would remain available throughout the construction period. USRC would work with the private air rights developer and the bus carriers to ensure that the temporary facilities are sited and designed in a manner that provides users with the highest reasonably achievable level of comfort.

5.5.3.5 Loading

Construction of the Preferred Alternative would have a major adverse impact on loading operations and facilities.

The east loading facility, which is accessed from H Street NE, would remain open for operation during the majority of the Preferred Alternative construction period. However, the west loading dock would be closed in Phase 4 when construction activities would occur nearby. The new loading dock at Second and K Streets NE would not be operational until the end of the construction period because of the need to use the area for material laydown and storage.

Because of these constraints, large truck loading on-site would be limited. Small trucks would have to be used instead. A facility to transfer and screen large loads to smaller trucks would be needed. At this stage of planning, the location of this temporary facility has not been determined.

5.5.3.6 Pedestrians

Construction of the Preferred Alternative would have moderate adverse impacts on pedestrian traffic.

Throughout the construction period, circulation within WUS would be affected as tracks and platforms are replaced; sections of the station are closed to allow for column removal in the First Street Tunnel; and new concourses and access points are built. The intensity of the impacts would vary with the phase but would be greatest during Phases 1 and 2, when the column removal work is ongoing, and during Phase 4, because of interior construction activities on the west side of the site. Access to the Metrorail station from within WUS may also be affected.

Externally, throughout the construction period, street and sidewalk segments around WUS would be subject to temporary closures. The affected areas would include the front of the historic station building during the upgrade of the pick-up and drop-off lanes; and First Street NE, G Street, NE, and Second Street NE, as multimodal facilities and ramps are constructed there. Construction traffic (up to 120 trucks a day during periods of excavation; see **Table 5-44** above for durations)[116] may also make pedestrian movements more challenging and generate conflicts along truck routes, especially Second Street NE.

5.5.3.7 Bicycles

Construction of the Preferred Alternative would have a moderate adverse impact on bicycle circulation during the construction of the First Street pick-up and drop-off facilities, the H Street Concourse, and entrance to the below-ground facility.

During parts of Phase 4 of construction, portions of First Street NE near the H Street Concourse would be rebuilt; an entrance to the H Street Concourse and the access ramps to the below-ground facility would be built. The cycle track along First Street NE may be closed during the construction of these elements. Truck use of the existing H Street Tunnel may also create conflicts during construction. While

[116] See **Section 5.7**, *Avoidance, Minimization, and Mitigation Evaluation*, for proposed mitigation of this truck traffic.

this work is being performed, it may not be possible to maintain a bicycle accommodation along the First Street corridor. During portions of Phase 4, It is expected that bicyclists would be rerouted to the Second Street shared-use path portion of the Metropolitan Branch Trail. How long disruption of the cycle track would last is not known at this time, but it would likely be less than the full duration of Phase 4. Temporary road closures around WUS would also disrupt bicycle circulation, as described above for pedestrians.

5.5.3.8 City and Commuter Buses

Construction of the Preferred Alternative would have negligible adverse impacts on city and commuter bus operations as there would only be intermittent disruptions

Construction activities would not significantly affect commuter bus activities. Most commuter bus service in the area serves North Capitol Street and the Columbus Circle area, where the larger transportation network would absorb the construction truck traffic and where there would be no direct access to the construction site.

City bus operations, including the DC Circulator and WMATA Metrobus, could be disrupted if H Street NE were to be closed for safety reasons. Specific information on the frequency and duration of these possible closures is not available at this time but long-term disruptions to H Street NE are not anticipated.

Operation of the Gallaudet University shuttle out of the existing bus facility would have to stop in Phase 4, when the facility would be demolished. As explained in **Section 5.5.1.8**, *City and Commuter Buses*, this would become a permanent condition since the new bus facility could not accommodate the shuttle. During Phase 4 of construction, the shuttle would be accommodated in the interim bus facility (see **Section 5.5.3.4**, *Intercity, Tour/Charter, and Sightseeing Buses*).

5.5.3.9 Vehicular Parking and Rental Cars

Construction of the Preferred Alternative would have a major adverse impact on parking and rental cars in the period between the demolition of the existing parking garage and the completion of the below-ground facility in Phase 4 of construction.

Major impacts to parking and rental car operations would occur in Phase 4 of construction, when demolition of the existing parking garage would occur. There would be a partial loss of parking capacity during Phase 3 as partial demolition of the garage would begin, but it is only during Phase 4, which would last for approximately 4 years and 3 months and begin approximately 8 years and 9 months after the start of construction, that parking would be entirely unavailable at WUS, including rental car parking. This would be a major adverse impact on parking.

The loss of parking capacity would require WUS visitors or passengers to use alternative modes of transportation, including Metrorail, for-hire vehicles, and private pick-ups and drop-offs. Based on projected mode distribution, this shift would generate an estimated 581 daily Metrorail trips, 431 daily

for-hire trips, and 431 daily private pick-up and drop-off trips.[117] Given the overall daily volumes of these modes, the added trips would be manageable.

WUS-bound drivers may also seek parking in commercial parking facilities nearby or on the streets around the station. While the above estimate is based on a reasonable assumption that the reduction in parking capacity would lead to increases in Metrorail, for-hire, and private pick-up and drop-off trips, it is possible that a number of WUS-users would still drive to the station, including users from areas not well served by transit, who may have a limited set of options. If these drivers represented 50 percent of the demand, then the demand in the commercial market for parking would be approximately 530 daily spaces. Street parking near WUS is in very limited supply, as most streets within a quarter mile of the station are residential parking permit areas,[118] two-hour parking areas, or monitored parking areas on Architect of the Capitol property. Therefore, no WUS passengers or visitors are likely to be able to use street parking for long-term parking. There may be some demand for local on-street parking from WUS retail patrons. During Phase 4, the lack of parking at WUS may make the station unusable by anyone who would lack other options to reach it.

5.5.3.10 For-hire Vehicles

Construction of the Preferred Alternative would have a major adverse impact on for-hire vehicle operations because of extended queueing.

Passenger pick-up and drop-off in front of the historic station building by for-hire vehicles would remain available during most of the construction period, although some disruption would occur when the taxi and private pick-up and drop-off lanes (used by TNC vehicles) would be improved. The existing loop road along the back of the station building would be unavailable during the entire period of construction. Therefore, the east ramp currently used by taxis to reach the front of the station would stop being accessible from the start of construction. Taxis would have to queue along the west ramp as they do today when the east ramp is not available. During Phase 4, the west ramp would be closed, and taxis would have to queue along the new southeast road on the deck level and the new east ramp from the bus facility (both available after completion of Phases 1 and 2). The east ramp would be used for the entirety of Phase 4. The loss of parking likely would result in an uptick in for-hire operations (see *Vehicular Parking and Rental Cars* above), which would contribute to the adverse impact on these operations during Phase 4.

5.5.3.11 Private Pick-up and Drop-off

Construction of the Preferred Alternative would have a moderate adverse impact on private pick-up and drop-off operations.

[117] Because of the anticipated disruption in Metrorail service during Phase 4, however, fewer people may use Metrorail as an alternative mode of travel than modeled.

[118] District Department of Transportation. 2018. RPP/ANC Map. Accessed from https://ddot.dc.gov/sites/default/files/dc/sites/ddot/publication/attachments/RPP_blocks_ANC.pdf. Accessed on September 4, 2018.

Private pick-up and drop-off would remain available in front of WUS during the construction period. The reconstruction of traffic lanes in front of the station would require the temporary closure of parts of the pick-up and drop-off area, although some spaces would remain available at all times. Therefore, this adverse impact would be moderate. As noted above, the loss of parking likely would result in an uptick in private pick-up and drop-off operations (see *Vehicular Parking and Rental Cars* above), which would contribute to the adverse impact on these operations during Phase 4 of construction.

5.5.3.12 Vehicular Traffic

Construction of the Preferred Alternative would have a major adverse impact on vehicular traffic operations because of roadway closures and construction vehicle traffic.

In the Preferred Alternative, construction activities at WUS would generate traffic to and from the site throughout the day during the entire construction period, although the volume and nature of this traffic would vary depending on the phase and type of activities being conducted. It would be minimal during the Intermediate Phase between Phases 1 and 2, when only column-removal work would be performed. It would be greatest during excavations, when up to 120 trucks per 20-hour day could be traveling to and from the site. This is a maximum, conservative estimate that assumes that no work trains would be used to haul spoils away. Use of two work trains a day would eliminate most of this truck traffic. Additionally, while each construction phase (excluding the Intermediate Phase) would include a period of excavation and associated truck traffic, that period would be substantially shorter than the phase itself, as shown in **Table 5-44** above.

The longest period of excavation (approximately 2 year and 1 month) would occur during Phase 4, on the west side of the Project Area. During that time, most truck traffic would travel on First Street NE to connect to designated District truck routes along the North Capitol Street and New York Avenue corridors. Phase 1, on the east side of the Project Area, would have the shortest excavation period (approximately 5 months). During that period, trucks would likely travel along portions of Second Street NE before connecting to a designated truck route. No trucks would circulate along residential streets, or any other streets not designated as a truck route by the District.

As WUS would remain operational throughout the construction period, construction traffic would add to the traffic generated by users of the station. By the time of Phase 4, WUS would generate similar levels of vehicular traffic to that expected in the No-Action Alternative. Although construction traffic would add to total traffic volumes on major WUS access routes, it would be spread out across the entire day, reducing its impact on local traffic operations.

At various times during the construction period, temporary roadway closures would be required, especially along G Street NE between North Capitol Street and First Street NE; First Street NE, between Columbus Circle and K Street; and Second Street NE, between Massachusetts Avenue and K Street, to accommodate construction traffic in and out of the construction site. Road closures would generally last from 5 to 6 minutes on average and no more than 20 minutes. During those times, traffic may temporarily move to other streets such as H Street, K Street, 4th Street NE, and North Capitol Street.

5.6 Summary of Impacts

Table 5-46 summarizes the impacts of the No-Action Alternative and the Preferred Alternative by mode. **Table 5-47** provides quantitative comparisons where applicable.

5.7 Avoidance, Minimization, and Mitigation Evaluation

The transportation impacts analysis identified a series of potential impacts that require actions that would avoid, minimize, or mitigate these impacts. **Table 5-48** lists avoidance, minimization, and mitigation actions FRA is proposing to adopt for each type of potential impact.

5.8 Permits and Regulatory Compliance

Permitting and regulatory requirements would be as stated in **Appendix C3**, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 5.8, *Permits and Regulatory Compliance*.

Table 5-46. Summary of Impacts

Mode	Type of Impact	No-Action Alternative	Preferred Alternative
Commuter and Intercity Railroads	**Direct Operational**	Major adverse impact	Major beneficial impact
	Construction	N/A	Moderate adverse impact
WMATA Metrorail	**Direct Operational**	Moderate adverse impact	Minor adverse impact
	Construction	N/A	Moderate adverse impact
DC Streetcar	**Direct Operational**	Moderate beneficial impact (ridership); Minor adverse impact (new intersections)	Minor beneficial impact
	Construction	N/A	Moderate adverse impact
Intercity, Tour/Charter, and Sightseeing Buses	**Direct Operational**	Major adverse impact	Moderate adverse (hop-on/hop-off buses) or moderate beneficial impact (all others)
	Construction	N/A	Moderate adverse impact
Loading	**Direct Operational**	No impact	No adverse impact
	Construction	N/A	Major adverse impact
Pedestrians	**Direct Operational**	Major adverse impact	Major beneficial impact (inside WUS) and minor adverse impact (outside WUS)
	Construction	N/A	Moderate adverse impact
Bicycle Activity	**Direct Operational**	Moderate adverse impact	Major beneficial impact
	Construction	N/A	Moderate adverse impact
City and Commuter Buses	**Direct Operational**	Moderate adverse impact	No impact (university shuttle) or minor adverse impact (all others)
	Construction	N/A	Negligible adverse impact

Mode	Type of Impact	No-Action Alternative	Preferred Alternative
Vehicular Parking	**Direct Operational**	No impact	Moderate adverse impact
	Construction	N/A	Major adverse impact
Rental Cars	**Direct Operational**	Minor adverse impact	Minor adverse impact
	Construction	N/A	Major adverse impact
For-hire Vehicles	**Direct Operational**	Major adverse impact	Moderate beneficial impact
	Construction	N/A	Major adverse impact
Private Pick-up/drop-off	**Direct Operational**	Major adverse impact	Moderate beneficial impact
	Construction	N/A	Moderate adverse impact
Vehicular Traffic	**Direct Operational**	Major adverse impact	Major adverse impact
	Construction	N/A	Major adverse impact
All Modes	**Indirect Operational**	N/A	Minor adverse impact

Table 5-47. Quantitative Comparison of Alternatives (Direct Operational Impacts)

Measure	No-Action Alternative	Preferred Alternative
Commuter and Intercity Railroad		
Amtrak		
Daily Train Volume	144	288
Peak Train Volume	17	20
Daily Ridership	21,800	32,000
MARC		
Daily Train Volume	106	250
Peak Train Volume	15	34
Daily Ridership	37,900	70,700
VRE		
Daily Train Volume	34	92
Peak Train Volume	4	16
Daily Ridership	4,900	13,600
WMATA Metrorail		
AM V/C Arriving at WUS toward Shady Grove	80%	84%
AM V/C Leaving WUS toward Shady Grove	86%	103%
Excess Passengers Shady Grove	0	484
PM V/C Arriving at WUS toward Glenmont	107%	116%
PM V/C Leaving WUS toward Glenmont	91%	93%
Excess Passengers Glenmont	1,110	2,488
DC Streetcar		
V/C Eastbound AM (PM) Arriving at WUS	15% (20%)	19% (32%)
V/C Eastbound AM (PM) Leaving WUS	33% (27%)	43% (43%)
V/C Westbound AM (PM) Arriving at WUS	50% (17%)	67% (26%)

Measure	No-Action Alternative	Preferred Alternative
V/C Westbound AM (PM) Leaving WUS	32% (7%)	51% (9%)
Intercity, Tour/Charter, and Sightseeing Buses		
Peak-hour Bus Activity AM (PM)	28 (39)	41 (79)
Pedestrians		
Peak Interior Volumes AM (PM)	47,703 (61,646)	71,734 (92,356)
Peak Exterior Volumes AM (PM)	11,123 (10,819)	17,938 (16,766)
Bicycle Activity		
Peak Activity AM (PM)	207 (241)	309 (329)
City and Commuter Buses		
V/C AM/PM (All Buses)	54% (48%)	65% (54%)
Over Capacity Routes	16	16
Vehicular Parking and Rental Cars		
Parking Capacity	2,450	up to 550
Peak-hour Parking Trips AM (PM)	189 (299)	72 (84)
Peak-hour Rental Car Trips AM (PM)	46 (45)	105 (92)
For-Hire Vehicles		
Peak-hour For-hire Trips AM (PM)	524 (862)	1,156 (1,236)
Private Pick-up and Drop-off		
Peak-hour Private Pick-up/Drop-off Trips AM (PM)	872 (948)	1,550 (1,428)
Vehicular Traffic		
Peak-hour Traffic Volumes AM (PM)	1,631 (2,154)	2,883 (2,840)
Number of intersections degrading to LOS F during at least 1 peak hour	6	6

Measure	No-Action Alternative	Preferred Alternative
Number of intersections experiencing increases in queue length of more than 150 feet	21	18
Number of intersections experiencing average delay increases of more than 5 seconds	18	18

Table 5-48. Proposed Avoidance, Minimization, and Mitigation Measures

Mode	Impact	Proposed Action[1]
All Modes – Construction	All construction impacts on transportation	USRC to require the construction contractor to prepare an integrated Construction Transportation Management Plan. The Plan will aim to provide safe passage for pedestrians, cyclists and vehicular traffic around a construction site with as little inconvenience, impact and delay as possible. The Plan will define the measures to be implemented by the construction contractor to avoid, minimize, or mitigate impacts from construction on all transportation modes in each phase of construction, along with procedures to enforce, monitor, and evaluate these measures and ensure consistency with District requirements for managing construction impacts. The Plan will be coordinated with DDOT, WMATA, Architect of the Capitol (AOC), and other relevant agencies.
Amtrak – Construction	During construction, up to two Amtrak trains may be canceled daily.	USRC to coordinate with Amtrak to ensure that, as much as possible, Amtrak accommodates passengers on other Amtrak trains.
MARC – Construction	During construction, up to 4 MARC trains may be canceled daily.	USRC to coordinate with Amtrak, MARC, and VRE on alternative service options for affected MARC passengers, including honoring MARC tickets on alternative services.
VRE – Construction	During construction, up to 2 VRE trains may be canceled daily.	USRC to coordinate with Amtrak, MARC, and VRE on alternative service options for affected VRE passengers, including honoring VRE tickets on alternative services.
Metrorail – Operations	Increase in passenger volumes would have moderate impact on passenger circulation at WUS WMATA Station.	USRC to fund a new WMATA Station Access and Capacity Study and to contribute to improvements identified in that study that have not been addressed by the Concourse Modernization Project or by WMATA by the time of implementation.
Metrorail – Operations	Increase in passenger volumes would contribute to capacity issues on WMATA Red Line.	USRC, in coordination with DDOT, to engage with WMATA about the determination of the Preferred Alternative for a new core line, referred to as “Blue-Orange-Silver.”
Metrorail – Construction	During construction Phase 4, temporary schedule adjustments or intermittent	USRC to develop with WMATA construction approaches that would minimize delays and shutdowns/stoppages on the Red Line.

Mode	Impact	Proposed Action[1]
	stoppages or shutdowns may be required during weekdays, on evenings, or during weekends.	
DC Streetcar – Construction	During construction, activities may block direct access from Streetcar station to WUS facilities.	USRC to develop with DDOT options for temporary Streetcar station access during construction and take steps with the District State Safety Office to address issues that may affect Streetcar certification. USRC to implement any changes to public access required, subject to DDOT approval, and provide safe accommodations for pedestrians.
Bus Facility – Operations	Dynamic facility management might affect bus carrier operations at WUS	USRC to develop a Bus Facility Operations Plan in coordination with the bus carriers using the facility, DDOT, and the Mayor's Office of Special Events. The plan would address: • Approach to dynamic management, including use of zones and patterns to improve wayfinding and operations; • Technology used to implement management approach; • How special events in the District will be managed to minimize impacts to core operations and adjacent streets; • How peak intercity periods will be managed; • How revenues, costs, and slip fees will be managed and allocated in the facility to balance operational and maintenance needs and bus industry economics; • Safety and security systems planning; and • Operational approaches for electric charging or other alternative fuels. USRC to coordinate with the bus carriers on the design of the future facility and multiple connections and amenities for bus passengers. USRC to regularly evaluate trends in bus demand at WUS and in the District to identify refinements to operations planning or design.
Hop-on/Hop-off Buses – Operations	Hop-on/hop-off buses would no longer be accommodated in front of WUS.	USRC to identify a new curbside location for hop-on/hop-off sightseeing buses to pick up and drop off riders in coordination with DDOT.

Mode	Impact	Proposed Action[1]
Gallaudet University Shuttle	Loss of space for shuttle in bus facility	USRC to accommodate Gallaudet University shuttle on the H Street Deck level/train hall curbside.
Intercity Bus – Construction	Interim bus facilities would be used during Phase 4, possibly starting during Phase 3.	USRC to work with the private air rights developer to build the interim bus facilities as close as possible to an access point to the station and Metrorail, and with the best user amenities achievable; USRC to coordinate with bus carriers for the design.
Pedestrian – Operations	The increases in passenger volumes may have a moderate impact on pedestrian crossing and queueing conditions adjacent to WUS.	USRC to perform a pedestrian crossing study to identify and recommend to DDOT signal timing adjustments needed to provide sufficient crossing time for pedestrians exiting the front of WUS; the study also to identify opportunities to provide enhanced pedestrian accommodations at the front of WUS and work with DDOT to implement them. USRC to design, permit, and install agreed-upon upgrades. USRC to coordinate with DDOT on additional pedestrian safety infrastructure measures informed by the traffic monitoring to be conducted during the first year of operation (see below). USRC to design, permit, and install signalization of First Street and G Street NE USRC to implement signalization of First and G Streets NE, and a raised crosswalk at the H Street Concourse on First and Second Streets NE, subject to warrant study and DDOT review and approval. USRC to design, permit, and install pedestrian safety improvements, such as raised crosswalks or ADA improvements, at LOS F intersections on North Capitol Street and K Street, in coordination with DDOT.
Bicycle – Operations	Conflicts between bicycles, pedestrians, and vehicles on the First Street cycle track at H Street Concourse entrance.	USRC to coordinate with DDOT on appropriate bicycle facilities and strategies to reduce conflicts among bicyclists, pedestrians, and vehicles. USRC to design, permit, and install upgrades to adjacent quick build or unprotected bicycle infrastructure to a protected level, if such protection has not already been provided by the time of Project construction.
Bicycle – Construction	Work on First Street NE would disrupt use of the cycle track during parts of the construction period.	USRC to develop, with DDOT, appropriate bicycle accommodations and wayfinding plan to direct bicyclists to the Second Street NE shared use portion of the Metropolitan Branch Trail when needed.

Mode	Impact	Proposed Action[1]
		As part of the integration Construction Transportation Management Plan, USRC to minimize obstruction to bicycle traffic on roads and on the trail, and provide safe accommodations.
City and Commuter Buses – Operations	Multiple bus lines would experience increased overcrowding and delays.	USRC to reallocate the middle lanes in front of WUS to be used for transit bus passenger boarding and alighting for Circulator and Metrobus routes terminating or passing through the area in front of the station. USRC to relocate bus stops from adjacent streets, including Columbus Circle and E Street, to these middle lanes, based on which services are relocated to the front of WUS. USRC also to evaluate whether context-appropriate bus passenger amenities can be installed in the median serving the middle lanes. USRC to construct a bus stop on H Street adjacent to, or incorporated into, the north and south station headhouses with shelter, seating, and real-time information displays. USRC to design, permit, and install improved wayfinding, shelters, and other accommodations for major commuter bus stops serving WUS on North Capitol Street. USRC to support study, design, and construction of bus priority measures in the vicinity of Union Station, consistent with the District of Columbia's Long Range Transportation Plan, *Move DC*. Regarding existing Circulator operations at the WUS bus facility, USRC to design and install locations for Circulator operational and layover needs at, or adjacent to, WUS, including electric bus charging. USRC to evaluate whether middle lanes in front of WUS can be used for layover.
Vehicular Parking and Rental Cars – Operation	Level of parking and rental car provided is less than projected demand	No separate mitigation measures. The loss of parking would be mitigated through the improved multimodal connections and below-ground PUDO facility included in the Project and the mitigation measures listed in this table to provide access options for various WUS users.

Mode	Impact	Proposed Action[1]
Vehicular Parking and Rental Cars – Construction	Loss of parking during Phase 4 of construction.	No mitigation proposed. Passengers and visitors would use other garages or other modes of access.
For-hire Pick-up – Construction	During Phase 4 of the construction period, the west ramp and back ramp would become unavailable, forcing for-hire vehicles to queue on the southeast road and east ramp. This queue could interfere with traffic operations on the deck.	USRC to develop a for-hire vehicle plan as part of the integrated Construction Transportation Management Plan. The Plan should prioritize maintaining safe traffic operations and distributing pick-ups and drop-offs.
Private and For-hire Pick-up and Drop-off – Operations	Increased traffic congestion may negatively affect pick-up and drop-off operations.	USRC to ensure that there is sufficient staffing to manage curb activity along USRC-controlled curbsides. USRC to coordinate with District Department of Public Works and Metropolitan Police Department (MPD) to provide coordinated enforcement of active curb areas along public streets and discourage use of non-designated curb areas. USRC to coordinate with MPD to provide coordinated enforcement to prevent queues on public roadways. USRC to coordinate with DDOT and the District Department of For-Hire Vehicles (DDFHV) to develop and implement regulatory strategies to reduce excess taxis and TNC pick-up and drop-off activity at WUS, promote shared rides, and avoid adjacent spillovers or excessive congestion, including the creation of a geofenced area that determines specific pick-up location; incentives; and pricing policies for for-hire vehicles. USRC to develop, in coordination with DDOT and DDFHV, an advanced vehicle dispatching and dynamic wayfinding strategy to distribute taxis and TNC vehicles within the below-ground facility, from the facility to the front of WUS, and around the site, alongside an internal wayfinding strategy to direct passengers to appropriate curbsides based on traffic and queueing conditions.

Mode	Impact	Proposed Action[1]
		USRC to monitor future pick-up and drop-off conditions in order to refine operational approaches.
Vehicular Traffic – Operations	Increases in traffic volumes would result in increases in delay and queueing at multiple intersections.	USRC to work with DDOT to identify traffic mitigation approaches, including, but not limited to, regular monitoring activities, turn restrictions, alternative intersection phasing, lane reassignment, parking restrictions, and circulation changes, to address congestion at the most severely impacted intersections in the Study Area. USRC to be responsible for design, permitting, and installation of those improvements in coordination with DDOT. Specific solutions identified to date include: • Developing mode shift and trip reduction goals for the station to be achieved through mitigation efforts. • Conducting multimodal traffic performance monitoring in the first ten years of operation to confirm mode shift and trip reduction goals; this monitoring to be conducted consistent with DDOT Comprehensive Transportation Review (CTR) guidelines for Performance Monitoring Plans to determine refinements to the measures presented below and to operations and circulation in the Project Area. • As needed to address congestion identified by traffic monitoring, making spot intersection modifications at First and K Streets NE, North Capitol and G Streets, Second and K Streets NE, and other intersections in the Study Area. USRC to be responsible for design, permitting, and installation subject to DDOT approvals. • Coordinating with the U.S. Government Publishing Office (GPO) to open up currently closed sections of First Street and G Street NW to public access and to fund costs associated with this opening to meet GPO requirements and requirements for public access. • Performing a signal and mobility study of the southern portion of the Study Area, around the intersection of Louisiana Avenue and North Capitol Street, to identify how changes to signalization could address degraded traffic conditions. USRC, in coordination with

Mode	Impact	Proposed Action[1]
		DDOT, to install study-identified improvements and support DDOT signalization changes. • Further coordinating with the private air rights developer on strategies for traffic distribution to address degraded traffic conditions, as possible, on H Street. USRC, in coordination with the private air rights developer, to design and install wayfinding and other measures to improve traffic distribution on H Street. • Participating in DDOT's mobility study for the North Capitol Street corridor to understand how Project and DDOT policies and strategies could reduce congestion along the North Capitol Street corridor. USRC to provide technical support and information on future WUS operations to inform the study's recommendations. • Advancing facility design that implements internal wayfinding prioritizing transit access and balancing pick-up and drop-off demand across different locations based on congestion. This wayfinding would be provided through static and variable signage. • In coordination with DDOT, developing external wayfinding to reduce turn pressures on congested intersections, including, as appropriate, static and variable signage on the Center Leg Freeway to direct traffic to appropriate locations. USRC to design, permit, and install this wayfinding. • Allocating sufficient resources to implement identified mitigations.
Truck Traffic – Construction	During excavation, up to 120 daily construction trucks would enter and exit the site.	USRC to incorporate truck traffic plan into the integrated Construction Transportation Management Plan to avoid impacts of truck traffic on residential neighborhoods. Truck traffic plan to be coordinated with DDOT. Affected Advisory Neighborhood Commissions (ANCs) to be given an opportunity to comment on the plan. Truck traffic plan to be consistent

Mode	Impact	Proposed Action[1]
		with District commercial vehicle regulations and oversize permitting requirements, and to make use of DDOT routing tool.[119] USRC to coordinate with Amtrak to evaluate and maximize to the extent practicable the use of work trains instead of dump trucks to haul away excavation spoil. This approach would substantially eliminate the work truck traffic associated with excavation. Typical construction truck traffic would be addressed by the Construction Transportation Management Plan.
Indirect Impacts	Potential Federal air rights development would generate additional vehicular activity.	USRC to coordinate with DDOT and the new owner, transferee, or lessee of the Federal air rights to follow required transportation demand management practices to reduce traffic activity associated with the development of the Federal air rights through CTR process.

1. Operational measures are to be fully designed and ready to be implemented as early as practicable prior to the completion of the full construction of the Project, unless otherwise noted. Construction measures are to be fully designed and ready to be implemented when relevant construction activities commence.

[119] DDOT. *Commercial Vehicles.* Accessed from https://ddot.dc.gov/service/commercial-vehicles. Accessed on March 11, 2023.

6 Air Quality

6.1 Overview

This section addresses the potential impacts of the Preferred Alternative on air quality. Air quality is the condition of ambient air determined through the measurement of air pollution. Ambient air is the portion of the atmosphere to which the general public has access outside of buildings. Air pollution is the presence of potentially harmful gases or particles (pollutants) in ambient air. Urban air pollution is the result of emissions from mobile sources (such as automobiles, trains, or trucks) or stationary sources (such as boilers or generators. This section also identifies measures that FRA is proposing to avoid, minimize, or mitigate potential adverse impacts as well as relevant permitting and regulatory compliance requirements.

6.2 Regulatory Context

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 6.2, *Regulatory Context*.

This section addresses the requirements of the General Conformity Rule. Established under the Clean Air Act, the General Conformity Rule helps states and tribes improve air quality in those areas that do not meet National Ambient Air Quality Standards (NAAQS). The U.S. Environmental Protection Agency (EPA) has established NAAQS for carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), particulate matter sized 10 micrometers or less (PM_{10}), and 2.5 micrometers or less ($PM_{2.5}$), and lead. These pollutants are known as criteria pollutants. EPA designates areas that do not meet the NAAQS for one or more criteria pollutants as non-attainment or maintenance areas for those pollutants. The District is a moderate nonattainment area for O_3. To meet General Conformity Rule requirements, a project in a non-attainment or maintenance area for a pollutant must not cause annual emissions of this pollutant in excess of a *de minimis* threshold established by EPA. The General Conformity Rule applies to any Federal action in a non-attainment area. It is designed to ensure that Federal actions do not interfere with a state's or tribe's ability to attain and maintain the NAAQS. If the total direct and indirect emissions from the Federal action are below the applicable *de minimis* threshold rates, the emissions are exempt from the provisions of the General Conformity regulations. If a project would cause emissions of a criteria pollutant that exceed the applicable *de minimis*, a Conformity Determination must be performed.

Because the District is classified as moderate non-attainment for O_3, and is located within an O_3 transport region,[120] the applicable *de minimis* thresholds are 100 tons per year of nitrogen oxides (NO_x) and 50 tons per years of volatile organic compounds (VOC).[121] NO_x and VOC are precursor pollutants that combine to generate O_3.

Since the preparation of the 2020 DEIS, the General Conformity Rule requirements pertaining to carbon monoxide (CO) and particulate matter have ended in the District. The District was formerly in Nonattainment for CO and particulate matter. It was redesignated to maintenance status when monitoring data showed pollutant concentrations achieved the NAAQS. Conformity requirements for both pollutants ceased in 2016 as CO had reached the end of its 20-year maintenance period[122] and 1997 $PM_{2.5}$ NAAQS was revoked under the new $PM_{2.5}$ NAAQS State Implementation Plan (SIP) requirement rule.[123] As such, *de minimis* thresholds are no longer applicable to CO and particulate matter emissions and a conformity determination is not required for these pollutants. However, estimates of CO and PM_{10} and $PM_{2.5}$ emissions from the Preferred Alternative are presented for information purposes only.

6.3 Study Area

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 6.3, *Study Area*. The Local Study Area for air quality includes portions of the District near the air emission sources associated with the Project where the public has access to ambient air. The Regional Study Area encompasses the jurisdictions that are members of the Metropolitan Washington Council of Governments (MWCOG). This is the area within which MWCOG conducts regional air quality modeling.[124]

6.4 Methodology

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 6.4, *Methodology*.

Due to the removal of conformity requirements for CO and particulate matter in the region, there no longer a requirement to conduct microscale analyses to demonstrate that local concentrations are below the NAAQS, as confirmed by the District Department of Transportation (DDOT). Therefore, this supplemental impact analysis does not include a microscale analysis.[125]

[120] 45 USC 7511c. *Control of Interstate Ozone Air Pollution*.

[121] EPA. *De Minimis Tables*. Accessed from https://www.epa.gov/general-conformity/de-minimis-tables. Accessed on February 11, 2023.

[122] "Carbon Monoxide Hotspot Analysis Requirements for the Metropolitan Washington Air Quality Region" March 16, 2016.

[123] 81 FR 58009

[124] Metropolitan Washington Council of Governments. *FY 2017-2022 Transportation Improvement Program - Amendment to Constrained Long-Range Transportation Plan (CLRP)*. November 2016. Accessed from http://www1.mwcog.org/clrp/resources/KeyDocs_2016.asp. Accessed on November 10, 2022.

[125] The microscale analyses presented in the 2020 DEIS showed that all Action Alternatives would result in pollutant concentrations below the NAAQS. Since the Preferred Alternative would result in fewer vehicle trips that the 2020 DEIS Action Alternatives due to

6.5 Impacts of the Preferred Alternative

This section presents the impacts of the Preferred Alternative on air quality. A summary of the impacts is first presented in bold lettering, followed by the supporting description and analysis. Direct and indirect operational impacts and construction impacts are considered. The operational impacts of the Preferred Alternative are assessed relative to the No-Action Alternative or relative to applicable *de minimis* thresholds. There is also a brief assessment of the impacts relative to existing conditions.

6.5.1 Direct Operational Impacts

6.5.1.1 Stationary Source Analysis

Relative to the No-Action Alternative, stationary source emissions in the Preferred Alternative would have negligible adverse direct operational impacts on air quality.

Direct impacts for the purposes of this analysis are impacts from stationary sources located in the Project Area. The design of mechanical systems is highly conceptual at this early stage of design. As WUS receives heating and cooling from District energy sources, there is a limited need for heating, ventilation, and air conditioning equipment with direct (on-site) pollutant emissions. The only Project-related stationary source equipment with direct emissions would be cooling towers and emergency generators.

Cooling towers would be on the roof of one of the planned air rights buildings, on the east side of the Project Area, next to the northern end of the Railway Express Agency (REA) Building. Cooling towers do not directly emit pollutants through a combustion process and are a small source of particulate matter emissions. Such emissions would occur on the roofs on building, far from any areas where people are routinely present. Impacts to ambient air quality would be negligible.

Unlike cooling towers, emergency generators are direct sources of air pollutant emissions from combustion. Emergency generators would be installed on the east and west sides of WUS, between G Place and H Street NE, on the roofs of the planned air rights buildings. The operation of emergency generators is limited to a maximum of 500 hours per year. [126] Such generators can only be operated during emergency situations and for periodic testing and require an air quality permit from DOEE before installation and operation. During the permitting process, the applicant must demonstrate that the generators would not cause an adverse impact on air quality. Therefore, impacts to ambient air quality from the installation and operation of emergency generators in the Preferred Alternative are anticipated to be negligible.

Ventilation fans would be used to exhaust air from the tracks and platforms and the below-ground facility and maintain good ambient air quality in those areas. Eight fan plants would be installed on the roofs of the air rights buildings (two between G Street and G Place NE; two between G Place and H Street NE; two north of H Street NE; and two just south of K Street NE). Because the fan plants would be ventilating pollutants from

updated mode shares and lower background concentrations, it can be reasonably assumed that local CO and PM emissions from the Preferred Alternative would also be below the NAAQS.

[126] District Department of Energy and Environment. *Application For Source Category Permit Approval to Construct and/or Operate a Natural Gas Fired Emergency Engine Subject to NSPS Subpart JJJJ*. Accessed from https://doee.dc.gov/sites/default/files/dc/sites/ddoe/release_content/attachments/Source%20Category%20Application%20Form%20for%20NSPS%20Nat%20Gas%20Emergency%20Engines.pdf. Accessed on January 13, 2023.

mobile sources, their emissions are accounted for in the mesoscale analysis of indirect impacts. Because of their location on the roofs of buildings, direct impacts on ambient air quality would be negligible. [127]

6.5.2 Indirect Operational Impacts

6.5.2.1 Mesoscale Analysis

In the Preferred Alternative, the net increase in emission of O_3 precursors (NO_X and VOC) attributable to the Preferred Alternative relative to the No-Action Alternative would be below the General Conformity *de minimis* thresholds applicable in the District. Therefore, adverse indirect impacts on air quality would be minor.

For the purposes of this analysis, indirect impacts on air quality are those that result from pollutant emissions by mobile sources on a regional scale. Such regional emissions are evaluated through mesoscale analysis. Indirect impacts on air quality are a result of pollutant emissions on a regional scale. Such regional emissions are evaluated through mesoscale analysis. This section presents the results of the mesoscale air quality analysis for the Preferred Alternative.

The mesoscale analysis considered the changes in VOC, NO_X, CO, and particulate matter emissions (PM_{10} and $PM_{2.5}$) from motor vehicles and locomotives anticipated to occur by 2040 under the Preferred Alternative. The analysis used data (volumes, delays, and speeds) from the Preferred Alternative traffic analysis for on-road emissions sources; locomotive emissions were modeled based on future rail operations, accounting for locomotive propulsion and idling, and conservatively assumed the use of diesel locomotives.

Table 6-1 shows the results of the Preferred Alternative mesoscale analysis. The table shows total annual emissions in the Preferred Alternative and the No-Action Alternative. The net emissions attributable to the Preferred Alternative, calculated by subtracting the No-Action Alternative emissions from the total Preferred Alternative emissions, represent the impact of the Preferred Alternative.

Emissions of NO_X and VOC (shaded in **Table 6-1**) would increase relative to the No-Action Alternative. The net change in emissions attributable to the Preferred Alternative is the appropriate metric for review against the applicable *de minimis* thresholds because it reflects the net change in emissions caused by the Preferred Alternative. Other quantities shown in the table incorporate existing and No-Action Alternative emissions that are not associated with the Preferred Alternative.

For both NO_X and VOC, the net increase attributable to the Preferred Alternative (35.2 tons per year [tpy] of NO_X and 1.4 tpy of VOC) is below the applicable *de minimis* threshold (100 tpy and 50 tpy, respectively), indicating that the proposed Federal activity would not cause new violations of the NAAQS, increase the frequency or severity of NAAQS violations, or delay timely attainment of the NAAQS or any interim milestone. Therefore, adverse indirect impacts on ambient air quality would be minor.

[127] In the Preferred Alternative, the private air rights development would be smaller than in the No-Action Alternative (approximately 2.7 million square feet of mixed uses against approximately 3.8 million square feet). Therefore, direct stationary source emissions associated with the private air rights development (for instance emissions from boilers) would be reduced in the Preferred Alternative relative to the No-Action Alternative, partially offsetting increases associated with the Project.

Table 6-1. Preferred Alternative Mesoscale Inventory

Source	CO	NO_X	VOC	PM_{10}	$PM_{2.5}$
	tpy	tpy	tpy	tpy	tpy
Motor Vehicle Emissions	67.7	4.4	34.8	4.5	0.9
Locomotive Emissions	29.8	61.4	2.0	1.0	1.0
Total Preferred Alternative Emissions	97.5	65.8	36.8	5.6	1.9
No-Action Emissions	78.4	30.6	35.4	5.1	1.3
Net Change in Emissions attributable to the Preferred Alternative[1]	19.1	35.2	1.4	0.5	0.6
***De Minimis* Threshold[2]**	-	100	50	-	-

1. Calculated by subtracting total No-Action Alternative emissions from total Preferred Alternative emissions.
2. Applicable only to NO_X and VOC.

The mesoscale analysis also estimated operational emissions of CO, PM_{10}, and $PM_{2.5}$. In the District, there are no applicable regulatory thresholds for these pollutants because the region is in attainment for each of them. Therefore, these estimates are provided for information only. Emissions of CO would increase by approximately 24 percent relative to the No-Action Alternative; emissions of PM_{10} would increase by approximately 10 percent; emissions of $PM_{2.5}$ would increase by approximately 46 percent.

6.5.2.2 Mobile Source Air Toxics Analysis

Relative to the No-Action Alternative, the Preferred Alternative may result in localized, higher levels of mobile source air toxics (MSAT) emissions in the Local Study Area. Information to quantitatively assess these impacts is not available; based on existing information, they are anticipated to be minor.

The amount of MSAT emitted in the Preferred Alternative would be proportional to the amount of bus vehicle miles travel (VMT) and railroad activity, assuming other variables (such as travel not associated with WUS) remain the same. [128] Most Project-generated motor vehicle traffic would be light-duty vehicles, which are not a substantial source of MSAT. Although in the Preferred Alternative the capacity of the new bus facility would be less than in the No-Action Alternative, this would not prevent peak-hour bus activity to increase to accommodate an increased number of passengers. VMT and railroad activity in the Preferred Alternative would be higher than in the No-Action Alternative because of the greater activity associated with the expanded WUS.

The increase in bus VMT and rail activity would lead to higher diesel particulate matter emissions (a component of MSAT) near WUS. The increase in emissions could be partly offset by two factors: the decrease in regional traffic due to greater use of commuter rail and increased speeds on area highways due to the decrease in commuter traffic. As noted in **Section 5.5.1.1**, *Commuter and Intercity Rail*, the Preferred Alternative would provide intercity service to new markets and attract riders who might otherwise drive or

[128] Changes in railroad activity in the Preferred Alternative are addressed as direct impacts in **Section 5**, *Transportation*, of this report. Associated emissions are addressed as indirect impacts in this section because of the regional scale of the analysis.

take the bus, as well as provide some commuter service for longer distance commuters. Though the Project would likely be removing light-duty vehicles from regional traffic, which are not a substantial source of MSAT, the removal of these vehicles would lead to reduced congestion and emissions for the entire existing vehicle fleet mix which includes diesel vehicles. Taking light-duty vehicles off regional roadways would improve operations for existing diesel vehicle traffic, including a reduction in idling time, and MSAT emissions would be reduced.

A portion of the increase in railroad activity would be associated with electric locomotives, which do not generate MSAT emissions. An increase in diesel locomotive activity would increase diesel emissions near homes, schools, and businesses in WUS's vicinity. As a result, there may be areas where local ambient concentrations of MSAT would be higher in Preferred Alternative than in the No-Action Alternative. The magnitude and duration of these potential impacts cannot be reliably quantified due to incomplete or unavailable information.

On a regional basis, EPA's vehicle and fuel regulations, coupled with the progressive replacement over time of older vehicles by newer ones, is anticipated to result in substantial reductions in MSAT emissions over time and in overall lower MSAT levels in 2040. Indeed, EPA's national control programs are projected to reduce annual MSAT emissions by over 90 percent between 2010 and 2050.[129] Local conditions in the Regional Study Area may differ from national assumptions in terms of fleet mix and turnover, VMT growth rates, and local control measures. Therefore, the actual level of local MSAT reductions may differ from national assumptions. However, EPA's projected reductions are so substantial (even after accounting for VMT growth) that MSAT emissions in the Regional Study Area are likely to be lower by 2040.

6.5.3 Construction Impacts

Emissions of O_3 precursors (NO_X and VOC) during the construction of the Preferred Alternative would be below the General Conformity *de minimis* criteria applicable in the District. Therefore, air quality impacts from construction would be minor.

Construction activities in the Preferred Alternative would cause air pollutant emissions in amounts that would vary across the construction period, estimated to last approximately 13 years. The primary sources of emissions would be construction equipment, including dump trucks, and heavy machinery exhaust, along with ground-disturbing activities and the operation of construction vehicles on unpaved roadways, which would generate fugitive dust.

Excavation and the loading and transport of excavated soil and other materials would be the most emission-intensive part of the construction process, requiring the use of large diesel-fueled equipment such as excavators and dump trucks. Two scenarios were analyzed for the removal of excavation spoils from the Project site: one scenario assumed removal only by trucks (120 trucks a day: All Truck Scenario) and the other assumes spoil removal by work trains (two work trains a day: Work Train Scenario).

As explained in **Section 1.7**, *Summary Description of the Preferred Alternative* of this report and, in more details, in **Appendix S2**, *Description of Alternative F*, **Section S.11.1**, *Construction Phasing and Sequence*,

[129] U.S. Department of Transportation, Federal Highway Administration. October 18, 2016. Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents. Accessed from https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/. Accessed on October 10, 2022.

construction would take place in four main phases, with a one-year intermediate phase between Phase 1 and Phase 2, during which only column removal work would occur. **Table 1-5** of this report shows the duration of each phase.

Table 6-2 shows estimated annual construction-related emissions for each phase for the All Truck Scenario; **Table 6-3** shows estimated annual construction-related emissions for the Work Train Scenario. Estimates for each phase (including the Intermediate Phase) reflect emissions associated with excavation; support of excavation construction; caisson drilling; foundation slab construction; overbuild deck construction; track demolition and reconstruction; terminal demolition; subbasement column removal; and construction for the G Street Ramp, First Street Ramp, and East Ramp. For each phase, emissions were annualized, conservatively assuming that all types of activity would take place during each year of the phase.

Table 6-2. Preferred Alternative Annual Construction Emissions per Phase(All Truck Scenario)

Construction Period	CO	NO_X	VOC	PM_{10}	$PM_{2.5}$
	Tons/Year	Tons/Year	Tons/Year	Tons/Year	Tons/Year
Phase 1	27.1	62.7	7.7	2.7	2.1
Intermediate Phase	6.2	23.3	1.9	0.4	0.4
Phase 2	23.0	52.4	6.9	2.6	1.8
Phase 3	17.0	36.7	4.9	2.3	1.4
Phase 4	29.1	62.2	8.1	3.7	2.4
***De Minimis* Threshold**	-	100	50	-	-

Table 6-3. Preferred Alternative Annual Construction Emissions per Phase (Work Train Scenario)

Construction Period	CO	NO_X	VOC	PM_{10}	$PM_{2.5}$
	Tons/Year	Tons/Year	Tons/Year	Tons/Year	Tons/Year
Phase 1	24.3	60.5	6.8	1.9	1.8
Intermediate Phase	6.2	23.3	1.9	0.4	0.4
Phase 2	18.8	49.1	5.6	1.4	1.3
Phase 3	12.2	32.9	3.3	0.9	0.9
Phase 4	22.2	56.8	5.9	1.7	1.6
***De Minimis* Threshold**	-	100	50	-	-

This conservative assumption allows for comparison with EPA's *de minimis* criteria and a General Conformity applicability determination for NO_X and VOC. In either scenario in all phases, emissions of these O_3 precursors (shaded in **Tables 6-2 and 6-3**) would be below the applicable *de minimis* threshold. Therefore, adverse impacts on ambient air quality would be minor.

In all phases, except the Intermediate Phase, the Work Train Scenario would result in less emissions of NO_X and VOC than the All Truck Scenario. The Intermediate Phase would not include any excavation work or involve the transport of materials to or from the Project Area. Therefore, the scenarios make no difference for this phase.

Tables 6-2 and 6-3 shows annual estimated CO and particulate matter emissions. As noted above, there are no applicable regulatory thresholds for these pollutants because the region is in attainment for each of them. Therefore, the estimates in the tables are provided for information only. The Work Train Scenario would result in less emissions of every pollutant in each phase except the Intermediate Phase, for the same reason as explained above.

6.5.4 Combined Operational and Construction NO_X and VOC Emissions

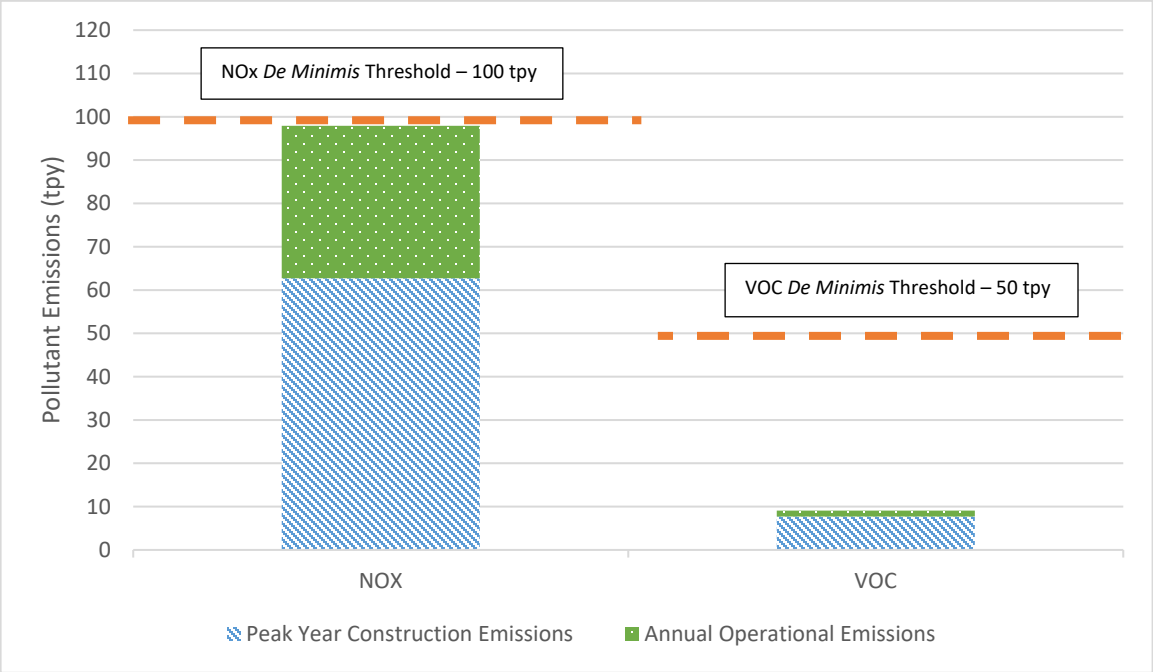
To demonstrate that a General Conformity determination is not required, direct emissions from the construction period were combined with the net change in indirect operational emissions attributable to the Preferred Alternative and compared to the applicable *de minimis* thresholds. For construction emissions, the phase and scenario with the highest annual emissions of NO_x (Phase 1 – All Truck Scenario) was used. Operational emissions are those that would occur after the Project is complete. However, during the entire construction period, operational activity at WUS (e.g., car and train traffic) would be well below this post-completion level of activity, which could only be achieved only after the Project is complete. Therefore, the estimates shown here are very conservative. Actual emission levels are anticipated to be substantially lower.

As shown in **Table 6-4**, even with this very conservative approach, emissions of NO_X and VOC associated with the Preferred Alternative would be below the applicable *de minimis* thresholds. **Figure 6-1** shows this comparison graphically, with a breakdown between construction emissions and operational emissions for the two precursor pollutants compared to their respective *de minimis* thresholds.

Table 6-4. Combined Annual Operational and Construction NO_X and VOC Emissions

Component	NO_X	VOC
	tpy	tpy
Construction Emissions	62.7	7.7
Maximum Net Change in Annual Operational Emissions attributable to the Preferred Alternative	< 35.2	< 1.4
Maximum Combined Preferred Alternative Operational and Construction Emissions	< 97.9	< 9.1
***De Minimis* Thresholds**	100	50

Figure 6-1. Preferred Alternative Combined Operational and Construction Emissions



6.5.5 Comparison to Existing Conditions

At the local level, the impacts of the Preferred Alternative on air quality relative to existing conditions would generally be the same as relative to the No-Action Alternative. Increases in pollutant concentrations would be proportionally greater relative to existing conditions, but this does not affect compliance with the NAAQS.

At the regional level, as shown in **Table 6-5**, the emissions specifically attributable to the Preferred Alternative would not change but total emissions would be less than in existing conditions for all pollutants except PM_{10}. This is because total emissions in the Preferred Alternative incorporate the reduction in emissions anticipated to occur by 2040 from improved regulations and technology for vehicles and locomotives.

Table 6-5. Mesoscale Inventory Comparison

Source	CO	NO_X	VOC	PM_{10}	$PM_{2.5}$
	tpy	tpy	tpy	tpy	tpy
Total Emissions under Existing Conditions	162.9	73.5	62.9	4.4	2.1
Total Emissions in No-Action Alternative	78.4	30.6	35.4	5.1	1.3
Total Emissions in Preferred Alternative	97.5	65.8	36.8	5.6	1.9
Emissions Attributable to Preferred Alternative[1]	19.1	35.2	1.4	0.5	0.6

1. Calculated by subtracting total No-Action Alternative emissions from total Preferred Alternative emissions. Totals may not be exact due to rounding.

6.6 Summary of Impacts

Table 6-6 summarizes the impacts of the No-Action Alternative and the Preferred Alternative.

Table 6-6. Summary of Impacts

Type of Impact	No-Action Alternative	Preferred Alternative
Direct Operational	Negligible adverse impact	Negligible adverse impact
Indirect Operational – Mesoscale Analysis	Minor adverse impact	Minor adverse impact
Indirect Operational – MSAT	Undetermined	Minor adverse impact
Construction	Undetermined	Minor adverse impact

6.7 Avoidance, Minimization, and Mitigation Evaluation

6.7.1 Operational Impacts

The Preferred Action Alternative would not result in major adverse operational impacts on ambient air quality. To avoid or minimize less than major adverse impacts, FRA is proposing the following measure:

- Union Station Redevelopment Corporation (USRC) would ensure that Project design places ventilation fans at least 30 feet from the nearest operable windows, louvers, or doors, and emergency generators at least 30 feet from the nearest building or on a rooftop.
- USRC to coordinate with rail operators to impose restrictions on diesel locomotive idling in order to minimize MSAT emissions.

6.7.2 Construction Impacts

Construction-related emissions would not exceed the applicable *de minimis* criteria. Although no major adverse impacts are anticipated during construction, FRA is proposing to adopt measures to minimize pollutant emissions. Such measures, which USRC would require the construction contractor to implement, would include but are not limited to:

- Dust suppression; idling restrictions; use of Ultra Low Sulfur Diesel (ULSD) fuel; proper maintenance of all motor vehicles, machinery, and equipment; and fitting of equipment with mufflers or other regulatory-required emissions control devices would be used.
- Compliance with the District's anti-idling law (20 DCMR 900) during all construction phases. This regulation limits non-road engine idling to three minutes. Idling restriction signs would be placed on the premises to remind drivers and construction personnel of the applicable regulations. Drivers and equipment operators would be trained accordingly.
- Fitting all diesel-fuel construction equipment with after-engine emission controls. The construction contractor would also be required to use ULSD fuel for all off-road construction vehicles as an additional measure to reduce air emissions. Any non-road diesel equipment would have to be rated 50 horsepower or greater to meet EPA's Tier 4 emission limits or be retrofitted with appropriate emission reduction equipment. Emission reduction equipment could include EPA-verified or California Air Resource Board-verified diesel oxidation catalysts or diesel particulate filters.
- Implementing measures to protect local residents, visitors, passengers, and passers-by from off-site exposure to dust and debris in accordance with 20 DCMR 605. Appropriate methods of dust control would be determined according to the surfaces concerned (roadways or disturbed areas) and include, as applicable: application of water during ground-disturbing activities; stone surfacing of construction roads; seeding of areas of exposed or stock-piled soils; wheel washing; and regular sweeping of paved roadways. Recycling construction waste and demolition materials may also reduce dust emissions.
- During construction in or immediately adjacent to the historic station building (demolition of the Claytor Concourse, column removal), put airtight walls or partitions in place around the construction areas, as needed to eliminate the risk of train engine exhaust fumes or dust drifting into the indoor areas accessible to the public or station employees.

6.8 Permits and Regulatory Compliance

In the Preferred Alternative, the Project would not exceed any of the applicable NAAQS and emissions inventories would remain below the applicable *de minimis* thresholds. Therefore, the Project would be in compliance with applicable regulations and General Conformity Rule requirements.

The District's air quality regulations are defined in Title 20, Chapters 1 through 15.[130] The Project would need to ensure compliance with applicable requirements, including the General Permit requirements defined at Title 20, Section 200. A permit from the Department of Energy and Environment (DOEE) must be obtained before causing or allowing the construction of a new stationary source, the modification of an existing stationary source, or the installation or modification of any air pollution control device on a stationary source. [131]

[130] *District of Columbia Municipal Regulations and District of Columbia Register. Title 20. Environment*. Accessed from https://www.dcregs.dc.gov/Common/DCMR/ChapterList.aspx?titleId=16. Accessed on November 14, 2022.

[131] District of Columbia. *General Permit Requirements*. *Effective June 5, 2020.* Accessed from https://dcregs.dc.gov/Common/DCMR/SectionList.aspx?SectionId=7641. Accessed on November 14, 2022.

7 Greenhouse Gas Emissions and Resilience

7.1 Overview

This section addresses the potential impacts of the Preferred Alternative on greenhouse gas (GHG) emissions and resilience. GHGs trap heat in the atmosphere and can affect air quality and climate change. Major GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases (such as hydrofluorocarbons and perfluorocarbons). The primary pollutant of concern from sources related to human activity is CO_2, which is the most abundant and influential GHG.

This section also identifies measures that the Federal Railroad Administration (FRA) is proposing to avoid, minimize, or mitigate potential adverse impacts.

7.2 Regulatory Context

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 7.2, *Regulatory Context*.

7.3 Study Area

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, **Section 7.3**, *Study Area.* Concerns about GHG emissions are primarily related to their impact on climate change, a regional and global phenomenon. The state of dispersion science is not sufficiently advanced to usefully consider GHG emission impacts at a microscale level. Therefore, a Local Study Area was not defined for GHG and the study area for GHGs is regional only. The Regional Study Area encompasses the jurisdictions of the Metropolitan Washington Council of Governments (MWCOG).

7.4 Methodology

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 7.4, *Methodology*.

The 2020 DEIS used 2017 CO_2-equivalent (CO_2e) emissions in the District as a benchmark to assess the intensity of impacts, along with the District reduction target for 2032 (50 percent of 2006 emissions). Since the 2020 DEIS, new data have become available and are used in this report. The assessment of impacts is made based

on 2019 CO_2e emissions: 7,170,450 metric tons of CO_2e.[132] Additionally, the District has updated its GHG reduction targets to 56 percent by 2032 and carbon neutrality by 2045.[133] The 2032 benchmark is approximately 4,614,141 metric tons of CO_2e. In light of the District's carbon neutrality goal, any impact above zero additional CO_2 is considered a major adverse impact.

7.5 Impact of the Preferred Alternative

This section presents the impacts of the Preferred Alternative on GHG emissions and resilience. Impacts are first summarized in bold lettering, followed by a supporting description and analysis. Direct and indirect operational impacts as well as construction impacts are considered. Operational impacts are assessed relative to the No-Action Alternative. A brief assessment of the impacts relative to existing conditions is also provided.

7.5.1 Direct Operational Impacts

The primary concern associated with GHG emissions is their effect on climate change. Such an effect is by definition long-term and global in extent. Therefore, all GHG impacts are addressed as indirect impacts.

7.5.2 Indirect Operational Impacts

Relative to the No-Action Alternative, the Preferred Alternative would result in major adverse indirect operational impacts on CO_2 emissions from mobile and stationary sources.

7.5.2.1 Stationary Source Emissions - WUS[134]

CO_2 emissions associated with the Preferred Alternative would result from the additional energy needed to operate the expanded WUS, including electricity, heat, and cooling. As estimated in **Section 8.5.1.1**, *Buildings*, **Table 8-1**, the additional energy consumption would amount to approximately 72,904,000 kBTUs per year. Based on the proportion of each energy source used at WUS in existing conditions, approximately 44 percent of this energy would be electrical; 35 percent chilled water; and 21 percent steam.

The CO_2 emissions associated with this increase in energy consumption were estimated using U.S. Energy Information Administration (EIA)'s emission factors: 117 pounds of CO_2 per 1,000 kBTUs of natural gas energy

[132] District Department of Energy and Environment (DDOE). *2006-2020 Greenhouse Gas Inventory*. Accessed from: https://doee.dc.gov/service/greenhouse-gas-inventories. Accessed on November 4, 2022. Emissions for 2019 were used because 2020 emissions were affected by the COVID-19 pandemic.

[133] District of Columbia. *Clean Energy DC*. Accessed from https://doee.dc.gov/cleanenergydc. Accessed on November 9, 2022. *Carbon Free DC (*https://storymaps.arcgis.com/stories/034104405ef9462f8e02a49f2bd84fd9*)* is the District's strategy to become carbon neutral by 2045 and achieve the goals defined in *Clean Energy DC.*

[134] Stationary sources include onsite energy-generating equipment, such as boilers, as well as offsite energy-generating plants. The stationary source emission estimates in this section were developed based on the estimates of energy consumption increases presented in **Section 8**, *Energy Resources*, of this report and GHG emissions factors, not on a review of specific emission sources. These estimates provide a rough-order-of-magnitude measure of **potential** GHG emissions. They do not incorporate measures to reduce energy consumption and associated emissions.

and 1,177 pounds per megawatt-hour (MWh) for electric energy.[135] **Table 7-1** shows the resulting estimate. The additional increase in energy consumption would potentially generate approximately 9,791 additional metric tons of CO_2 per year.

Table 7-1. Preferred Alternative Stationary Source CO_2 Emissions - WUS

Component	Change in Energy Consumption (KBTUs/Year)	Change in Energy Consumption (MWh/Year)	CO_2 Emission Factor	Change in CO_2 Emissions (Metric Tons/Year)
WUS Electricity	31,812,242	9,321	1,177 lbs/MWh	4,976
WUS Chilled Water	25,480,372	7,466	1,177 lbs/MWh	3,986
WUS Steam	15,611,386	--	117 lbs/1,000 KBTU	829
Total WUS	72,904,000	--	--	9,791

7.5.2.2 Stationary Sources Emissions – Private Air Rights Development

In the Preferred Alternative, the private air rights development would be smaller than in the No-Action Alternative (see **Section 1**, *Analysis Framework*, **Table 1-3**) and generate less emissions. The reduction in annual electric energy use would be approximately 51,693,900 kBTUS, as estimated in **Section 8.5.1.1**, *Buildings*, **Table 8-1**. Based on Department of Energy's prototypical models,[136] it can be estimated that local natural gas consumption would account for approximately 23 percent of this total, approximately 11,889,600 kBTUs. Electricity would account for the remaining 77 percent, approximately 39,804,300 kBTUs. **Table 7-2** shows the resulting decrease in emissions, based on the corresponding EIA emission factors. Relative to the No-Action Alternative, annual CO_2 emissions from the private air rights development would be reduced by approximately 6,859 metric tons.

Table 7-2. Preferred Alternative Stationary Source CO_2 Emissions - Private Air Rights Development

Component	Change in Energy Consumption (KBTUs/Year)	Change in Energy Consumption (MWh/Year)	CO_2 Emission Factor	Change in CO_2 Emissions (Metric Tons/Year)
Electricity	-39,804,300	-11,665	1,177 lbs/MWh	-6,228
Natural Gas	-11,889,600	--	117 lbs/1,000 KBTU	-631
Total		--	--	-6,859

[135] U.S. Energy Information Administration. *Carbon Dioxide Emissions Coefficients.* Accessed from https://www.eia.gov/environment/emissions/co2_vol_mass.php. Accessed on November 4, 2022. U.S. Energy Information Administration. *States Electricity Profiles. District of Columbia. 2020.* Accessed from https://www.eia.gov/electricity/state/districtofcolumbia/. Accessed on November 4, 2022. Energy from steam and electricity was converted to MWh prior to applying the factor.

[136] U.S. Department of Energy. *Commercial Prototype Building Models Climate Zone 4A*. Accessed from https://www.energycodes.gov/development/commercial/prototype_models. Accessed on April 3, 2018.

7.5.2.3 Stationary Sources Emissions – Potential Federal Air Rights Development

In the preferred Alternative, the potential development of the Federal air right area would increase annual energy consumption in the Project Area by 27,600,000 kBTUs (see **Section 8.5.2.1**, *Federal Air Rights Development*, **Table 8-3**). Assuming a similar distribution as for the private air right development (23 percent natural gas, 77 percent electricity), this would generate approximately an additional 3,661 metric tons of CO_2 per year (**Table 7-3**).

Table 7-3. Preferred Alternative Stationary Source CO_2 Emissions from Potential Federal Air Rights Development

Energy Type	Additional Consumption (KBTUs/Year)	Additional Consumption (MWh/Year)	CO_2 Emission Factor	Additional CO_2 Emissions (Metric Tons)
Electricity	21,252,000	6,227	1,177 lbs/MWh	3,324
Natural Gas	6,348,000	--	117 lbs/1,000 KBTU	337
Total	27,600,000			3,661

7.5.2.4 Mobile Source Emissions

In the Preferred Alternative, vehicular and rail traffic would increase relative to the No-Action Alternative. This would generate additional CO_2 emissions on the regional level. A mesoscale analysis of emissions was performed using data from the traffic impact analysis. Locomotive emissions were estimated based on planned operations of diesel locomotives in the Project Area in the Preferred Alternative, including locomotive propulsion, idling, and generator activity as well as anticipated train consists and movements. **Table 7-4** shows the results of the analysis.

Table 7-4. Preferred Alternative Annual Mobile Source CO_2 Emissions

Source	CO_2 Emissions (Metric Tons)
Motor Vehicle Emissions	30,169
Locomotive Emissions	10,361
Subtotal Emissions	40,531
No-Action Alternative Emissions	31,284
Preferred Alternative-Related Emissions[1]	9,247

1. Emissions specifically attributable to the Project in the Preferred Alternative. Calculated by subtracting No-Action Alternative emissions from Preferred Alternative emissions.

Modal shift from car to rail along the Northeast Corridor in the Preferred Alternative may result in a reduction of GHG emissions from automobiles. Additionally, in 2022, Amtrak adopted a Net Zero Strategy with a net-zero emissions goal for 2045, which can be anticipated to have reduced emissions from train operations by 2040.[137]

[137] Amtrak. *Net-Zero Strategy*. Accessed from https://www.amtrak.com/net-zero#diesel. Accessed on February 11, 2023.

Resulting reductions in GHG emissions would partially or wholly offset local GHG emissions associated with traffic at WUS.

7.5.2.5 Summary of CO_2 Emission Estimates

Table 7-5 shows the total potential annual emissions of CO_2 from stationary and mobile sources attributable to the Preferred Alternative. Total potential emissions would be approximately 15,840 metric tons, representing approximately 0.22 percent of the District's total 2019 emissions and 0.34 percent of its 2032 reduction target. It would be approximately a 22 percent increase over emissions in the No-Action Alternative. The estimates presented in this section are conservative and do not account for measures that would be taken to reduce energy consumption and related emissions (see **Section 7.7**, *Avoidance, Minimization, and Mitigation Evaluation*). Additionally, as noted in **Section 5.5.1.1**, *Commuter and Intercity Railroads*, of this report, the Preferred Alternative would provide intercity service to new markets and attract riders who might otherwise drive as well as provide some commuter service for longer distance commuters. This would reduce emissions from car traffic in the entire Northeast Corridor. However, the District as set a goal of carbon neutrality by 2045.[138] In this context, any net increase in CO_2 emissions would be a major adverse impact.

Table 7-5. Total Estimated Changes in Annual CO_2 Emissions in the Preferred Alternative

Source	CO_2 Emissions (Metric Tons/Year)	Percentage of 2019 Total Inventory	Percentage of 2032 Target
Stationary Sources -WUS	9,791	0.14%	0.21%
Stationary Sources -WUS	-6,859	0.1%	0.15%
Potential Federal Air Rights Development	3,661	0.05%	0.08%
Mobile Sources	9,247	0.13%	0.20%
Total Additional Emissions	15,840	0.22%	0.34%
Total Emissions No-Action Alternative	70,846[139]	0.99%	1.54%
Increase relative to No-Action Alternative	22%	-	-

7.5.2.6 Resilience

Relative to the No-Action Alternative, the Preferred Alternative would have a beneficial impact on WUS's resilience.[140]

[138] District of Columbia. *Clean Energy DC*. Accessed from https://doee.dc.gov/cleanenergydc. Accessed on November 9, 2022. *Carbon Free DC (*https://storymaps.arcgis.com/stories/034104405ef9462f8e02a49f2bd84fd9*)* is the District's strategy to become carbon neutral by 2045 and achieve the goals defined in *Clean Energy DC.*

[139] To maintain comparability, the estimate for the No-Action Alternative shown in the table has been updated from the 2020 DEIS using the updated generation factors used for the Preferred Alternative.

[140] This beneficial impact is not assigned an intensity as it would largely depend on the as-yet undefined resiliency features that would be included in the Project's final design.

As explained in Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 7.5.1.2, *Indirect Operational Impacts*, *Resilience,* climate change impacts are likely to increase resiliency challenges at WUS. The Preferred Alternative would have the potential to result in a beneficial impact to the extent that it would provide an opportunity to improve the station's resilience. Features or measures designed to increase the resiliency of WUS could be incorporated into the design and operation of the proposed expansion to minimize the potential impacts of extreme weather events. **Section 7.7.1.2**, *Resilience* lists examples of potential resilience-enhancing measures. [141] The Preferred Alternative would also support the transportation objectives of *Resilient DC*, which calls for greater integration, capacity, and frequency of regional transit systems at Union Station. [142]

7.5.3 Construction Impacts

Construction of the Preferred Alternative would result in major adverse impacts on CO_2 emissions.

Construction of the Preferred Alternative would generate CO_2 emissions from construction equipment and heavy machinery exhaust. Excavation, including the loading, transportation, and disposal of surplus soil and other materials, would require the use of large diesel-fueled equipment (such as excavators and dump trailers). This would be the most CO_2 intensive part of the construction process. Support of excavation, caisson drilling, pressure slab, ramp, and overbuild deck construction would also generate substantial amounts of CO_2.

Construction emissions of CO_2 were estimated on an annual basis using the same approach as used for the analysis of air quality impacts (see **Section 6.5.3**, *Construction Impacts*, of this report). Construction would take place in four main phases, with a one-year intermediate phase between Phase 1 and Phase 2, during which only column removal work would occur. The emissions analysis considered two scenarios for excavation and spoil disposal: removal by trucks (All Truck Scenario, 120 trucks a day) or removal by work trains (Work Train Scenario, two work trains a day). **Table 7-6** shows **t**he results of the analysis**.**

Table 7-6. Construction CO_2 Emissions (Metric Tons/Year) in Preferred Alternative

Scenario	Phase 1	Intermediate	Phase 2	Phase 3	Phase 4
All Truck	20,415	6,314	18,462	12,423	20,807
Work Train	17,739	6,314	14,437	7,883	14,304

Emissions in the All Truck Scenario would be greater than in the Work Train Scenario during all phases, except the Intermediate Phase, during which no materials would need to be excavated and transported from the Project Area. Annual emissions would be greatest during Phase 4 for the All Truck Scenario and Phase 1 for the Work Train Scenario. The greatest annual construction emissions in the All Truck Scenario (20,807 metric tons) would constitute 0.29 percent of the District's total 2019 emissions and 0.45 percent of its 2032 emission target. [143] The greatest estimated annual construction emissions in the Work Train Scenario (17,739 metric

[141] As noted above, the impact analysis presented in this section does not account for the effect of such measures, which will be finalized during Project design.

[142] District of Columbia. *Resilient DC. A Strategy to Thrive in the Face of Change*. Accessed from https://resilient.dc.gov/. Accessed on October 31, 2022.

[143] The District's 2019 CO_2e emissions amounted to 7,170,450 metric tons of CO_2e. The District 's 2032 target is approximately 4,614,141 metric tons of CO_2e.

tons) would constitute 0.25 percent of the District's total 2019 emissions and 0.38 percent of its 2032 emission target.

Additionally, the creation and transportation of materials used to construct the Project would also generate GHG emissions. These emissions cannot be quantified because the quantity, origin, and fabrication method of the construction materials are not known, but they are likely to be substantial given the size of the Project.

7.5.4 Comparison to Existing Conditions

The Preferred Alternative would result in a greater proportional increase in CO_2 emissions relative to existing conditions than relative to the No-Action Alternative. This is because the No-Action Alternative baseline incorporates the emissions from the private air rights development as well as those from increased vehicular traffic and train service. However, the total amount of CO_2 emissions the Preferred Alternative would generate, their size relative to overall District emissions, and their potential effect on climate change would be the same regardless of the baseline.

7.6 Summary of Impacts

Table 7-7 summarizes the impacts of the No-Action Alternative and the Preferred Alternative.

Table 7-7. Summary of Impacts

Impact Category	Type of Impact	No-Action Alternative	Preferred Alternative
GHG	**Direct Operational**	Not applicable	Not applicable
	Indirect Operational	Major adverse impact	Major adverse impact
	Construction	Undetermined	Major adverse impact
Resilience		Moderate adverse Impact	Beneficial Impact

7.7 Avoidance, Minimization, and Mitigation Evaluation

7.7.1 Operational Impacts

7.7.1.1 GHG Emissions

The Preferred Alternative has the potential to generate additional GHG emissions, inconsistent with the District's goal to achieve carbon neutrality by 2045. Therefore, FRA is proposing that, as design progresses, Union Station Redevelopment Corporation (USRC) prepare a Life Cycle Assessment of the total GHG emissions associated with the Project (embodied emissions) to help assess more accurately the impacts of the Project. During Project design, USRC would identify measures and strategies to reduce energy consumption at WUS

and associated GHG as much as possible. **Section 8.7,** *Avoidance, Minimization, and Mitigation Evaluation,* discusses potential energy conservation measures that the Project could incorporate.

7.7.1.2 Resilience

FRA is proposing that USRC:

- Wherever possible, ensure that at least the Federally owned portion of the Project achieves the requirements and standards of Public Buildings Service (PBS)-P100. PBS-P100 provides performance-based standards and prescriptive requirements focused on energy efficiency, carbon neutrality, and practices that protect against climate risks.[144] These facility standards are meant to be used in conjunction with other Federal governing standards (excluding the historic station building).
- As required by PBS-P100, direct that at least the Federally owned portion of the Project achieve a Leadership in Energy and Environmental Design (LEED) v4 Gold rating within a boundary encompassing all station areas that support typical operations (excluding the historic station building).[145]

Examples of potential strategies to be incorporated in Project design to enhance WUS's resilience include, but are not limited to:

- Monitoring and incorporating into the Project design and technology to minimize buckled railroad tracks.
- Increasing power supply redundancy and backup generation.
- Reducing dependency on centralized power by installing renewable energy systems at WUS, including, for instance, solar panels.
- Designing shelter facilities to provide shading and natural ventilation for passenger comfort and safety.
- Incorporating water conservation and green infrastructure features (See **Section 3.7**, *Avoidance, Minimization, and Mitigation Evaluation*)
- Considering reflective roofs or green roofs to reduce urban heat island effect.
- Considering appropriate glazing for the train hall to control solar heat by season.
- Although the Project Area is located outside of the floodplain:
  - Considering raising electrical components above ground level to protect from flash flood events during extreme storm events.
  - Considering building materials that can withstand inundation, or installing flood barriers at openings of below-grade structures that may become vulnerable to flooding

[144] U.S. General Services Administration. *P100 Facilities Standards for the Public Buildings Service. October 2021 with 2022 Addendum*. Accessed from https://www.gsa.gov/cdnstatic/P100%202022%20Addendum%20Final_.pdf. Accessed on March 15, 2023.

[145] U.S. Green Building Council. *LEED v4*. Accessed from https://www.usgbc.org/leed/v4. Accessed on March 15, 2023.

- Considering dry and wet floodproofing measures for proposed below-grade parking areas.

7.7.2 Construction Impacts

The measures described in **Section 6.7.2**, *Construction Impacts,* to reduce air pollutant emissions would also reduce GHG emissions.

7.8 Permits and Regulatory Compliance

There are no permits pertaining to GHG emissions or resilience. During construction, the contractors would have to comply with the District's anti-idling regulations, as applicable.

8 Energy Resources

8.1 Overview

This section addresses the potential impacts of the Preferred Alternative on the use of energy resources. The analysis focuses on the amount of energy that would be consumed by WUS and other land uses within the Project Area. This section also identifies measures that the Federal Railroad Administration (FRA) is proposing to avoid, minimize, or mitigate potential adverse impacts as well as relevant permitting and regulatory compliance requirements.

8.2 Regulatory Context

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 8.2, *Regulatory Context*. See also **Section 8.8**, *Permits and Regulatory Compliance* below for additional or updated references.

8.3 Study Area

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 8.3, *Study Area*. The Local Study Area is the portion of the Project Area extending from the front of WUS up to K Street NE. The Regional Study Area includes the entire District.

8.4 Methodology

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report,* Section 8.4*, Methodology.*

The approach used in the 2020 DEIS used Energy Use Intensity (EUI) factors to assess the potential additional energy consumption associated with the Project at an order of magnitude level. This analysis uses the same approach but updates the factors from the 2018 values used in the 2020 DEIS to 2021 values (references are included in footnotes).

Additionally, rough-order-of-magnitude energy consumption from rail and automobile traffic has been estimated in gallons of diesel or gasoline fuel. The estimates were derived from modeled carbon dioxide (CO_2) emissions (see **Section 7** of this report) using conversion factors available from the U.S.

Environmental Protection Agency (EPA). For rail, the factor is 10.21 kilograms (kg) of CO_2 for one gallon of diesel. For automobiles, it is 8.78 kg of CO_2 for one gallon of gasoline.[146]

8.5 Impacts of the Preferred Alternative

This section presents the impacts of the Preferred Alternative on energy resources. Impacts are first summarized in bold lettering, followed by a supporting description and analysis. Direct and indirect operational impacts as well as construction impacts are considered. The operational impacts of the Preferred Alternative are assessed relative to the No-Action Alternative. A brief assessment of the impacts relative to existing conditions is also provided.

8.5.1 Direct Operational Impacts

Relative to the No-Action Alternative, the Preferred Alternative would have a minor adverse direct operational impact on energy resources.

8.5.1.1 Buildings

WUS

In the Preferred Alternative, relative to the No-Action Alternative, the expanded WUS would consume additional energy to operate the new or expanded station elements. **Table 8-1** provides high-level, order-of-magnitude estimates of potential energy consumption increases based on the change in square footage for each station element and the EUI factor for the corresponding land use. Altogether, the station expansion would result in an increase in energy consumption by approximately 72,904,000 Kilo British Thermal Units (kBTUs) per year. [147]

Private Air Right Development

The private air-right development would be smaller in the Preferred Alternative than in the No-Action Alternative (see **Table 1-3** in **Section 1**, *Analysis Framework*, of this report). Therefore, the Preferred Alternative would result in a reduction in energy use by this development. **Table 8-1** provides a high-level, order-of-magnitude estimate of this reduction, which would amount to approximately 51,693,900 kBTUs per year.

[146] U.S. Environmental Protect Agency. *Emission Factors for Greenhouse Gas Inventories*. Accessed from https://www.epa.gov/system/files/documents/2022-04/ghg_emission_factors_hub.pdf. Accessed on January 21, 2023.

[147] A kBTU is one thousand British Thermal Units (BTU). A BTU is "a measure of the heat content of fuels or energy sources." Specifically, it is the quantity of heat required to raise the temperature of one pound of liquid water by 1-degree Fahrenheit at the temperature that water has its greatest density (approximately 39 degrees Fahrenheit).

Table 8-1. Estimated Change in Annual Energy Use by Buildings in the Preferred Alternative

Location	Alternative Element	Approximate Additional Square Footage	Energy Use Intensity (EUI)[148] Category	EUI kBTUs/Square Foot/Year	Estimated Annual Use (kBTUs)
WUS	Retail	+64,000	Retail (Enclosed Mall)	65.7	+4,204,800
	Amtrak and other Support Space	+880,000	Transportation Terminal/Station	56.2	+49,456,000
	Train Hall /Concourse Space	+380,000	Transportation Terminal/Station	56.2	+21,356,000
	Parking	+586,000	Parking (enclosed)	11.4	+6,680,400
	Bus Facility	+122,000	Parking (partially enclosed)	8.9	+1,085,800
	Existing Parking	-1,110,000	Parking (partially enclosed)	8.9	-9,879,000
	Subtotal				+72,904,000
Private Air-Rights Development	Residential	-70,750	Multi-family Housing	59.6	-4,216,700
	Office	-1,100,000	Office	52.9	-58,190,000
	Retail	-35,000	Retail Store	51.4	-1,799,000
	Hotel	+198,600	Hotel	63	+12,511,800
	Subtotal				-51,693,900
Total					**+21,210,100**

Net Change

The Preferred Alternative would result in an increase in building-related energy consumption of approximately 21,210,100 kBTUs a year in the Project Area. This would be an increase of approximately 7 percent relative to Project Area's consumption in the No-Action Alternative (approximately 312,342,000 kBTUs, see **Table 8-7** below) and would amount to approximately 0.015 percent of the District's total energy consumption in 2020 (144 billion kBTUs).[149] Total estimated consumption in the

[148] Values derived from Energy Star Portfolio Manager. April 2021. *Technical Reference. U.S. Energy Use Intensity by Property Type*. Accessed from https://portfoliomanager.energystar.gov/pdf/reference/US%20National%20Median%20Table.pdf. Accessed on October 25, 2022. Energy Star Portfolio Manager. August 2018. *Technical Reference. Parking and the Energy Star Score in the United States and Canada*. Accessed from https://www.energystar.gov/sites/default/files/tools/Parking_August_2018_EN_508.pdf. Accessed on October 25, 2022.

[149] U.S. Energy Information Administration. *District of Columbia Energy Profile*. Accessed from https://www.eia.gov/state/print.php?sid=DC. Accessed on October 25, 2022.

Preferred Alternative (approximately 333,552,100 kBTUs, see **Table 8-7** below) would be around 0.2 percent of the District's 2020 consumption.

The additional consumption is not likely to create capacity issues or to require the development of a dedicated energy source. The Project would likely require upgrades to local distribution and transmission energy systems (including electricity and steam).[150] Such changes would be planned and designed in coordination with the affected utilities. These upgrades are not likely to be beyond what is commonly required by large-scale development projects in the District. Impacts would be minor.

8.5.1.2 Rail Activity

Relative to the No-Action Alternative, increases in rail activity would occur at WUS in the Preferred Alternative. Based on the modeling of annual CO_2 emissions presented in **Section 7.5.2.4**, *Mobile Source Emissions*, of this report, and a factor of 10.21 kg of CO_2 per gallon of diesel fuel, the associated additional energy consumption from rail activity can be estimated to be approximately 600,881 gallons of diesel fuel per year (**Table 8-2**).[151] It would represent an increase of 145 percent relative to the No-Action Alternative. In 2021, U.S. refineries produced more than 68 billion gallons of diesel fuel.[152] The additional consumption associated with the Preferred Alternative is not likely to create shortages or supply issues. The impact would be minor.

Table 8-2. Estimated Annual Diesel Consumption from Rail Operations

	CO_2 Emissions (Metric Tons)	Diesel Fuel Consumption (Gallons)[1]
Preferred Alternative Total	10,361	1,014,789
No-Action Alternative Total	4,226	413,908
Increase Attributable to the Preferred Alternative	6,135	600,881

1. One gallon for 10.21 kg of CO_2. [153]

[150] The potentially affected systems are protected as Critical Energy Infrastructure Information. Only the owning utility has access to this information and would need to conduct the appropriate studies to assess how the Project could affect them. Such analysis, and follow-on actions, would be conducted during the later stages of Project design.

[151] This estimate is based on model CO_2 emissions and, therefore, does not incorporate electricity use by electrical locomotives. Like demand for diesel, the additional demand for electricity would take place over time and is not likely to generate supply issues.

[152] U.S. Energy Information Administration. *Diesel Fuel Explained. Where our Diesel Comes from*. Accessed from https://www.eia.gov/energyexplained/diesel-fuel/where-our-diesel-comes-from.php#:~:text=In%202021%2C%20U.S.%20refineries%20produced,barrels%20(59.82%20billion%20gallons). Accessed on January 21, 2023.

[153] U.S. Environmental Protect Agency. *Emission Factors for Greenhouse Gas Inventories*. Accessed from https://www.epa.gov/system/files/documents/2022-04/ghg_emission_factors_hub.pdf. Accessed on January 21, 2023.

8.5.2 Indirect Operational Impacts

Relative to the No-Action Alternative, the Preferred Alternative would have a minor adverse indirect operational impact on energy resources.

8.5.2.1 Potential Federal Air Rights Development

The potential development of the Federal air rights in the Preferred Alternative would result in a further increase in energy consumption in the Project Area, as shown in **Table 8-3** provides an estimate. Additional site energy consumption from the potential Federal air-rights development in the Preferred Alternative, approximately 27.6 million kBTUs, would represent an increase of around 9 percent over the No-Action Alternative. It would amount to approximately 0.02 percent of the District's total energy consumption in 2020. As such, the additional consumption is not likely to create capacity issues or to require the development of a dedicated energy source. The impact would be minor.

Table 8-3. Estimated Annual Energy Use of Potential Federal Air-rights Development in the Preferred Alternative

Use	Square Footage	EUI Category	EUI kBTUs/Square Foot/Year	Estimated Annual Use (kBTUs)
Residential	175,000	Multi-family Housing	59.6	10,430,000
Office	310,000	Office	52.9	16,399,000
Retail	15,000	Retail Store	51.4	771,000
Total				**27,600,000**

8.5.2.2 Automobile Traffic

Relative to the No-Action Alternative, increases in traffic around WUS would occur in the Preferred Alternative (see **Section 5.5.1.12**, *Vehicular Traffic*, of this report). Based on the modeling of annual CO_2 emissions presented in **Section 7.5.2.4**, *Mobile Source Emissions,* of this report, and a factor of 8.78 kg of CO_2 per gallon of gasoline fuel, the resulting additional energy consumption from WUS-related traffic can be estimated to be approximately 354,328 gallons of gasoline per year. It would represent an increase of 11 percent relative to the No-Action Alternative. In 2021, the United States' consumption of gasoline was approximately 370,272,000 per day.[154] The additional consumption associated with the Preferred Alternative is not likely to create shortages or supply issues. The impact would be minor.

[154] U.S. Energy Information Administration. *U.S. Product Supplied of Finished Motor Gasoline*. Accessed from https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=mgfupus2&f=a. Accessed on January 21, 2023.

Table 8-4. Estimated Annual Gasoline Consumption from WUS-Related Traffic

	CO_2 Emissions (Metric Tons)	Gasoline Consumption (Gallons)[1]
Preferred Alternative Total	30,169	3,436,105
No-Action Alternative Total	27,058	3,081,777
Increase Attributable to the Preferred Alternative	**3,111**	**354,328**

1. One gallon for 8.78 kg of CO_2. [155]

8.5.3 Construction Impacts

Construction of the Preferred Alternative would result in minor adverse impacts on energy resources.

Construction of the Preferred Alternative would consume energy, mostly in the form of diesel fuel used for construction vehicles and equipment. An order-of-magnitude estimate of construction fuel consumption can be derived from the estimates of CO_2 emissions presented in **Section 7.5.3**, *Construction Impacts*, of this report using the same approach as for the train activity estimate presented in **Section 8.5.1.2**, *Rail Activity*, above. Results are shown in **Table 8-5** for both the All Truck and the Work Train Scenarios for each construction phase.

Table 8-5. Estimated Annual Diesel Consumption per Construction Phase

	Phase 1	Intermediate Phase	Phase 2	Phase 3	Phase 4
All Truck Scenario					
CO_2 Emissions (Metric Tons)	20,415	6,314	18,462	12,423	20,807
Diesel Fuel Consumption (Gallons)	1,999,510	618,413	1,808,227	1,216,748	2,037,904
Work Train Scenario					
CO_2 Emissions (Metric Tons)	17,739	6,314	14,437	7,883	14,304
Diesel Fuel Consumption (Gallons)	1,737,414	618,413	1,414,006	772,086	1,400,979

Energy consumption in the All Truck Scenario would be greater than in the Work Train Scenario during all phases except the Intermediate Phase, during which no materials would need to be excavated and transported from the Project Area. Consumption would be greatest during Phase 4 for the All Truck Scenario (more than 2 million gallons) and Phase 1 for the Work Train Scenario (approximately 1.7

[155] U.S. Environmental Protect Agency. *Emission Factors for Greenhouse Gas Inventories*. Accessed from https://www.epa.gov/system/files/documents/2022-04/ghg_emission_factors_hub.pdf. Accessed on January 21, 2023.

million gallons). As noted above, in 2021, U.S. refineries produced more than 68 billion gallons of diesel fuel.[156] The additional consumption associated with the construction of the Preferred Alternative is not likely to create supply issues. Additionally, large-scale construction projects such as the Project are common in large urban areas like the District. While they require large amounts of energy, they do not create shortages or issues for suppliers or distributors. Impacts would be minor.

8.5.4 Comparison to Existing Conditions

With regard to buildings, relative to existing conditions, the Preferred Alternative would result in an estimated increase in energy consumption of 72,904,000 kBTUs, or approximately 70 percent of the existing WUS consumption. With the potential Federal air-rights development, the increase relative to existing conditions would be 100,504,000 kBTUs, or approximately 97 percent. This would be a proportionately greater increase than relative to the No-Action Alternative, representing around 0.07 percent of the District's total energy consumption in 2020.

With regard to fuel consumptions, the increase in the Preferred Alternative would be proportionately greater relative to existing conditions than relative to the No-Action Alternative. However, the needed quantities would remain the same, and as noted, above, they are not likely to cause shortages or supply issues.

8.6 Summary of Impacts

Table 8-6 and **Table 8-7** summarize the impacts of the No-Action Alternative and the Preferred Alternative.

Table 8-6. Summary of Impacts

Type of Impact	No-Action Alternative	Preferred Alternative
Direct Operational	Minor adverse impact	Minor adverse impact
Indirect Operational	No impact	Minor adverse impact
Construction	Minor adverse impact	Minor adverse impact

[156] U.S. Energy Information Administration. *Diesel Fuel Explained. Where our Diesel Comes from*. Accessed from https://www.eia.gov/energyexplained/diesel-fuel/where-our-diesel-comes-from.php#:~:text=In%202021%2C%20U.S.%20refineries%20produced,barrels%20(59.82%20billion%20gallons). Accessed on January 21, 2023.

Table 8-7. Quantitative Estimates of Direct and Indirect Impacts by Alternative (kBTUs per Year)

	No-Action Alternative Additional Consumption	No-Action Alternative Total Consumption	Preferred Alternative Additional Consumption	Preferred Alternative Total Consumption
WUS	-	103,500,000	+72,904,000 (+70%)	176,404,000
Private Air-Rights Development	+208,842,000 [157]	208,842,000	-51,693,900 (-25%)	157,148,100
Sub-Total	**+208,842,000**	**312,342,000**	**21,210,100**	**333,352,100**
Potential Federal Air-Rights Development	-	-	+27,600,000	27,600,000
Total	**+208,842,000 (+202%)**	**312,342,000**	**48,810,100 (+16%)**	**361,152,100**

8.7 Avoidance, Minimization, and Mitigation Evaluation

FRA is proposing the following avoidance, minimization, and mitigation measures to minimize energy impacts as much as possible:

- Union Station Redevelopment Corporation (USRC) would develop and incorporate Net-Zero Energy strategies into the design of the Project to the greatest extent practicable, including, for instance, solar panels.[158] *Clean Energy DC*, the District's plan to reduce greenhouse gas emissions, calls for all new construction to achieve net-zero energy beginning in 2026.[159] The District's *Net-Zero Energy Project Guide* outlines approaches to achieving this goal.[160]

[157] To maintain comparability, the estimate for the private air-rights development in the No-Action Alternative shown in the table has been updated from the 2020 DEIS using the April 2021 EUIs.

[158] Appendix Z of the 2017 DC *Energy Conservation Code* defines a net-zero energy building as "a highly energy-efficient building that produces on-site or procures through the construction of new renewable energy generation, enough energy to meet or exceed the annual energy consumption of its operations."

[159] District of Columbia. *Clean Energy DC. 2018. The District of Columbia Climate and Energy Action Plan*. Accessed from https://doee.dc.gov/sites/default/files/dc/sites/ddoe/page_content/attachments/Clean%20Energy%20DC%20-%20Full%20Report_0.pdf. Accessed on October 26, 2022.

[160] District of Columbia. n.d. *Net-Zero Energy Project Guide. A Process for Planning, Designing, Constructing, and Operating Your New Net-Zero Energy Building*. Accessed from https://doee.dc.gov/sites/default/files/dc/sites/ddoe/service_content/attachments/DC-ZEProjectGuide.pdf. Accessed on October 26, 2022.

- USRC would incorporate cost-effective energy efficiency technologies into the Project design. Numerous simple efficiency upgrades on systems such as lighting, refrigeration, water and space heating and cooling, windows, doors, and building insulation, would result in major energy savings at reasonable costs with short payback periods. Newer technologies would save additional energy by adjusting energy consumption to the needs of the people using the space. These include, but are not limited to, programmable and learning thermostats; energy management systems that react to utility price signals and energy demand in the region; and light motion sensors and dimmers.
- USRC would develop a Tenant Manual. The Tenant Manual would be prepared for any current and future entities that may control the new retail space created by the Project, designed to help them fit-out and operate their spaces with sustainable and energy efficient designs and operating practices that reduce overall energy demand. USRC would identify, within that Manual, potential strategies to ensure that energy reduction is achieved. These strategies may include, but are not limited to: identifying core and shell features that allow tenant choices in energy-related fit-out (for example, chilled water distribution capabilities, individual electric metering, the energy management systems, and other building features); and requiring or encouraging tenants to adopt appropriate sustainable design, energy efficiency, water use, and water pollution control commitments to the extent feasible as part of their respective lease agreements.

8.8 Permits and Regulatory Compliance

The Project would need to submit Green Determination Requests to the District Department of Consumer and Regulatory Affairs to determine the applicability of green and energy laws and regulations in the Green Building Design Process.

The Green Building Division regulates construction in the District that falls under the regulations of the Green Building Act, Green Construction Code and Energy Conservation Code. The Division is responsible for plan reviews, building inspections, and certificate of occupancy review. When filing a Green Determination Request, the project owner is seeking to determine which green building codes and laws are applicable to the project. The laws and codes that could apply include:

- 2006 Green Building Act (GBA).[161] The GBA establishes high-performance green building standards for public and private construction projects. If a project falls within the scope of the GBA, and associated regulations, compliance with the GBA would also satisfy compliance with the 2017 Green Construction Code.

[161] District of Columbia. *Green Building Act*. Division I, Title 6, Chapter 14A, § 6-1451.01 — 6-1451.11. Accessed from https://code.dccouncil.gov/us/dc/council/code/titles/6/chapters/14A/. Accessed on October 26, 2022.

- 2017 District of Columbia Building Codes.[162] The 2017 District of Columbia Construction Codes consist of the 2015 International Code Council (ICC) family of model codes, the 2014 National Electrical Code, and 2013 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 90.1, as amended by the District of Columbia Municipal Regulations (DCMR) Title 12, Sections A through M. The 2017 DC Construction Code took effect on May 29, 2020.
- 2017 District of Columbia Green Construction Code (GCC). [163] The GCC consists of the 2012 edition of the International Green Construction Code published by the ICC, as amended by the District of Columbia Green Construction Code Supplement of 2017 (12-K DCMR).
- 2017 District of Columbia Energy Conservation Code (ECC). The ECC applies broadly to all residential and commercial buildings, the building sites, and associated systems and equipment and regulates the design and construction of buildings for the effective use and conservation of energy over the useful life of each building.
- Green Area Ratio (GAR) - Part of the Zoning Regulations, the GAR is administered by the District Department of Energy and Environment.[164]

The potential Federal air-rights development may have to comply with the U.S. Department of Energy's Federal Energy Management Program (FEMP)[165] standards for energy efficiency in federal buildings as required under the Energy Conservation and Production Act[166]. The current commercial standards are ANSI/ASHRAE/IES Standard 90.1-2019.[167] The purpose of FEMP is to work with stakeholders to enable federal agencies to meet energy-related goals, identify affordable solutions, facilitate public-private partnerships, and identify and leverage government best practices.

A number of laws apply to new construction or modernization of federal buildings,[168] including:

- Executive Order 14057, *Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability*, Section 206, *Increasing Energy and Water Efficiency*, requiring agencies to increase facility energy efficiency and water efficiency and establish targets for fiscal year 2030 for agency-wide facility energy use intensity and potable water use intensity.

[162] District of Columbia. *2017 Building Codes*. Accessed from https://dob.dc.gov/node/1615636. Accessed on October 26, 2022.

[163] District of Columbia. *Green Construction Code*. 2017. Accessed from https://www.dcregs.dc.gov/Common/DCMR/ChapterList.aspx?subtitleId=97. Accessed on October 26, 2022.

[164] District Of Columbia. *Green Area Ratio*. Accessed from https://doee.dc.gov/service/green-area-ratio-overview. Accessed on October 26. 2022.

[165] Office of Energy Efficiency and Renewable Energy (EERE). *Federal Energy Management Program*. Accessed from https://www.energy.gov/eere/femp/federal-energy-management-program. Accessed on October 26, 2022.

[166] U.S. Public Law 94-385. *Energy Conservation and Production Act*. Accessed from https://www.govinfo.gov/content/pkg/STATUTE-90/pdf/STATUTE-90-Pg1125.pdf. Accessed on October 26, 2022.

[167] EERE. *Building Energy Codes Program. ANSI/ASHRAE/IES Standard 90.1-2013*. Accessed from https://www.ashrae.org/technical-resources/bookstore/standard-90-1. Accessed on October 26, 2022.

[168] EERE. *Federal Energy Management Program. Building Energy Use. New Construction or Modernization*. Accessed from https://www4.eere.energy.gov/femp/requirements/guidelines_filtering. Accessed on October 26, 2022.

- Executive Order 14057, Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability, Section 205, Achieving Net-Zero Emissions Buildings, Campuses, and Installations. Agency are to achieve net-zero emissions across their portfolios of buildings, campuses, and installations by 2045 and reduce greenhouse gas emissions by 50 percent from buildings, campuses, and installations by 2032 from 2006 levels, prioritizing improvement of energy efficiency and the elimination of onsite fossil fuel use.
- 42 USC 6835(a)(1), Agency Procedures. The head of each Federal agency is required to adopt procedures necessary to assure that new Federal buildings meet or exceed the Federal building energy standards established under 42 USC § 6834.
- 42 USC 6834(a)(3)(A), Energy Efficiency. If life cycle cost-effective, new Federal buildings must be designed to achieve ASHRAE 90.1 energy consumption levels and 30 percent below such levels. The version of ASHRAE 90.1 that Federal agencies must use depends on when design for construction begins.
- 42 USC 6835(b), Expenditure of Federal Funds. The head of a Federal agency may expend Federal funds for the construction of a new Federal building only if the building meets or exceeds the Federal building energy standards established under 42 USC § 6834.
- 42 USC 6834(a)(3)(D)(i)(I)-(II), Fossil Fuel Reduction. New Federal buildings and major renovations of existing buildings are to reduce fossil fuel-generated energy consumption by 55 percent in fiscal year (FY) 2010, 65 percent in FY 2015, 80 percent in FY 2020, 90 percent in FY 2025, and 100 percent in FY 2030, compared to a FY 2003 baseline.
- 42 USC 8254(b)(1), Life Cycle Cost Methods and Procedures. The design of new Federal buildings shall be made using life cycle cost methods and procedures established under 42 USC 8254(a).
- 42 USC 8253(e), Metering Requirements. Agencies are required to install metering and advanced metering devices in Federal buildings in accordance with U.S. Department of Energy metering guidelines.
- 42 USC 6834(a)(3)(A)(iii), Solar Hot Water. If life cycle cost-effective, 30 percent of hot water demand in new Federal buildings undergoing major renovations must be met with solar hot water.
- 42 USC 6834(a)(3)(D)(i)(III), Sustainable Design Principles. New Federal buildings and major renovations of existing buildings are to apply sustainable design principles to the siting, design, and construction of such buildings.

9 Land Use, Land Planning, and Property

9.1 Overview

This section addresses the potential impacts of the Preferred Alternative on land use and zoning, private property, and applicable local and regional plans and policies. This section also identifies measures that the Federal Railroad Administration (FRA) is proposing to avoid, minimize, or mitigate potential adverse impacts as well as relevant permitting and regulatory compliance requirements.

9.2 Regulatory Context

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 9.2, *Regulatory Context*.

9.3 Study Area

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 9.3, *Study Area.* The Local Study Area is the Project Area and the zoning districts within one-half mile of the Project Area. North of K Street NE, where the Project consists solely of track modifications, the Local Study Area is the track area and the zoning districts within one-quarter mile of the Project Area. The Regional Study Area includes the neighborhoods adjacent to the Project Area. The outer limits of the Regional Study Area are the limits of the Atlas District/H Street Corridor, Capitol Hill, the Monumental Core, NoMA,[169] and Mount Vernon Triangle neighborhoods.

9.4 Methodology

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report,* Section 9.4*, Methodology.*

[169] North of Massachusetts Avenue.

9.5 Impacts of the Preferred Alternative

This section presents the impacts of the Preferred Alternative on zoning, land use, and development; property; and plans. Impacts are first summarized in bold lettering, followed by a supporting description and analysis. Direct and indirect operational impacts as well as construction impacts are considered. The operational impacts of the Preferred Alternative are assessed relative to the No-Action Alternative. A brief assessment of the impacts relative to existing conditions is also provided.

9.5.1 Direct Operational Impacts

9.5.1.1 Zoning, Land Use, and Development

Relative to the No-Action Alternative, the Preferred Alternative would have no direct operational impact on zoning. It would have a major beneficial direct operational impact on land use and development.

The Preferred Alternative would not affect zoning. Federal buildings and facilities, such as WUS, are not subject to local zoning. Federal development in the District is subject to review and approval by the National Capital Planning Commission (NCPC) as the zoning authority. The Preferred Alternative would be subject to review and approval by NCPC. Above-ground Project elements in the Preferred Alternative would be consistent with the height limits set by the Union Station North (USN) zoning designation. The USN designation applies to the adjacent private air rights and is anticipated to apply to the potential Federal air rights development (see **Section 9.5.2.1**, Zoning, Land Use, and Plans).[170] In the Preferred Alternative, the tallest element would be the new train hall, with an elevation of 55 feet above the high point of H Street NE, approximately 40 feet lower than the historic station's roof vault. This height is also compatible with the Production, Distribution, and Repair (DPR)-3 zoning designation, currently applying to the Federal air rights parcel.[171]

The Preferred Alternative would have a major beneficial impact on land use by enhancing multimodal transportation uses and connectivity within the Project Area and provide a more accessible and modernized multimodal facility capable of accommodating more passengers and more train and bus service than in the No-Action Alternative. It would make efficient use of a highly constrained area by keeping all WUS-related uses close together south of the H Street Bridge. The Preferred Alternative would also benefit the surrounding neighborhoods by creating new connections between the areas on either side of the rail terminal. It would be compatible with the District's Comprehensive Plan's Future

[170] USN zoning allows development to a maximum height of up to 130 feet above the crest of the H Street Bridge with a 20-foot height step down to 110 feet within 300 feet of the historic station building and another 20-foot height step down to 90 feet within 150 feet of it. Greater heights are permissible in the 110-foot and 90-foot areas if permitted by the Zoning Commission (https://handbook.dcoz.dc.gov/zones/special-purpose-zones/union-station-north/usn/. Accessed on November 1, 2022).

[171] PDR-3 zoning limits overall building height to 90 feet above existing grade (https://handbook.dcoz.dc.gov/zones/production-distribution-and-repair/pdr-3/. Accessed on November 1, 2022).

Land Use Map (FLUM).[172] The FLUM is the governing planning document for the long-range buildout of the District. It provides a generalized view of how the District intends to use its land. F**or the Project Area and its immediate surroundings, t**he FLUM shows a mix of **Federal, High Density Commercial, and Medium to High Density residential.**

This beneficial impact on land use would translate into an improvement in WUS user experience relative to the No-Action Alternative. New access points from First, Second, and H Streets NE into the H Street Concourse would make it easier to enter WUS from the surrounding neighborhoods as well as provide connectivity and continuity from First Street to Second Street. Retail in the new concourses could potentially become a destination for local residents as well as tourists. The historic station building would remain the heart of the station and its most visible and inviting entrance. The additional concourse space and access points would alleviate congestion, especially during peak travel times, making it easier for passengers and visitors to appreciate and enjoy the grand architecture of the historic station. The new train hall would be designed to be a monumental, compelling gateway space worthy of welcoming visitors and travelers to the nation's capital. Areas of architectural interest would extend past the historic station building to encompass part of the track and platform area. In combination with enhanced accessibility through wider platforms, full compliance with Americans with Disabilities Act (ADA) requirements, effective signage, more spacious waiting areas, and greater amounts of natural light, boarding or alighting from trains at WUS would be a much easier and more enjoyable experience than would be the case in the No-Action Alternative.

Similarly, intercity bus passengers would enjoy the benefits of a contemporary, purpose-built facility with better amenities and a direct functional and visual integration with the remainder of the station, including the historic station building, via the train hall middle mezzanine. The Preferred Alternative would also provide bus passengers with a more direct, and for many passengers, shorter connection to the Metrorail Station, an important mode of access for WUS users, particularly tourists and travelers unfamiliar with the station. Also, the First Street, Central, and H Street Concourses, along with headhouses on H Street, would provide a more direct and welcoming connection for DC Streetcar users.

9.5.1.2 Property Ownership, Land Acquisitions, and Displacements

Relative to the No-Action Alternative, the Preferred Alternative would have a minor adverse direct operational impact on property ownership, land acquisitions, and displacements.

The Preferred Alternative would have an adverse impact on property ownership because it would involve constructing a portion of the new train hall and other Project features within the private air rights above the rail terminal. All such impacts would be limited to the area south of H Street NE, with the exception of a small headhouse to be built on the northern side of the street. Altogether, the Project in the Preferred Alternative would require using approximately 125,823 square feet of private air rights

[172] District of Columbia Office of Planning. 2021. *Comprehensive Plan – Future Land Use Map.* Accessed from https://planning.dc.gov/sites/default/files/dc/sites/op/publication/attachments/LU_62821.pdf. Accessed on January 16, 2023.

property (approximately 2.9 acres).[173] This would represent approximately 20 percent of the 622,800-gross-square-foot footprint of the private air rights.[174] The adverse impact would be minor because the Preferred Alternative was developed in coordination with the private air rights developer, ensuring that, although sizable, the reduction would not preclude developing the remaining air rights.

The Preferred Alternative would also require a property transaction to construct the new H Street Concourse at the location of the existing H Street Tunnel. The tunnel is the former at-grade alignment of H Street NE between First and Second Streets NE, which passed under the rail terminal as K Street NE and still does. This section of H Street was closed off after the construction of the H Street Bridge. In the Preferred Alternative, the H Street Tunnel would be acquired and replaced with the new concourse.[175]

9.5.1.3 Consistency with Local and Regional Plans

Relative to the No-Action Alternative, the Preferred Alternative would have a major beneficial direct operational impact on community planning through its consistency with the most relevant local and regional plans.

Unlike the No-Action Alternative, the Preferred Alternative would generally be supportive of or consistent with relevant local and regional plans, as summarized below. As such, it would have a major beneficial impact to community planning.

Comprehensive Plan for the National Capital-Federal Elements[176]

The Preferred Alternative is consistent with and would advance the goals of the relevant Federal Elements of the Comprehensive Plan. The bullets below summarize the overarching goals of the relevant portions of this plan and how the Preferred Alternative would support and advance them:

- "Transportation: Develop and maintain a multimodal regional transportation system that meets the travel needs of workers, residents, and visitors while improving regional mobility, accessibility, air quality, and environmental quality through expanded transportation alternatives and transit-oriented development."

  The Preferred Alternative would advance this goal by creating an expanded and modern multimodal station that would accommodate the need of a growing number of commuter and intercity trains as well as intercity bus passengers and promote the use of non-auto modes of transportation both locally and regionally.

[173] This estimate includes the Daylight Access Zone (approximately 17,647 square feet), only a portion of which would be used to install skylights opening unto the Central Concourse underneath. The method through which the needed private air rights would be made available to the Project has not yet been determined and may vary according to the element being accommodated.

[174] Total area as stated in Letter from Akridge to FRA dated May 31, 2016.

[175] The exact process through which the tunnel would be acquired has not yet been determined.

[176] National Capital Planning Commission. 2020. *Comprehensive Plan for the National Capital. Federal Elements*. Accessed from https://www.ncpc.gov/plans/compplan/. Accessed on October 27, 2022.

- "Urban Design: Promote quality design and development in the region that reinforces its unique role as the nation's capital and creates a welcoming and livable environment for people."

  The Preferred Alternative would incorporate quality design features that would enhance WUS's role as a monumental gateway to the nation's capital. Enlarged circulation spaces and modern passenger facilities would create a welcoming environment for passengers and visitors.

- "Historic Preservation: Preserve, protect, and rehabilitate historic properties in the National Capital Region and promote design and development that is respectful of the guiding principles established by the Plan of the City of Washington and the symbolic character of the capital's setting."

  The Preferred Alternative would be designed accordance with the Secretary of Interior's *Standards for the Treatment of Historic Properties.* New construction would be compatible with the historic station, which would continue to function as a grand gateway to Washington, DC. Expanded circulation spaces would improve passenger and visitor experience of the historic building.

- "Visitors & Commemoration: Provide a positive and memorable experience for all visitors to the NCR in a way that showcases the institutions of American culture and democracy, supports planning goals, and enhances activities that are unique to visiting the nation's capital."

  Through quality design respectful of the historic station; expanded circulation spaces; and improved, modern passenger facilities, the Preferred Alternative would create a positive and memorable experience for all visitors.

Comprehensive Plan for the National Capital-District Elements[177]

The Preferred Alternative is also consistent with and would advance the goals of the relevant portions of this plan, resulting in a major beneficial impact. The bullets below summarize the overarching goals of each relevant element and how the Preferred Alternative would support and advance them:

- "Transportation: Create a safe, sustainable, efficient multimodal transportation system that meets the access and mobility needs of District residents, the regional workforce, and visitors; supports local and regional economic prosperity; and enhances the quality of life for District residents."

  The Preferred Alternative would advance this goal by creating an expanded and modern multimodal station that would accommodate the need of a growing number of commuter and intercity train as well as intercity bus passengers, including District residents and

[177] District of Columbia. 2020. *Comprehensive Plan for the National Capital. District Elements.* Accessed from https://plandc.dc.gov/node/1494536. Accessed on October 27, 2022.

visitors. The Preferred Alternative would remedy WUS's existing deficiencies (such as antiquated platforms that are not ADA-compliant), which would continue in the No-Action Alternative. The expanded station would contribute to supporting the local economy. By improving connections between the areas to the east and west of the station, it would enhance the quality of life of area residents.

- "Land Use: Ensure the efficient use of land resources to meet long-term neighborhood, citywide, and regional needs; to help foster other District goals; to protect the health, safety, and welfare of District residents, institutions, and businesses; to sustain, restore, or improve the character, affordability, and equity of neighborhoods in all parts of the city; to provide for additional housing and employment opportunities, and to effectively balance the competing demands for land to support a growing population and the many activities that take place within Washington, DC's boundaries."

  The Preferred Alternative would advance this goal primarily by making an efficient use of the space (below and above tracks) that is currently occupied by the rail terminal to expand the station in a manner that would enhance connections between the areas to the east and west of the station and contribute to knitting together neighborhoods currently divided by the rail terminal.

- "Central Washington: Central Washington is comprised of 6.8 square miles of land that include the "monumental core" of the city, with such landmarks as the U.S. Capitol and White House, the Washington Monument and Lincoln Memorial, the Federal Triangle and Smithsonian Museums. Planning for this area is done collaboratively with the federal government, with the National Capital Planning Commission having land use authority over federal lands. Central Washington includes the city's traditional Downtown and other employment centers, it includes Gallery Place and Penn Quarter, the region's entertainment and cultural center, and recently emerging neighborhoods like Mount Vernon Triangle and NoMa […]. As the center of employment in the region, 475,531 people are employed within its boundaries and most commute to the area for its jobs. […]."

  WUS is located in the Central Washington planning area and provides a direct local, regional, and national connection to the area. By expanding and enhancing the station, the Preferred Alternative would facilitate multimodal access to the central area and foster its continued growth and development. High quality design respectful of the historic station would enhance WUS' role as a grand gateway into central Washington, DC.

- "Historic Preservation: Preserve and enhance the unique cultural heritage, beauty, and identity of the District of Columbia by respecting the historic physical form of the city and the enduring value of its historic structures and places, sharing responsibility for their protection and stewardship, and through planning leadership, ensuring their perpetuation for the benefit of the citizens of the District and the nation."

  The Preferred Alternative would be designed in accordance with the Secretary of Interior's *Standards for the Treatment of Historic Properties.* New construction would be compatible

with the historic station, which would continue to function as a grand and primary gateway to Washington, DC.

H Street Strategic Development Plan[178]

The H Street NE Strategic Development Plan (2003) calls for the strengthening of the connection between WUS and the H Street corridor, activation of the streetscape on the H Street Bridge, increased commercial office space, and for the area to serve as a multimodal center.

The Preferred Alternative would help achieve the plan's connectivity goals by providing new connections between H Street NE and the front of WUS via the new concourses and entrances into the station from the H Street Bridge, Second Street NE, and First Street NE. The Preferred Alternative would also support the plan's transit goals by expanding and modernizing multimodal options at WUS.

North of Massachusetts Avenue (NoMA) Vision Plan and Development Strategy[179]

The District developed the *NoMA Vision Plan and Development Strategy* to guide the development of the NoMA neighborhood. The *NoMA Vision Plan and Development Strategy* calls for the pursuit of "a balanced approach to transportation, creating a pedestrian-friendly neighborhood with improved transit accessibility. The long-term future of NoMA is dependent on transportation and utility infrastructure demands keeping pace with proposed development. This plan signals the need for multi-agency coordination and a holistic approach to transportation and infrastructure investment that addresses future needs with the most sustainable environmental practices."

The Preferred Alternative would support the *NoMA Vision Plan and Development Strategy*'s connectivity goals. It would improve accessibility to transit by bringing the station elements into compliance with ADA and Life Safety requirements; [180] provide new pedestrian entrances under the H Street Bridge at First and Second Streets NE as well as at the headhouses on H Street NE; and increase the capacity for bicycle storage. The new H Street Concourse would create a more pedestrian-friendly environment by connecting the neighborhoods to the east and west of WUS.

[178] District of Columbia. 2003. *H Street Corridor Revitalization*. Accessed from https://planning.dc.gov/publication/h-street-corridor-revitalization-main-page. Accessed on October 27, 2022.

[179] District of Columbia Office of Planning. 2006. *NoMA Vision Plan and Development Strategy.* Accessed from https://planning.dc.gov/sites/default/files/dc/sites/op/publication/attachments/Section%25201-%2520Introduction.pdf. Accessed on October 27, 2022.

[180] Life safety requirements include strategies, operations, and technologies that are used to protect people based on building construction, design, and features. Requirements can include but are not limited to fire prevention, emergency plans, smoke detectors, sprinkler systems, and emergency generators.

Northwest One Redevelopment Plan[181]

Northwest One is comprised of residential neighborhoods on the west side of North Capitol Street that are largely made up of low-income housing provided by public and private entities. In 2006, the District adopted a plan for the area. The Northwest One Redevelopment Plan makes recommendations to create a vibrant, mixed-income community with a new public school, recreation center, playing fields and parks, health clinic and neighborhood library. The plan also calls for the reconfiguration of some streets, including "extending" K Street to link the neighborhood to those east and west of it to increase connectivity and safety and alleviate congestion.

The Preferred Alternative would be consistent with the *Northwest One Redevelopment Plan.* Although it would not alter K Street NE, the Preferred Alternative would contribute to achieving the general connectivity goals of the plan by providing new access points to WUS on and below the H Street Bridge on First and Second Streets NE. This would enhance the connection between the neighborhoods to the east and west of WUS.

Downtown East Re-urbanization Strategy[182]

Judging that development of Downtown East, adjacent to and extending to the west of WUS out to 4th Street NW, was lagging behind the resurgence of nearby areas, including the Mount Vernon Triangle and NoMA neighborhoods, the District adopted a re-urbanization strategy for that area in 2019. Vision goals guiding the strategy include making Downtown East connected and accessible via physical connections, including an emphasis on WUS and its connectivity to surrounding neighborhoods and improving access to all modes of transportation to and through the area, among others. The planned expansion of WUS was one factor that prompted the District to develop the Strategy.

The Preferred Alternative would advance the goals of the *Downtown East Re-urbanization Strategy* by enhancing WUS both as a multimodal facility providing access to Downtown and as a local landmark that connects, rather than separates, neighborhoods. The Preferred Alternative would implement several recommendations of the Strategy, including providing access to WUS from all sides; streamlining transfer between modes of transit; and supporting rail investment.

Move DC 2021[183]

Move DC 2021 is the long-range transportation plan for the District. Move DC 2021 provides an overarching framework of goals and policies that will guide transportation decisions in the District over a 25-year period. It identifies a series of strategies to achieve the goals and policies, and tools to identify

[181] District of Columbia. 2006. *Northwest One Redevelopment Plan*. Accessed from https://planning.dc.gov/sites/default/files/dc/sites/op/publication/attachments/NorthwestOneFinal.pdf. Accessed on October 27, 2022.

[182] District of Columbia. 2019. *Downtown East Re-urbanization Strategy*. Accessed from https://planning.dc.gov/sites/default/files/dc/sites/op/page_content/attachments/Downtown%20East%20ReUrbanization%20Strategy%20-%20Final%2008-2019.pdf. Accessed on October 27, 2022.

[183] District of Columbia. 2021. *Move DC 2021*. Accessed from https://movedc.dc.gov/. Accessed on October 27, 2022.

needs and priorities for different modes of transportation. Move DC 2021 defines a set of 18 policies and 41 strategies to achieve goals pertaining to safety, equity, mobility, project delivery, management and operations, sustainability, and enjoyable spaces.

The Preferred Alternative is generally supportive of, or consistent with, Move DC 2021's policies. For instance, the provision of a pedestrian and bicycle ramp along the west side of WUS, which could potentially become part of a future greenway developed as part of a different project, is consistent with the policy to "integrate and expand the pedestrian and bicycle network to ensure safe, connected, and more equitable infrastructure for all users." The inclusion in the Preferred Alternative of a below-ground pick-up and drop-off facility is consistent with the policy to "increase accessibility and efficient delivery of goods and movement of people through curbside management and roadway management." More generally, the expansion of the station to accommodate more trains and passengers, and the reduction in parking capacity at the station, are supportive of the Move DC 2021 policy to "achieve 75 % non-auto mode commute trips by 2032."

Mount Vernon Triangle Action Agenda,[184] Florida Avenue Market Small Area Plan,[185] and Ward 5 Works[186]

These plans focus on areas that are not immediately adjacent to WUS but can be potentially affected by activities and actions at the station. The Mount Vernon Triangle extends west of New Jersey Avenue NW and the Northwest One area. The District produced the *Mount Vernon Triangle Action Agenda* in 2003 to govern the approach to land use development in this neighborhood. The *Agenda* calls for the enhancement of retail, hotel, recreation, nonprofit, and cultural uses along lively street corridors. The 2009 *Florida Avenue Market Small Area Plan* focused on developing a 40-acres area near the intersection of Florida and New York Avenues, north of WUS, into a pedestrian-oriented mix of commercial and residential uses. *Ward 5 Works*, released in 2014, is a strategy to transform 1,000 acres of industrial land in Ward 5 north of WUS into a hub of green, food, tech and creative businesses that creates jobs, community amenities and better environmental performance for District residents. The Preferred Alternative would generally support these plans through improvements in multimodal accessibility and connectivity.

[184] District of Columbia. 2003. *The Mount Vernon Triangle Action Agenda. Creating a Vibrant new Downtown Neighborhood*. Accessed from https://planning.dc.gov/sites/default/files/dc/sites/op/publication/attachments/Mount%20Vernon%20Triangle%20Action%20Agenda.pdf. Accessed on October 28, 2022.

[185] District of Columbia. 2009. *Florida Avenue Market Small Area Plan*. Accessed from https://planning.dc.gov/sites/default/files/dc/sites/op/publication/attachments/Florida%20Avenue%20Market%20Small%20Area%20Plan_Council%20Approved_R18-0257.pdf. Accessed on October 28, 2022.

[186] District of Columbia. 2014. *Ward 5 Works. Ward 5 Industrial Land Transformation Study*. Accessed from https://planning.dc.gov/sites/default/files/dc/sites/op/publication/attachments/W5_07142014_FINALfinalSmallest.pdf. Accessed on October 28, 2022.

9.5.2 Indirect Operational Impacts

9.5.2.1 Potential Federal Air Rights Development

Relative to the No-Action Alternative, the potential Federal air rights development in the Preferred Alternative would have a major beneficial indirect operational impact on land use. It would have no indirect operational impacts on zoning, or development; property ownership, land acquisitions, and displacement; or local and regional plans.

In the Preferred Alternative, the demolition of the existing WUS parking garage would make Federal air rights (currently occupied by the WUS parking garage) available for potential future transfer and development. As explained in Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 9.4.1, *Operational Impacts,* the Federal Railroad Administration (FRA) determined that it is reasonably foreseeable that the Federal air rights area would be rezoned to match the District's USN zoning designation that applies to the adjacent private air rights. The USN zoning designation allows for a mix of uses, including residential, retail, and office.[187]

The potential future Federal air rights transfer and development in the Preferred Alternative would be consistent with the USN zoning designation. For the purposes of this SDEIS, it is assumed to consist of 310,000 square feet of office; 175,000 square feet of residential uses; and 15,000 square feet of retail uses. While the mechanism to allow for this future transfer and development has not been determined, as an example, FRA could lease the air rights to Union Station Redevelopment Corporation (USRC), which in turn could sublease the development rights to a private party.[188] Other options include transferring the rights to a private party directly or as part of an exchange of property rights.

The potential future transfer and development of the Federal air rights would have a major beneficial impact on land use in the Project Area. It would replace an automobile-focused use with residential and commercial uses more consistent with their surroundings, including the private air rights development. As such, it would become part of a new vibrant neighborhood to the north of WUS, within which the expanded station would be seamlessly integrated.

9.5.2.2 Regional Study Area

Relative to the No-Action Alternative, the Preferred Alternative would have no adverse indirect operational impacts on zoning, land use, or development; property ownership, land acquisitions, and displacement; or local and regional plans.

The improved connectivity and activity at WUS that the Preferred Alternative would promote may accelerate medium- or high-density development near WUS. Such development already characterizes most of the Regional Study Area, such as Mount Vernon Triangle and NoMA. Indirect impacts from

[187] District of Columbia. *Zoning Handbook. Union Station North.* Accessed from https://handbook.dcoz.dc.gov/zones/special-purpose-zones/union-station-north/usn/. Accessed on October 28, 2022.

[188] The FRA-USRC lease and USRC's organizational documents would permit USRC to facilitate the development similar to USRC's role in the 1980s development.

induced development may be more noticeable along and near the H Street Corridor, currently comprised of a high-activity street (H Street NE) surrounded by residential rowhouse neighborhoods, and across Capitol Hill.

However, the District's zoning regulations and applicable plans would continue to guide the density and character of potential future developments in all these areas. This would avoid the development of incompatible land uses and ensure that neighborhoods evolve in accordance with the District's vision for their future. Thus, the Preferred Alternative would have no adverse indirect operational impacts on zoning, land use, or development; property ownership, land acquisitions, and displacement; or local and regional plans.

9.5.3 Construction Impacts

Construction of the Preferred Alternative would have moderate adverse impacts on land use and development. It would have no impacts on zoning; property ownership, land acquisitions, and displacement; or local and regional plans.

Construction activities in the Preferred Alternative would largely be contained within WUS and the rail terminal. Construction would affect rail operations but the phased, east-to-west construction approach would minimize this impact and the resulting disruptions in service as much as possible (see **Section 5.5.3**, *Construction Impacts* for further discussion of potential impacts of construction on transportation modes, including intercity buses and parking). At various times during the construction period (approximately 13 years), five areas may be used for access and staging: the West Rail Yard (between K Street and H Street); WUS east access ramp, First Street NE, Second Street NE, and the H Street Bridge curbs; the H Street Tunnel; the Railway Express Agency (REA) Parking Lot; and a train access area for potential material delivery and removal in the constricted "throat" of the rail terminal north of K Street NE.

Of these, the WUS east access ramp, First Street NE, and Second Street NE curbs are just outside the Project Area. They would be used as access points for personnel, minor equipment, short-term truck parking, and limited material deliveries, generally consistent with their existing use. The H Street Bridge, although within the Project Area, is a public right-of-way. In addition to the uses just listed, it could also be used to place equipment to hoist or pump materials into and out of the site. This would be a short-term use occurring multiple times over the entire period of construction. Close coordination with DDOT and Amtrak would ensure that disruptions to street and rail traffic do not occur or remain minimal.

Use of the West Rail Yard area and the REA Parking Lot for construction access and staging would involve a change in the current use of these areas, including demolitions of existing buildings and construction of access ramps. The West Rail Yard would be a major staging area during Phases 1 to 3 and part of Phase 4. Use of the REA Parking Lot likely would be mostly during Phase 1. Amtrak, one of the Project Proponents, controls those areas. Construction planning would include minimizing any impacts on the operation of the rail terminal.

The H Street Tunnel (former at-grade H Street right-of-way) would be used for east side access during Phase 1 but that end of the tunnel would be demolished during Phase 1 excavation. The west end of the tunnel would be used for access during Phases 2 through 4.[189]

For the entire duration of the First Street Tunnel column removal work, overlapping Phase 1 and Phase 2, part of the Retail and Ticketing Concourse would be closed to the public to allow for the removal of columns within the run-through track tunnel as part of the track reconstruction work. This would affect the uses currently accommodated in the eastern third of the concourse, including retail outlets, which would be displaced for up to approximately 2 years and 6 months. At the beginning of Phase 4 of construction, the existing bus facility and parking garage would be demolished. During all of Phase 4, a temporary bus facility or bus loading zones would be established on the completed portion of the structural deck (see **Section 5.5.3.4**, *Intercity, Tour/Charter, and Sightseeing Buses*, and **Section 5.5.3.9**, *Vehicular Parking and Rental Cars*, of this report for further discussion of potential impacts on intercity buses and parking during Phase 4).

9.5.4 Comparison to Existing Conditions

The impacts of the Preferred Alternative relative to existing conditions would generally be the same as impacts relative to the No-Action Alternative. These impacts would result from features of the Project or the Study Area that would not change with the baseline.

9.6 Summary of Impacts

Table 9-1 summarizes the impacts of the No-Action Alternative and the Preferred Alternative.

Table 9-1. Summary of Impacts

Impact Category	Type of Impact	No-Action Alternative	Preferred Alternative
Zoning	**Direct Operational**	No impact	No impact
	Indirect Operational	No impact	No impact
	Construction	No impact	No impact
Land Use	**Direct Operational**	Major beneficial impact due to private air rights development	Major beneficial impact due to enhanced multimodal uses and increased connectivity
	Indirect Operational	No impact	Major beneficial impact from potential Federal air rights development

[189] As explained in **Section 9.5.1.2**, *Property Ownership, Land Acquisitions, and Displacements*, the H Street Tunnel would be acquired to construct the new H Street Concourse.

Impact Category	Type of Impact	No-Action Alternative	Preferred Alternative
	Construction	Minor adverse impact	Moderate adverse impact
Property	**Direct Operational**	No impact. Potential encroachment of the private air rights development deck into Federal and Amtrak property	Minor adverse impact. Use of approximately 2.9 acres of private air rights south of H Street Bridge
	Indirect Operational	No impact	No impact
	Construction	No impact	No Impact
Local and Regional Plans	**Direct Operational**	Minor adverse impact. Generally inconsistent due to no improvement to connectivity	Major beneficial impact. Supportive of or consistent with the goals and objectives of the relevant plans
	Indirect Operational	No impact	No impact
	Construction	No impact	No impact

9.7 Avoidance, Minimization and Mitigation Evaluation

During conceptual design of the Project, minimization and avoidance measures to land use impacts were considered to the greatest extent possible. The Preferred Alternative was designed to be consistent with the zoning, land use, and regional and local plans. While it would have an adverse impact on private property due to the displacement of approximately 2.9 acres of private air rights, the Preferred Alternative was developed in coordination with the air rights owner and coordination would continue through the design process. Union Station Redevelopment Corporation (USRC) would work with the private air rights owner regarding the acquisition of the privately owned air rights needed to construct Project elements for just compensation, consistent with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended.[190]

[190] 49 CFR 24, *Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally-Assisted Programs*.

9.8 Permits and Regulatory Compliance

2983 The following permits and processes (**Table 9-2**) would need to be completed for land use, planning, and
2984 property-related aspects of the Project, to comply with applicable laws and regulations.

Table 9-2. List of Potential Permits and Approvals

Permitting Entity	Description and Laws/Regulations	Potential Permits and Processes
U.S. Commission on Fine Arts	Provides design review of government properties in the District.	Project Review[191]
District Department of Buildings	Authorizes the building of a project according to a specific scope of work, including approved plans. Any modification of permit scope or approved plans must also be approved. - 12 District of Columbia Municipal Regulations (DCMR) Construction Codes[192] - Title 6 Housing and Building Restrictions and Regulations[193] - Title 42 Real Property[194]	Building Permit[195]
District Department of Transportation	Manages and maintains publicly owned transportation infrastructure in the District. Lead agency with authority over the planning, design, construction, and maintenance of alleys, bridges, sidewalks, streets, streetlights, and traffic signals in DC. Right-of-Way Policies and Procedures Manual to establish a fair and efficient manner to complete the acquisitions or transfers of property, and to issue permits to allow for uses	Public Space Permit – Construction and Occupancy[197] Fences and Retaining Walls Permit[198] Sidewalk, Curb, and Gutter Permit[199]

[191] CFA. 2023. *Government Projects.* Accessed from https://cfa.gov/project-review/government. Accessed on January 8, 2023.

[192] District of Columbia. *Construction Codes*. Accessed from https://dob.dc.gov/page/dc-construction-codes. Accessed on October 28. 2022.

[193] District of Columbia. *Title 6 Housing and Building Restrictions and Regulations*. Accessed from https://code.dccouncil.us/dc/council/code/titles/6/. Accessed on October 28, 2022.

[194] District of Columbia. Title 42 *Real Property*. Accessed from https://code.dccouncil.us/dc/council/code/titles/42/. Accessed on October 29, 2022.

[195] District of Columbia. *Building Permit Application*. Accessed from https://mybusiness.dc.gov/#/. Accessed on October 28, 2022.

[197] District Department of Transportation. *Public Space Permit Applications*. Accessed from https://ddot.dc.gov/node/496092. Accessed on October 28, 2022.

[198] District Department of Transportation. *Fences and Retaining Walls*. Accessed from https://ddot.dc.gov/node/482312. Accessed on October 28, 2022.

[199] District Department of Transportation. *Sidewalk, Curb, Gutter*. Accessed from https://ddot.dc.gov/node/482482. Accessed on October 28, 2022.

Permitting Entity	Description and Laws/Regulations	Potential Permits and Processes
	of the right-of-way that is compatible with overall operations. [196]	
Federal Aviation Administration (FAA)	Responsible for ensuring national airspace is navigable and free of obstructions. Development that may obstruct airspace is required to provide notice to FAA consistent with CFR Title 14 Part 77.9. Federal air-rights development may require obstruction notice and analysis due to height.	Notification of Proposed Alteration or Construction (Part 77)[200]
National Capital Planning Commission	Reviews project plans and development proposals for federal property within the District (40 USC 8722).	Project Review[201]

[196] District Department of Transportation. 2019. *Right of Way Policies and Procedures Manual.* Accessed from https://ddot.dc.gov/sites/default/files/dc/sites/ddot/page_content/attachments/DDOT%20ROW%20Manual%202019-07-31.pdf. Accessed on October 28, 2022.

[200] Federal Aviation Administration. 2022. *Notice of Proposed Construction or Alteration.* Accessed from https://www.faa.gov/airports/central/engineering/part77. Accessed on January 8, 2023.

[201] NCPC. 2022. *Review Process Overview.* Accessed from https://www.ncpc.gov/review/overview/. Accessed on January 17, 2023.

10 Noise and Vibration

10.1 Overview

This section addresses the potential noise and vibration impacts of the Preferred Alternative. Primary permanent noise and vibration sources near WUS include street and rail traffic. Construction activities are another common source of noise and vibration in urban environments. This section also identifies measures that the Federal Railroad Administration (FRA) is proposing to avoid, minimize, or mitigate potential adverse impacts.

10.2 Regulatory Context

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 10.2, *Regulatory Context*.

10.3 Study Area

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 10.3, *Study Area*. The Operational Noise and Vibration Study Area consists of noise and vibration-sensitive receptors within 600 feet of the Project Area and within the traffic study area. The Construction Noise and Vibration Study Area extends out 500 feet from the Project Area.

10.4 Methodology

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 10.4, *Methodology*.[202] The analysis uses the Federal Transit Administration (FTA)'s criteria as described in Sections 10.4.1.1, *Operational Noise Prediction Methodology*; 10.4.1.2, *Operational Vibration Prediction Methodology*; and 10.4.2.2, *Construction Noise Impact Criteria* of Appendix C3.

[202] Noise and vibration model inputs were updated to reflect features specific to the Preferred Alternative, including the construction of ramps to and from the below-ground pick-up and drop-off facility on G Street NE and along the east side of WUS.

10.5 Impacts of the Preferred Alternative

This section presents the results of the operational and construction noise and vibration assessment of the Preferred Alternative. Impacts are first summarized in bold lettering followed by a supporting description and analysis. Direct and indirect operational impacts as well as construction impacts are considered. Operational impacts are assessed relative to the No-Action Alternative. An assessment of the impacts relative to existing conditions is also provided.

10.5.1 Direct Operational Impacts

Relative to the No-Action Alternative, in the Preferred Alternative, increases in noise levels would result in moderate adverse operational direct impacts at 14 receptor locations. The Preferred Alternative would result in minor localized adverse direct operational impact on vibration near the throat of the rail terminal and negligible adverse operational direct elsewhere.

10.5.1.1 Operational Noise

The modeling conducted to assess the operational noise impacts of the Preferred Alternative predicted ambient noise levels at 164 receptor locations in the vicinity of WUS. [203] The modeled operational noise levels incorporate background noise as well as noise caused by the Preferred Alternative. **Figure 10-1** shows modeled operational noise levels in the Preferred Alternative. At most locations, noise levels would range from 60 to 75 A-weighted decibels (dBA) day-night average sound level (Ldn).[204] Such levels are typical of a dense urban setting. Predominant noise sources are the rail terminal and vehicular traffic on New York Avenue NE, Florida Avenue NE, K Street NE, and Massachusetts Avenue NE.

Figure 10-2 compares noise levels in the Preferred Alternative and the No-Action Alternative. In some locations closest to the rail terminal, the Preferred Alternative would have a beneficial impact on noise levels relative to existing conditions due to changes in structural design. Outside these areas, increases in train operations and traffic in the Preferred Alternative would generally cause noise levels to increase relative to the No-Action Alternative. At receptors south of K Street NE and west of WUS, and at receptors north of New York Avenue, noise would increase by less than 1 dBA (Ldn). At receptors in the New York Avenue Area, they would increase by less than 2 dBA (Ldn). At receptors north of K Street NE and south of New York Avenue, and at receptors south of K Street NE and east of WUS, noise levels would increase by up to 2 dBA (Ldn). At receptors south of Florida Avenue NE and north of K Street NE,

[203] Receptors are land uses sensitive to noise and vibration. Consistent with the FTA manual, receptors fall into three categories: Category 1 includes receptors where quiet is an essential element of their use, such as amphitheaters, certain historic landmarks, or recording studios. Category 2 receptors include locations where people sleep, such as residences, hospitals, and hotels. Category 3 receptors include institutional uses accommodating activities that noise can disrupt, such as schools, places of worship, libraries, and museums.

[204] dBA is the standard metric to measure environmental noise. It is an expression of the relative loudness of sounds as perceived by the human ear. A-weighting gives more value to frequencies in the middle of human hearing and less value to frequencies at the edges. Ldn represents the sound energy over a 24-hour period with a 10-decibel penalty applied to sound that occurs between 10:00 PM and 7:00 AM when people are more sensitive to noise. Ldn accounts for how loud events are, how long they last, how many times they occur, and whether they occur at night.

they would increase by up to 3 dBA (Ldn). At one receptor in the Union Market Area (R181, 1255 Union Street NE), they would increase by up to 9 dBA (Ldn). Changes less than 3 dBA are generally not perceptible. Anticipated increases in noise levels would result in negligible adverse noise impacts except at those locations where they would cause FTA thresholds to be exceeded.

As shown in **Table 10-1** and **Figure 10-3,** relative to the No-Action Alternative, noise levels would exceed the FTA criterion for a moderate impact at 14 receptors.[205]

Noise impacts occurring adjacent to the rail terminal would be due to the increase in train operations. This includes impacts on the Equity Residential building (R15), Revel at NoMA CNTR Apartments (R16), the Courtyard Marriot (R37), the Gantry DC apartments (R64 and R65), the Uline Arena (R96), the Toll Brothers City Living (R98 and R99), the New York Avenue Men's Emergency Shelter (R178), Theory Apartments (R181), and the Red Carpet Inn (R182). Noise impacts occurring along New York Avenue at the Hecht Warehouse Lofts (R58) and the Homewood Suites and Hampton Inn (R61) would be the result of the projected growth in traffic volumes on this roadway.

The Preferred Alternative would also create stationary sources of noise similar to those created in the No-Action Alternative. All stationary mechanical equipment would be located approximately 50 feet or farther away from the property line, which would help attenuate sound and maintain noise levels below the District's noise ordinance 60 dBA (leq) standard.[206] As mechanical equipment design advances, other sound attenuation elements, such as silencers and enclosures could be incorporated, if and as needed. Therefore, impacts from stationary noise sources are anticipated to be negligible.

[205] The criteria depend on baseline conditions and are identified in **Table 10-1**.

[206] District of Columbia Municipal Regulations. Title 20 Section 20-2701, *Maximum Sound Levels*. Accessed from https://www.dcregs.dc.gov/Common/DCMR/SectionList.aspx?SectionNumber=20-2701. Accessed on January 23, 2023.

Figure 10-1 Preferred Alternative Noise Levels

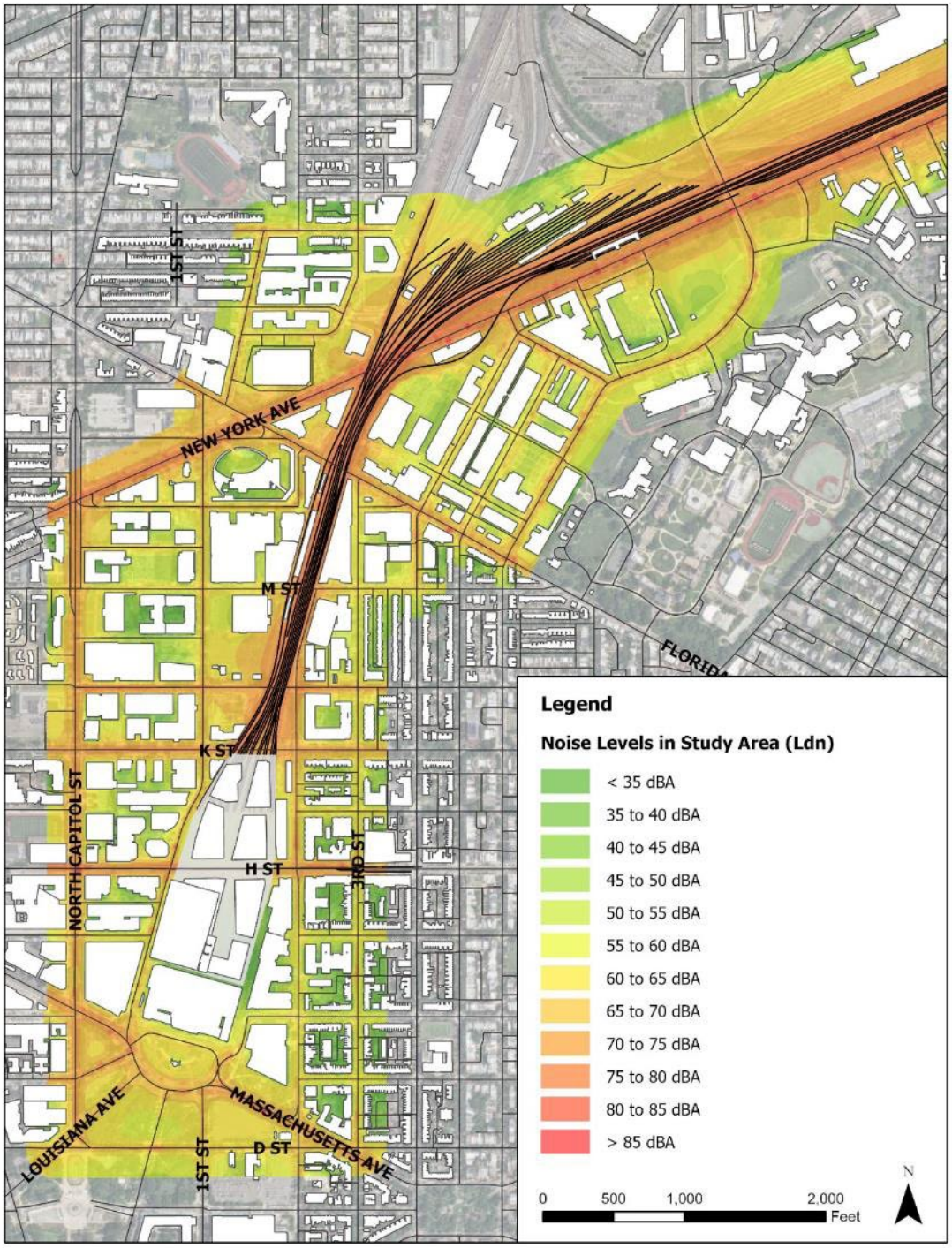


Figure 10-2. Comparison of Preferred Alternative and No-Action Alternative Noise Conditions

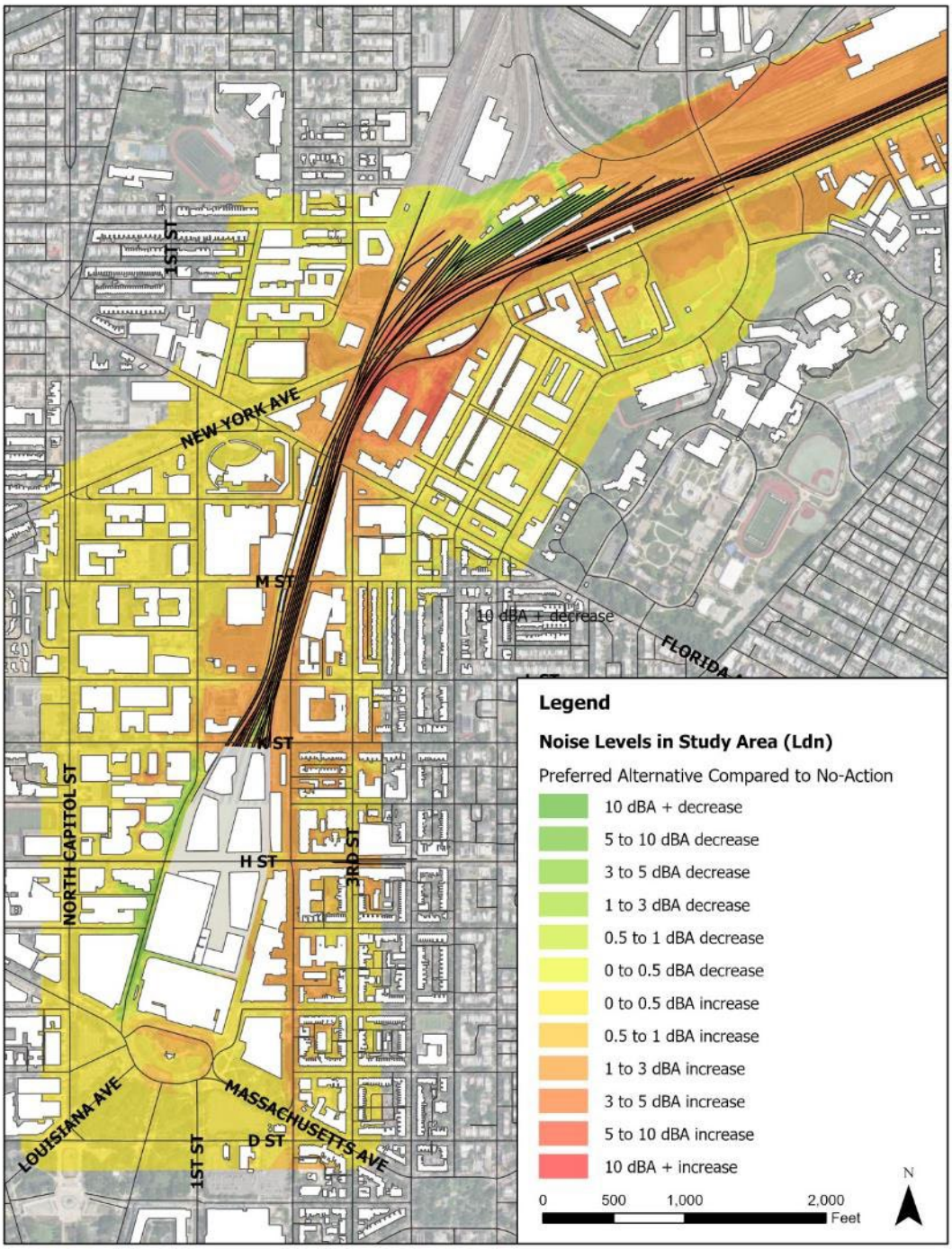


Figure 10-3. Preferred Alternative Operational Noise Impacts

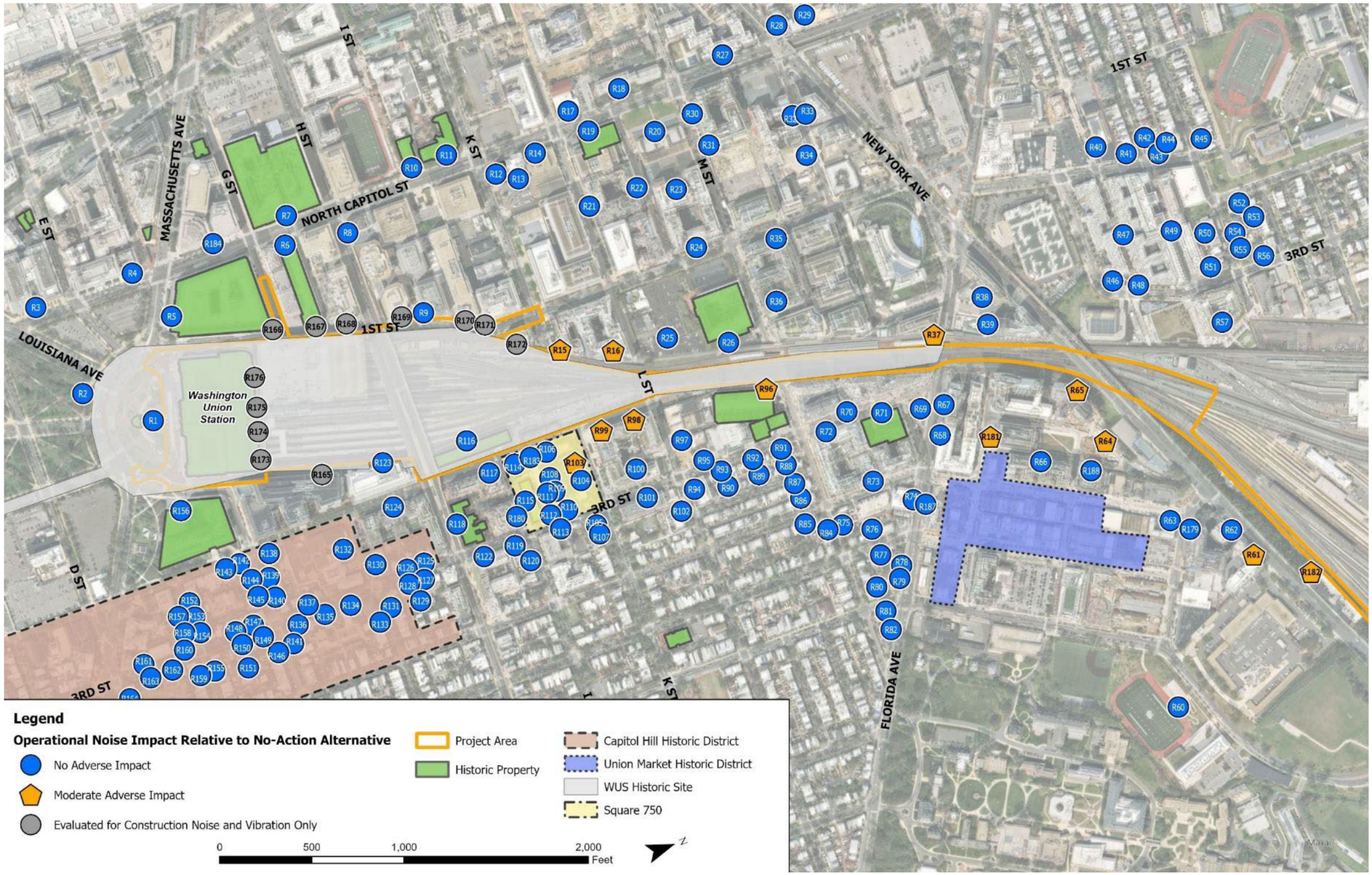


Table 10-1. Preferred Alternative Operational Noise Impact Assessment

Receptor	Address	Land Description	Noise Level (Ldn, dBA)							FTA Noise Impact Assessment Relative to Existing Condition	FTA Noise Impact Assessment Relative to No-Action Alternative
			Existing	Impact Criteria (re: Existing)		No-Action	Impact Criteria (re: No-Action)		Pre. Alt.		
				Moderate	Severe		Moderate	Severe			
R15	100 K Street NE	Equity Residential	71.8	72.6	74.3	71.7	72.5	74.2	73.1	Moderate	Moderate
R16	1005 First Street NE	Revel at NoMA CNTR Apartments	70.4	71.4	73.1	70.8	71.8	73.5	72.7	Moderate	Moderate
R25[1]	170 L St NE	Noma Station - Bristol Development	68.6	69.7	71.6	69.2	70.3	72.1	70.2	*Potentially Moderate*	*No Potential Impact*
R37	1325 2nd St NE	Courtyard Marriot	73.1	73.7	75.5	73.5	74.1	75.8	74.4	Moderate	Moderate
R58[2]	1401 New York Avenue NE	Hecht Warehouse Lofts	73.3	73.9	75.7	73.0	73.6	75.4	73.9	Moderate	Moderate
R61	501 New York Avenue NE	Homewood Suites and Hampton	73.2	73.8	75.6	73.8	74.3	76.1	74.4	Moderate	Moderate
R62	411 New York Avenue	Selina Union Hotel	73.7	74.2	76.0	74.2	74.7	76.5	74.6	Moderate	No Impact
R64	300 Morse Street Building D	The Gantry DC-1	54.7	57.9	62.0	57.9	60.3	63.7	61.7	Moderate	Moderate
R65	300 Morse Street Building A	The Gantry DC-2	68.9	70.0	71.8	69.8	70.9	72.6	72.5	**Severe**	Moderate
R96	1140 3rd St NE	Uline Arena	73.5	75.1	78.6	72.7	74.6	78.0	75.1	Moderate	Moderate
R98	230 K Street NE	Toll Brothers City Living	68.9	70.0	71.8	69.4	70.5	72.2	70.8	Moderate	Moderate
R99	230 K Street NE II	Toll Brothers City Living II	67.9	69.1	71.0	68.3	69.4	71.3	69.6	Moderate	Moderate
R103	203-219 K Street NE	Residential	65.3	66.7	68.9	65.8	67.1	69.3	67.1	Moderate	Moderate
R107	301-319 K Street NE	Residential	62.9	64.5	67.1	63.3	64.9	67.4	64.7	Moderate	No Impact
R118	211 I Street NE	Landmark Lofts	68.0	69.2	71.1	68.4	69.5	71.4	69.2	Moderate	No Impact
R178[2]	1355 New York Ave NE	Men's Emergency Shelter	74.9	75.3	77.1	75.8	76.1	77.9	76.4	Moderate	Moderate
R181	1255 Union St NE	Theory Apartments	49.9	54.9	60.0	50.5	55.3	60.2	59.6	Moderate	Moderate
R182	600 New York Ave NE	Red Carpet Inn	69.2	70.3	72.1	74.2	74.7	76.5	75.4	**Severe**	Moderate

1. Planned developments are evaluated for noise effects but are only described as potential impacts; they are not counted as impacts of the Preferred Alternative.
2. For the map to remain on a legible scale, this receptor is not shown in **Figure 10-3**.

10.5.1.2 Operational Vibration

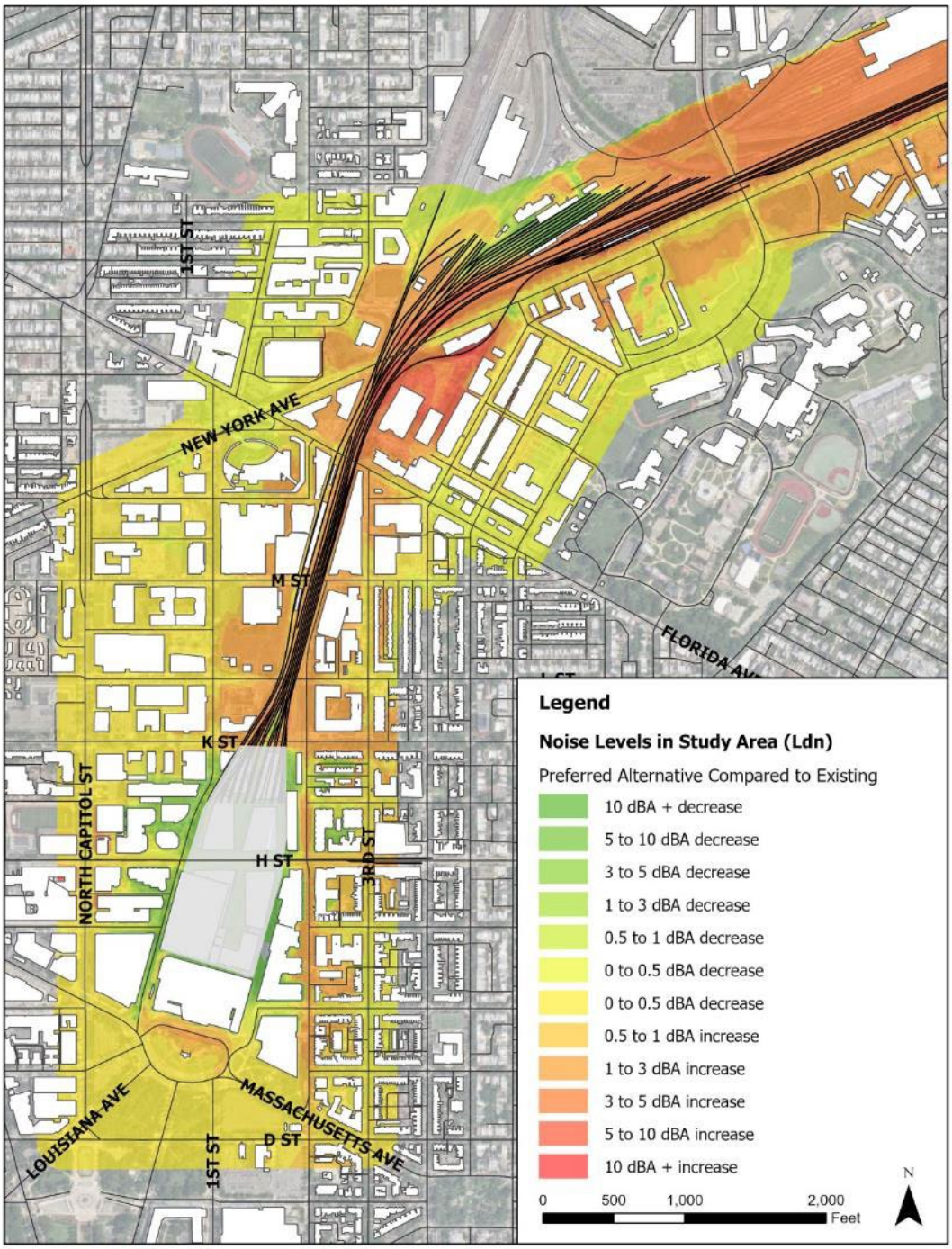
Vibration impacts in existing rail corridors are assessed based on (1) whether vibration levels would exceed the applicable FTA criteria and (2) whether there would be either a 3 vibration decibel (VdB) increase in vibration or at least a doubling of the number of train operations. While, in the Preferred Alternative, the number of train operations (not including Metro and DC streetcar operations) would approximately triple relative to the No-Action Alternative, the FTA criteria would not be exceeded. Vibration levels in the Preferred Alternative would be similar to those in the No-Action Alternative except that the Preferred Alternative would cause an increase in vibration of up to 2 VdB at the closest receptors to Track 43 in the throat of the rail terminal (segment of tracks between K Street NE and New York Avenue NE). This would be a minor impact.

The Preferred Alternative includes improvements to the track infrastructure in the rail terminal and the throat, including extending platform lengths; modifying rail profiles to achieve clearance under the H Street bridge; providing space for train storage on multiple tracks in the throat; using direct fixation for tracks in station; using number 9 turnouts or greater to optimize train speeds through special trackwork; and introducing pocket tracks. These proposed improvements would not affect the specific train types operating on each track or train speeds. Therefore, the level of vibration from train events would not be affected. Track reconstruction would generally help to improve rail conditions, including reducing rail roughness, minimizing potential for rail corrugation, and minimizing gaps in the rail running surface associated with jointed rail and/or connections between tangent track and special trackwork.

10.5.1.3 Comparison to Existing Conditions

Figure 10-4 shows changes in operational noise levels in the Preferred Alternative relative to existing conditions. The Preferred Alternative would result in negligible adverse operational impacts from increase in noise levels not exceeding 3 dBA (Ldn). Changes less 3 dBA are commonly considered imperceptible. These negligible impacts would be the result of increases in street traffic and rail operations.

Figure 10-4. Comparison of Preferred Alternative and Existing Noise Levels



In locations closest to the rail terminal south of K Street NE, the Preferred Alternative would have a beneficial impact on noise levels relative to existing conditions. Noise would decrease substantially (from approximately 5 to 10 dBA) because the Project elements and the private air rights development would cover the currently open rail terminal.

As shown in **Table 10-1**, relative to existing conditions, there would be moderate adverse noise impacts at 14 receptor locations and severe adverse noise impacts at two receptor locations. There would also be a potential for moderate impact at one planned development (R25).

There would also be minor adverse operational impacts due to increases in vibration in the Preferred Alternative relative to existing conditions. The greatest potential for increase in vibration would come from the re-introduction of Track 43. Re-introducing Track 43 would shift the easternmost track up to 10 feet closer to receptors on the east side of WUS. For the closest receptors, which are approximately 50 feet away from the nearest track, the introduction of Track 43 would increase vibration by approximately up to 2 VdB, a minor impact.

10.5.2 Indirect Operational Impacts

Relative to the No-Action Alternative, there would be no indirect noise or vibration operational impacts in the Preferred Alternative.

All noise and vibration impacts would take place at the same time as the Preferred Alternative. No impacts would occur beyond the Study Area.

10.5.3 Construction Impacts

10.5.3.1 Support of Excavation Noise

In the Preferred Alternative, Support of Excavation (SOE) construction activities would result in major (severe) adverse noise impacts at 32 receptor locations and moderate adverse noise impacts at eight receptor locations.[207]

The Preferred Alternative SOE would include a 49-foot sheet pile wall as well as slurry walls with faces of 49 feet and 62 feet. Construction of the SOE structures would involve the use of cranes, drill rigs, dump trucks, concrete pump trucks, excavators, and vibratory sheet pile drivers that would generate noise while operating.

Figure 10-5 and **Table 10-2** show noise impacts from SOE construction.

[207] The east ramp construction was added to SOE models for Phase 1 and the G Street and First Street ramps to Phase 4.

Figure 10-5. Preferred Alternative Support of Excavation Noise Impacts

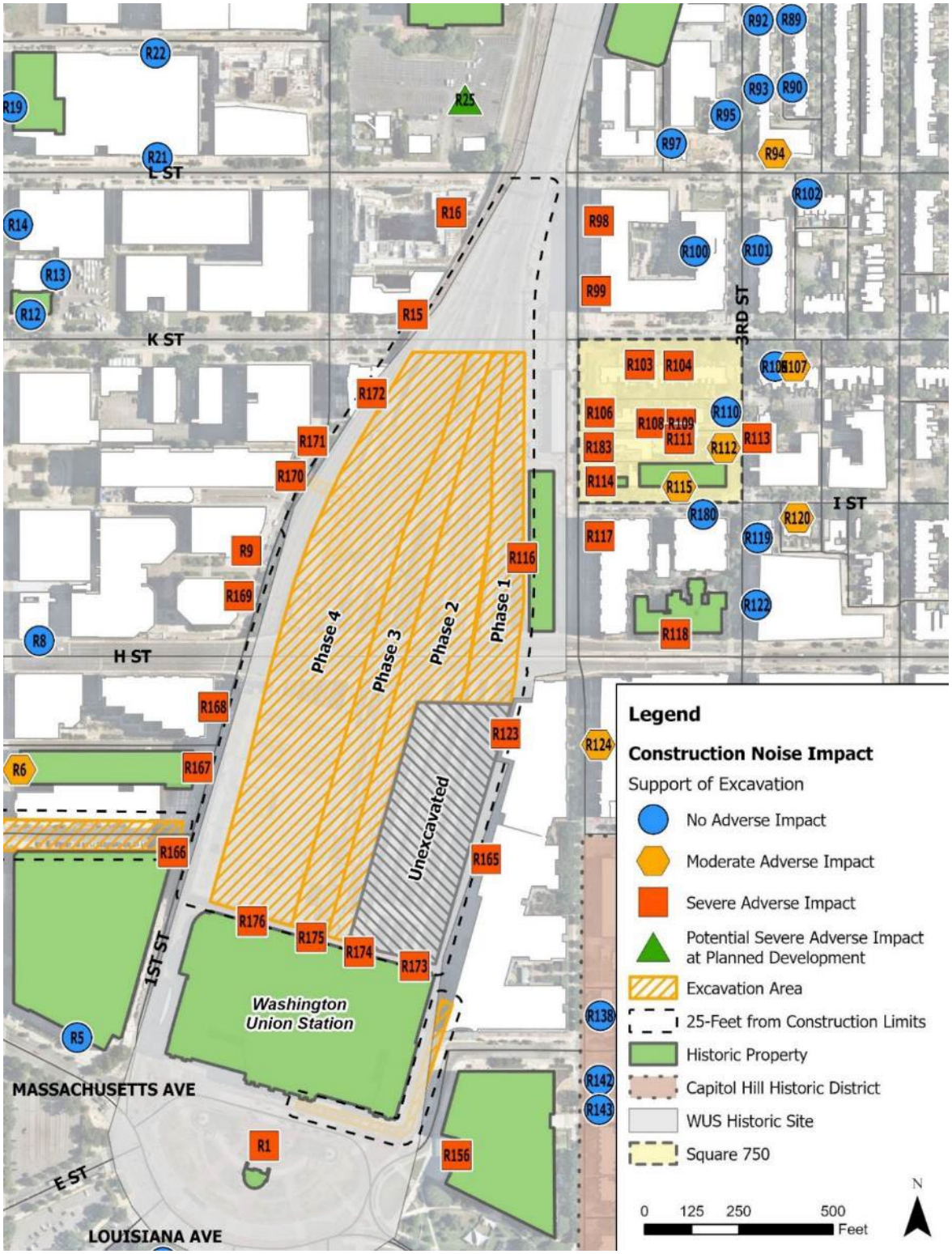


Table 10-2. Preferred Alternative Support of Excavation Construction Noise Impact Assessment

Receptor	Address	Land Description	Historic?	Noise Level (Ldn, dBA)				Impact
				Existing	Long-Term Construction Noise Impact Criteria		Construction Noise	
					Moderate	Severe		
R1	Columbus Circle	Columbus Circle	Yes	60.1	62.8	68.4	70.1	**Severe**
R4[3]	520 N Capitol St NW	Phoenix Park Hotel	No	67.4	62.5	67.7	62.7	Moderate
R6	715 N Capitol St NE	US Printing Warehouse	Yes	66.5	66.8	72.1	67.6	Moderate
R9	First St NE	NCC TV Studio	No	61.2	58.5	64.0	74.3	**Severe**
R15	100 K Street NE	Equity Residential	No	71.8	65.0	70.8	79.2	**Severe**
R16	1005 First Street NE	Revel at NoMA CNTR Apartments	No	70.4	64.7	69.8	73.8	**Severe**
R25[1]	170 L Street NE	NoMA Station - Bristol Development	No	68.6	63.3	68.5	75.0	*Potentially Severe*
R94	300 L Street NE	The Aria on L (Top-level)	No	63.7	60.0	65.4	65.0	Moderate
R98	230 K Street NE	Toll Brothers City Living	No	68.9	63.5	68.7	80.9	**Severe**
R99	230 K Street NE II	Toll Brothers City Living Phase II	No	67.9	62.8	68.1	78.0	**Severe**
R103	203-219 K St NE	Residential	Yes	65.3	61.0	66.4	67.7	**Severe**
R104	221-243 K Street NE	Residential	Yes	64.4	60.4	65.8	66.5	**Severe**
R106	917-923 2nd Street NE	Residential	Yes	64.7	60.6	66.0	83.8	**Severe**
R107	301-319 K Street NE	Residential	No	62.9	59.5	65.0	61.9	Moderate
R108	208-224 Parker Street NE	Residential	Yes	53.6	54.7	60.7	75.7	**Severe**
R109	226-242 Parker Street NE	Residential	Yes	49.8	53.3	59.5	70.0	**Severe**
R111	219-231 Parker Street NE	Residential	Yes	49.3	53.1	59.4	69.5	**Severe**
R112	908-914 3rd St NE	Residential	Yes	56.8	56.1	61.9	56.6	Moderate
R113	907-913 3rd Street NE	Residential	No	57.7	56.6	62.3	65.7	**Severe**
R114	220 I Street NE	Intern Housing	Yes	62.5	59.2	64.7	77.1	**Severe**
R115	210 I Street NE	Washington Intern Housing	Yes	**58.5**	57.0	62.7	58.2	Moderate
R116	900 2nd Street NE	Center City Public Charter School	Yes	72.1	70.0	76.0	90.6	**Severe**

Receptor	Address	Land Description	Historic?	Noise Level (Ldn, dBA)				Impact
				Existing	Long-Term Construction Noise Impact Criteria		Construction Noise	
					Moderate	Severe		
R117[2]	201 I Street NE	Senate Square Apartments (First-level)	No	60.2	57.9	63.5	68.9	**Severe**
	201 I Street NE	Senate Square Apartments (Mid-level)	No	59.9	57.7	63.3	76.3	
	201 I Street NE	Senate Square Apartments (Top-level)	No	63.4	59.8	65.2	82.6	
R118	211 I Street NE	Landmark Lofts	Yes	68.0	62.9	68.1	70.6	**Severe**
R120, R121	307-313 I Street NE	Residential	No	58.7	57.1	62.8	58.7	Moderate
	307-313 I Street NE	Residential (Balcony)	No	58.2	56.8	62.5	59.1	
R123	700 2nd Street NE	Kaiser Permanente Medical Center	No	70.5	69.7	74.8	89.9	**Severe**
R124	701 2nd Street NE	Station House Apartments	No	61.0	58.4	63.9	60.8	Moderate
R156	1 Columbus Circle NE	Thurgood Marshall Building	Yes	55.8	60.7	66.5	69.4	**Severe**
R165[2]	100 F Street NE	US Securities/Exchange Commission (First-level)	No	66.9	67.1	72.4	86.3	**Severe**
	100 F Street NE - Mid	US Securities/Exchange Commission (Mid-level)	No	66.7	67.0	72.3	85.7	
	100 F Street NE - Top	US Securities/Exchange Commission (Top-level)	No	65.9	66.4	71.8	84.8	
R166	2 Mass Avenue NE	City Post Office (Postal Museum) - Construction Side	Yes	59.7	62.6	68.2	81.7	**Severe**
R167	10 G Street NE	US Printing Warehouse (Construction Side)	Yes	61.9	63.9	69.4	77.8	**Severe**
R168	750 First Street NE	Union Station Redevelopment Corp.	No	62.7	64.4	69.8	77.5	**Severe**
R169	810 First Street NE	Davita Union Plaza	No	62.8	64.4	69.9	74.1	**Severe**
R170	888 First Street NE	Federal Energy Reg Commission	No	63.2	64.7	70.1	76.9	**Severe**
R171	77 K Street NE	IRS Taxpayer Assistance Center	No	66.2	66.6	71.9	78.1	**Severe**
R172	111 K Street NE	NASPA	No	75.1	70.0	78.3	87.8	**Severe**
R173	Union Station	WUS - Tracks 25-28	Yes	62.3	64.1	69.6	88.6	**Severe**

Receptor	Address	Land Description	Historic?	Noise Level (Ldn, dBA)				Impact
				Existing	Long-Term Construction Noise Impact Criteria		Construction Noise	
					Moderate	Severe		
R174	Union Station	WUS - Tracks 22-25	Yes	53.8	59.8	65.7	91.8	**Severe**
R175	Union Station	WUS - Tracks 10-12	Yes	54.5	60.1	66.0	91.8	**Severe**
R176	Union Station	WUS - Tracks 25-28	Yes	54.3	60.0	65.9	88.9	**Severe**
R183	911 2nd St NE	Pullman Place Condos	No	63.9	60.1	65.5	82.7	**Severe**

1. Planned developments are evaluated for noise effects but are only described as potential impacts; they are not counted as impacts of the Preferred Alternative.
2. Receptors with multiple heights are assessed at each level but are considered a single impact.
3. For the map to remain on a legible scale, this receptor is not shown in **Figure 10-5.**

Noise generated by SOE construction activities would exceed applicable District or FTA criteria at multiple receptors adjacent to WUS, along First, and on Second Street NE, resulting in major adverse impacts at 32 receptor locations and moderate adverse impacts at eight receptor locations.[208] In addition, there would be a potential severe impact at one planned development (R25). Noise levels would also exceed the 65 dBA (Lmax) District noise ordinance limit for nighttime construction. Construction would occur in two 10-hour shifts, for a total of 20 hours a day. Therefore, it would include night work for which a permit would be required.[209]

Locations of severe adverse noise impacts due to SOE construction activities include: WUS at the south end of the rail terminal; the Railway Express Agency (REA) Building; the US Securities and Exchange Commission building; the Thurgood Marshall Building and Columbus Circle near the location of the east ramp to the below-ground facility; the Kaiser Permanente Medical Center; as well as multiple residential and commercial building along First, Second, K, I (Eye), and Parker Streets NE.

10.5.3.2 Excavation Noise

In the Preferred Alternative, the rail terminal would be excavated down to the concourse and B1 level. Equipment used for excavation activities would include dump trucks, excavators, loaders, backhoes, bulldozers, and clam shovels.

For the purposes of analyzing noise impacts, two scenarios were assumed: under one scenario, spoil removal would be wholly by truck (All Truck Scenario: 120 trucks a day); under the other, work trains would be used (Work Train Scenario: two trains a day). The method of spoil removal is undetermined at this time. The two scenarios represent both ends of the spectrum of possibilities and the range within which impacts may be expected to fall.

In the All Truck Scenario, trucks would travel along designated truck routes and only use local streets – such as K Street NE, G Street NE (between North Capitol Street and First Street), First Street NE, and Second Street NE – to access the construction site. For the purposes of the noise assessment, it was assumed that all trucks would travel on New York Avenue, North Capitol Street, Massachusetts Avenue, H Street NE, and K Street NE east of Second Street NE. It was also assumed that trucks would travel north and south from and to the Project Area on either First Street or Second Street NE. Therefore, only half the trucks would operate on each of these two streets. In the Work Train scenario, trains would generally operate outside of the peak service periods.

Regardless of the scenario, the modeled noise impacts presented in this section would not occur continuously during the entire 13-year construction period. At the most, they would be limited to the

[208] Some locations include multiple modeled receptors.

[209] Lmax represents the highest sound level generated by a source. The District of Columbia noise ordinance (Municipal Regulations Chapter 20-27 and 20-28) prohibits construction sound levels above 80 dBA (Leq) (except for pile driving) as measured at a distance of 25 feet from the outermost limits of the construction site between 7:00 AM and 7:00 PM unless a variance is granted. From 7:00 PM to 7:00 AM, construction activities may be limited to 65 dBA (Lmax) at a distance of 25 feet from the outermost limits of the construction site for noise originating in an industrial zone. These criteria are intended to apply to stationary construction sources.

periods during which active excavation activities take place. Phase 1, along the east side of the station, would last approximately 2 years and 4 months, but excavation would only take place over a period of about 5 months. This would be followed by the one-year Intermediate Phase, during which there would be no excavation. Phases 2 and 3 would last approximately 2 years and 8.5 months each, but active excavation would occur only over approximately 10 months (Phase 2) or 11 months (Phase 3). Phase 4 would have the longest excavation period (2 years and 1 month out of 4 years and 3 months).

Noise levels were modeled at the beginning of excavation and at the end of excavation. This is because at the beginning, equipment is at grade, generating more noise. As excavation proceeds, equipment moves below grade and noise become attenuated by SOE structures.

Start of Excavation

In the Preferred Alternative, at the start of excavation, there would be major adverse noise impacts at 29 receptor locations (All Truck Scenario) or 26 receptor locations (Work Train Scenario). There would be moderate adverse noise impacts at 14 receptor locations (All Truck Scenario) or 10 receptor locations (Work Train Scenario).[210]

The start of excavation activities, when all the operating equipment would be at the same grade as surrounding land uses, is when the potential for noise impacts is greatest. **Table 10-3** shows the receptor location that would experience impact at the start of excavation. **Figure 10-6** and **Figure 10-7** illustrate impacts in the All Truck Scenario and in the Work Train Scenario, respectively.

The noise levels generated by start of excavation activities vary according to the methods of spoil removal. In general, noise impacts would be greater in the All Truck Scenario than in the Work Train Scenario. While the highest levels would be similar in both scenarios (around 91 dBA in the All Truck Scenario and around 90 dBA in the Work Train Scenario), they would occur at locations in or immediately on the edge of the rail terminal (such as near the REA Building). Farther away, difference would be more much more noticeable, for instance at 701 Second Street NE (R124; 63.4 dBA in the All Truck Scenario but 59 dBA in the Work Train Scenario); 521-527 Second Street NE (R143; 61 dBA in the All Truck Scenario but 56.5 dBA in the Work Train Scenario); or 603-607 Second Street NE (R138; 61 dBA in the All Truck Scenario but 56.8 dBA in the Work Train Scenario). Other residential locations where the difference would be greater than 3 dBA include 203-219, 221-243, and 301-319 K Street NE (R103, R104, and R107); and 201 I (Eye) Street NE (R117).

Generally, construction noise levels would be approximately 2 dBA (Ldn) higher in the All Truck Scenario than in the Work Train Scenario. Noise level differences are primarily due to nighttime truck operations during the assumed 20-hour "construction day." However, the primary sources of noise during excavation are on-site dump trucks, clam shovels, and excavators. Noise exposure from these stationary sources would occur for longer durations than exposure from dump truck passbys.

[210] The east side ramp construction was added to start of excavation models for Phase 1 and The G Street and First Street ramps construction was added to the models for Phase 4, on the assumption that start of excavation and ramp construction would occur simultaneously.

At multiple locations and in both scenarios, noise levels would exceed the long-term construction noise impact criteria for severe or moderate impacts, or the District's noise ordinance, resulting in major and moderate noise impacts.

In the All Truck Scenario, the criteria for severe and moderate impacts would be exceeded at 29 receptor locations and 14 locations, respectively. In the Work Train Scenario, they would be exceeded at 26 and 10 locations, respectively. There would be a potential severe impact at one planned development location in both scenarios.

Locations adjacent to the rail terminal, such as the north side of the historic station building, the REA Building, the US Securities and Exchange Commission Building, the Kaiser Permanente Medical Center, as well as multiple commercial residential uses along K Street NE, First Street NE, Second Street NE north of H Street, and Parker Street NE, would experience major adverse impacts in both scenarios. Locations that would experience lesser impacts in the Work Train Scenario are located along truck routes to and from the Project Area: First Street NE, Second Street NE, and K Street NE. The most notable difference would be on Second Street south of H Street, where several locations that would experience moderate adverse impacts in the All Truck Scenario would drop below the threshold in the Work Train Scenario.

End of Excavation

In the Preferred Alternative, at the end of excavation, there would be major adverse noise impacts at four receptor locations (both scenarios). There would be moderate adverse noise impacts at 20 receptor locations (All Truck Scenario) or 12 receptor locations (Work Train Scenario).

As excavation proceeds, noisy equipment would shift below grade, resulting in greater sound attenuation from the SOE structures and surrounding buildings, and lower noise levels at nearby receptors. By the end of the excavation work, noise levels would be significantly lower than at the start. In the All Truck Scenario, noise levels would be up to 88 dBA (Ldn). In the Work Train Scenario, noise levels would be up to 86 dBA (Ldn). Noise levels would be approximately 2 dBA (Ldn) higher in the All Truck Scenario than in the Work Train Scenario. The greatest differences would occur at the same locations as described for noise levels at the start of excavation.

Table 10-4 identifies the receptors where noise levels would exceed the criteria for severe or moderate impact in either scenario. **Figure 10-8** and **Figure 10-9** illustrate impacts in the All Truck Scenario and in the Work Train Scenario, respectively.

Noise levels would exceed the long-term construction noise impact criteria for severe or moderate impacts at much fewer locations than at the start of excavation. There would be major (severe) adverse impacts at only four receptors in either scenario. Moderate impacts would occur at 20 or 12 receptor locations depending on the scenario. The Work Train Scenario would result in substantially fewer impacts than the All Truck Scenario. Eight receptor locations that would experience a moderate impact in the latter would experience no impact in the former, especially along Second Street south of H Street.

Figure 10-6. Preferred Alternative Start of Excavation Noise Impacts (All Truck Scenario)

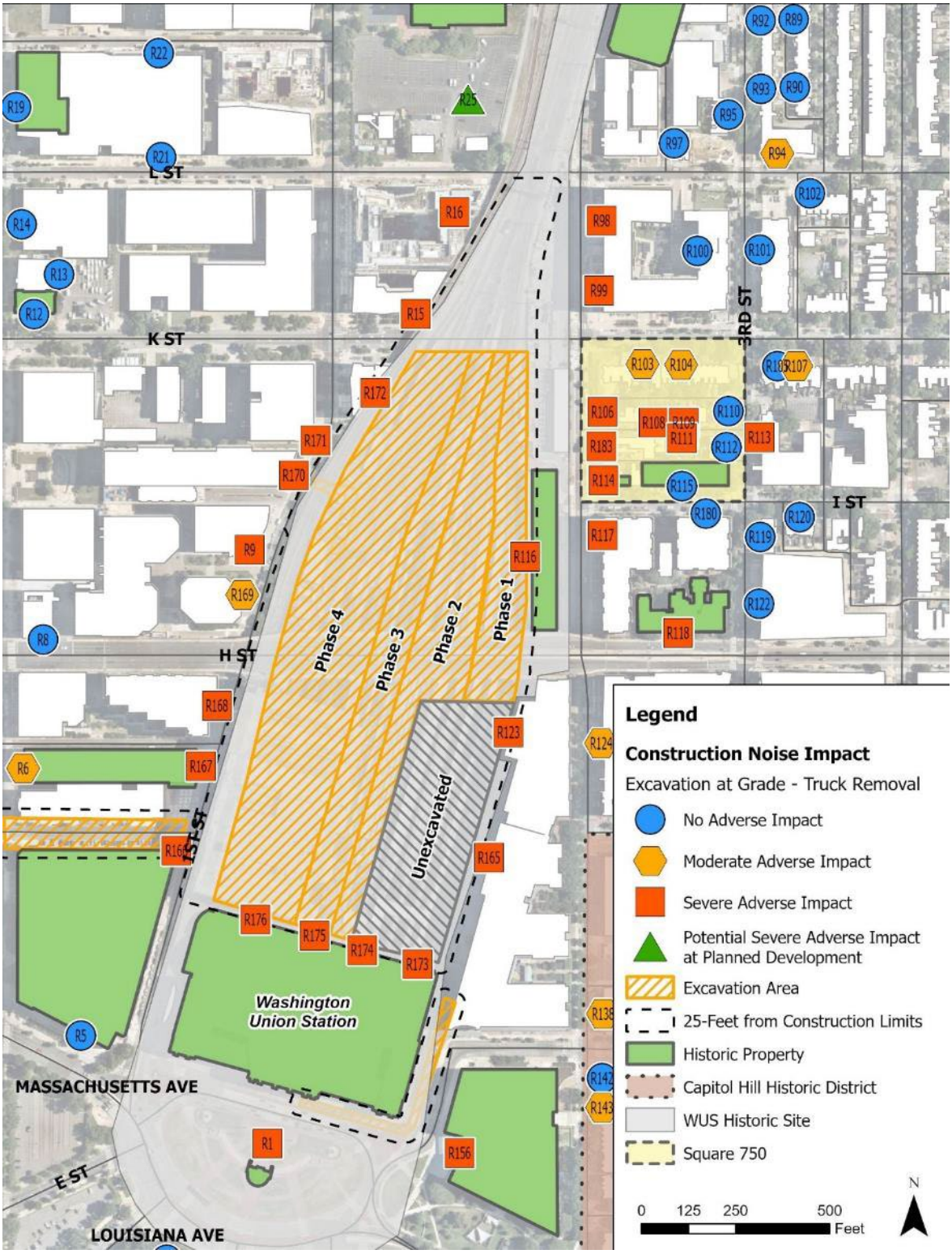


Figure 10-7. Preferred Alternative Start of Excavation Noise Impacts (Work Train Scenario)

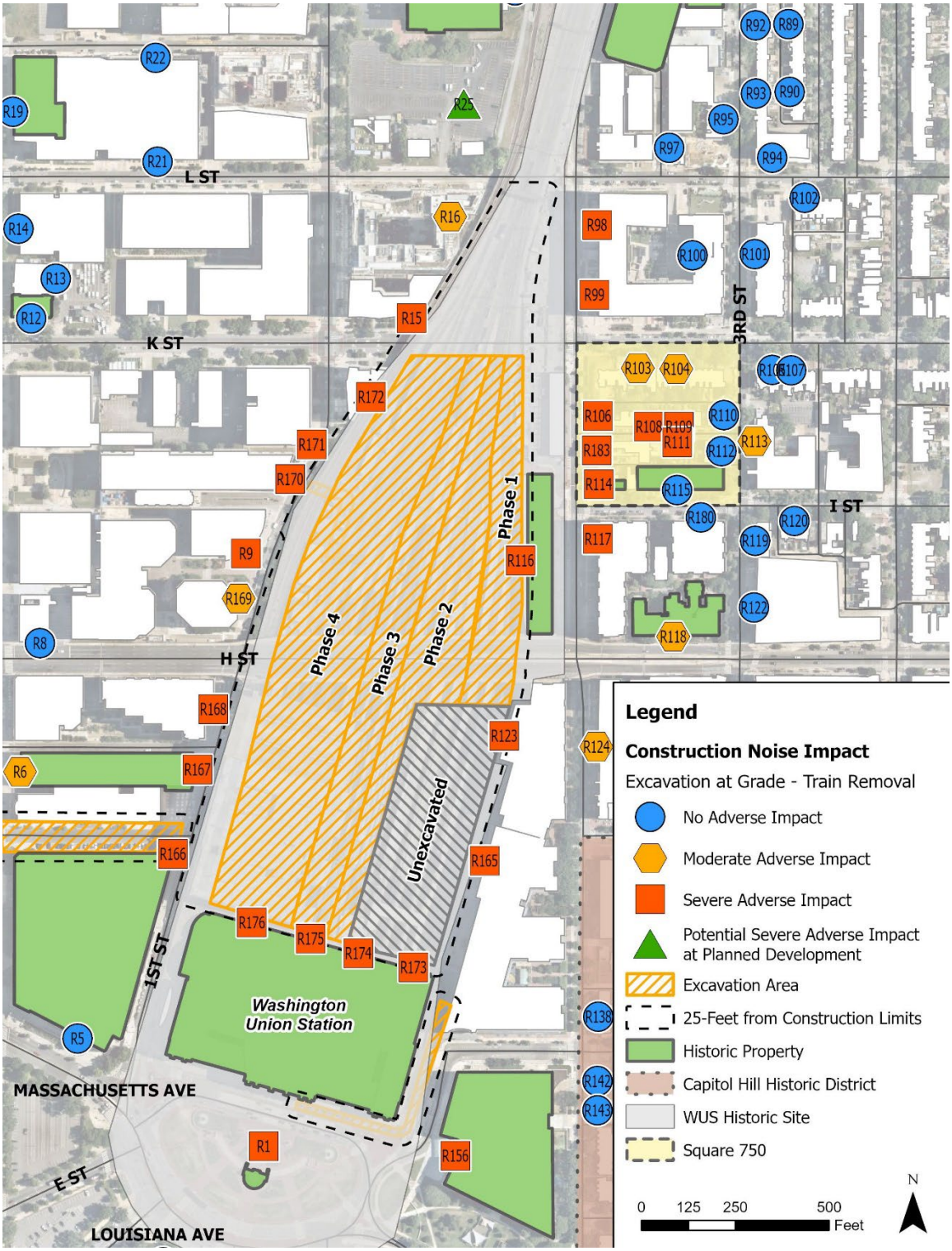


Table 10-3. Preferred Alternative Start of Excavation Noise Impact Assessment

Receptor	Address	Land Description	Historic?	Noise Level (Ldn, dBA)					Impact	
				Existing	Long-Term Construction Noise Impact Criteria		All Truck Scenario	Work Train Scenario	All Truck Scenario	Work Train Scenario
					Moderate	Severe				
R1	Columbus Circle	Columbus Circle	Yes	60.1	62.8	68.4	70.2	70.4	**Severe**	**Severe**
R4[3]	520 N Capitol St NE	Phoenix Park Hotel	No	67.4	62.5	67.7	65.5	63.8	Moderate	Moderate
R6	715 N Capitol St NE	US Printing Warehouse (Historic)	Yes	66.5	66.8	72.1	69.9	67.7	Moderate	Moderate
R9	1st St NE	CNN TV Studio	No	61.2	58.5	64.0	68.8	69.6	**Severe**	**Severe**
R15	100 K Street NE	Equity Residential	No	71.8	65.0	70.8	75.0	74.3	**Severe**	**Severe**
R16	1005 First Street NE	Revel at NoMA CNTR Apartments	No	70.4	64.7	69.8	70.5	68.1	**Severe**	Moderate
R25[1]	170 L Street NE	NoMA Station - Bristol Development	No	68.6	63.3	68.5	71.7	69.2	*Potentially Severe*	*Potentially Severe*
R94	300 L Street	The Aria on L (Top-level)	No	63.7	60.0	65.4	61.7	59.3	Moderate	No Impact
R98	230 K Street NE	Toll Brothers City Living	No	68.9	63.5	68.7	77.6	75.1	**Severe**	**Severe**
R99	230 K Street NE II	Toll Brothers City Living Phase II	No	67.9	62.8	68.1	76.3	73.8	**Severe**	**Severe**
R103	203-219 K Street NE	Residential	Yes	65.3	61.0	66.4	65.6	62.5	Moderate	Moderate
R104	221-243 K Street NE	Residential	Yes	64.4	60.4	65.8	64.9	61.7	Moderate	Moderate
R106	917-923 2nd Street NE	Residential	Yes	64.7	60.6	66.0	81.7	79.2	**Severe**	**Severe**
R107	301-319 K Street NE	Residential	No	62.9	59.5	65.0	62.0	57.8	Moderate	No Impact
R108	208-224 Parker Street NE	Residential	Yes	53.6	54.7	60.7	71.2	70.8	**Severe**	**Severe**
R109	226-242 Parker Street NE	Residential	Yes	49.8	53.3	59.5	66.7	65.3	**Severe**	**Severe**
R111	219-231 Parker Street NE	Residential	Yes	49.3	53.1	59.4	66.5	64.2	**Severe**	**Severe**
R113	907-913 3rd Street NE	Residential	No	57.7	56.6	62.3	62.5	60.4	**Severe**	Moderate
R114	220 I Street NE	Intern Housing	Yes	62.5	59.2	64.7	76.6	74.0	**Severe**	**Severe**
R116	900 2nd Street NE	Center City Public Charter School	Yes	72.1	70.0	76.0	91.4	88.9	**Severe**	**Severe**
R117[2]	201 I Street NE	Senate Square Apartments (First-level)	No	60.2	57.9	63.5	71.6	67.6	**Severe**	**Severe**
	201 I Street NE	Senate Square Apartments (Mid-level)	No	59.9	57.7	63.3	74.4	71.4		
	201 I Street NE	Senate Square Apartments (Top-level)	No	63.4	59.8	65.2	78.9	76.4		
R118	211 I Street NE	Landmark Lofts	Yes	68.0	62.9	68.1	69.8	66.8	**Severe**	Moderate
R123	700 2nd Street NE	Kaiser Permanente Medical Center	No	70.5	69.7	74.8	90.7	88.2	**Severe**	**Severe**
R124	701 2nd Street NE	Station House Apartments	No	61.0	58.4	63.9	63.4	59.0	Moderate	Moderate
R138	603-607 2nd Street NE	Residential	Yes	58.3	56.9	62.6	61.0	56.8	Moderate	No Impact
R139[3]	202-216 F St NE	Residential	Yes	54.7	55.2	61.1	56.6	54.7	Moderate	No Impact
R143	521-527 2nd Street NE	Residential	Yes	59.4	57.5	63.1	61.2	56.5	Moderate	No Impact
R144[3]	205-217 F St NE	Residential	Yes	55.7	55.6	61.4	57.0	55.0	Moderate	No Impact
R145[3]	219-231 F St NE	Residential	Yes	55.4	55.5	61.3	55.6	53.7	Moderate	No Impact
R151[3]	500-508 Groff Ct NE	Residential	Yes	31.2	41.2	46.7	44.8	44.7	Moderate	Moderate
R156	1 Columbus Circle NE	Thurgood Marshall Building (Historic)	Yes	55.8	60.7	66.5	69.4	69.8	**Severe**	**Severe**
R165[2]	100 F Street NE	US Securities and Exchange Commission (First-level)	No	66.9	67.1	72.4	87.1	84.6	**Severe**	**Severe**
	100 F Street NE - Mid	US Securities and Exchange Commission (Mid-level)	No	66.7	67.0	72.3	86.5	84.1		

Receptor	Address	Land Description	Historic?	Noise Level (Ldn, dBA)					Impact	
				Existing	Long-Term Construction Noise Impact Criteria		All Truck Scenario	Work Train Scenario	All Truck Scenario	Work Train Scenario
					Moderate	Severe				
	100 F Street NE - Top	US Securities and Exchange Commission (Top-level)	No	65.9	66.4	71.8	85.5	83.0		
R166	2 Mass Avenue NE	City Post Office (Postal Museum) – Construction Side	Yes	59.7	62.6	68.2	82.7	83.3	**Severe**	**Severe**
R167	10 G Street NE	US Printing Warehouse – Construction Side	Yes	61.9	63.9	69.4	71.9	72.9	**Severe**	**Severe**
R168	750 First Street NE	Union Station Redevelopment Corp	No	62.7	64.4	69.8	71.6	72.5	**Severe**	**Severe**
R169	810 First Street NE	Davita Union Plaza	No	62.8	64.4	69.9	68.4	69.3	Moderate	Moderate
R170	888 First Street NE	Federal Energy Reg Commission	No	63.2	64.7	70.1	73.6	75.0	**Severe**	**Severe**
R171	77 K Street NE	IRS Taxpayer Assistance Center	No	66.2	66.6	71.9	72.4	73.0	**Severe**	**Severe**
R172	111 K Street NE	NASPA	No	75.1	70.0	78.3	81.7	82.8	**Severe**	**Severe**
R173	Union Station	WUS - Tracks 25-28	Yes	62.3	64.1	69.6	89.4	86.9	**Severe**	**Severe**
R174	Union Station	WUS - Tracks 22-25	Yes	53.8	59.8	65.7	87.6	85.1	**Severe**	**Severe**
R175	Union Station	WUS - Tracks 10-12	Yes	54.5	60.1	66.0	88.5	86.0	**Severe**	**Severe**
R176	Union Station	WUS - Tracks 1-10	Yes	54.3	60.0	65.9	82.8	83.9	**Severe**	**Severe**
R183	911 2nd St NE	Pullman Place Condos	No	63.9	60.1	65.5	81.3	78.8	**Severe**	**Severe**

1. Planned developments are evaluated for noise effects but are only described as potential impacts; they are not counted as impacts of the Preferred Alternative.
2. Receptors with multiple heights are assessed at each level but are considered a single impact.
3. For the map to remain on a legible scale, this receptor is not shown in **Figure 10-6 and 10-7.**

Figure 10-8. Preferred Alternative End of Excavation Noise Impacts (All Truck Scenario)

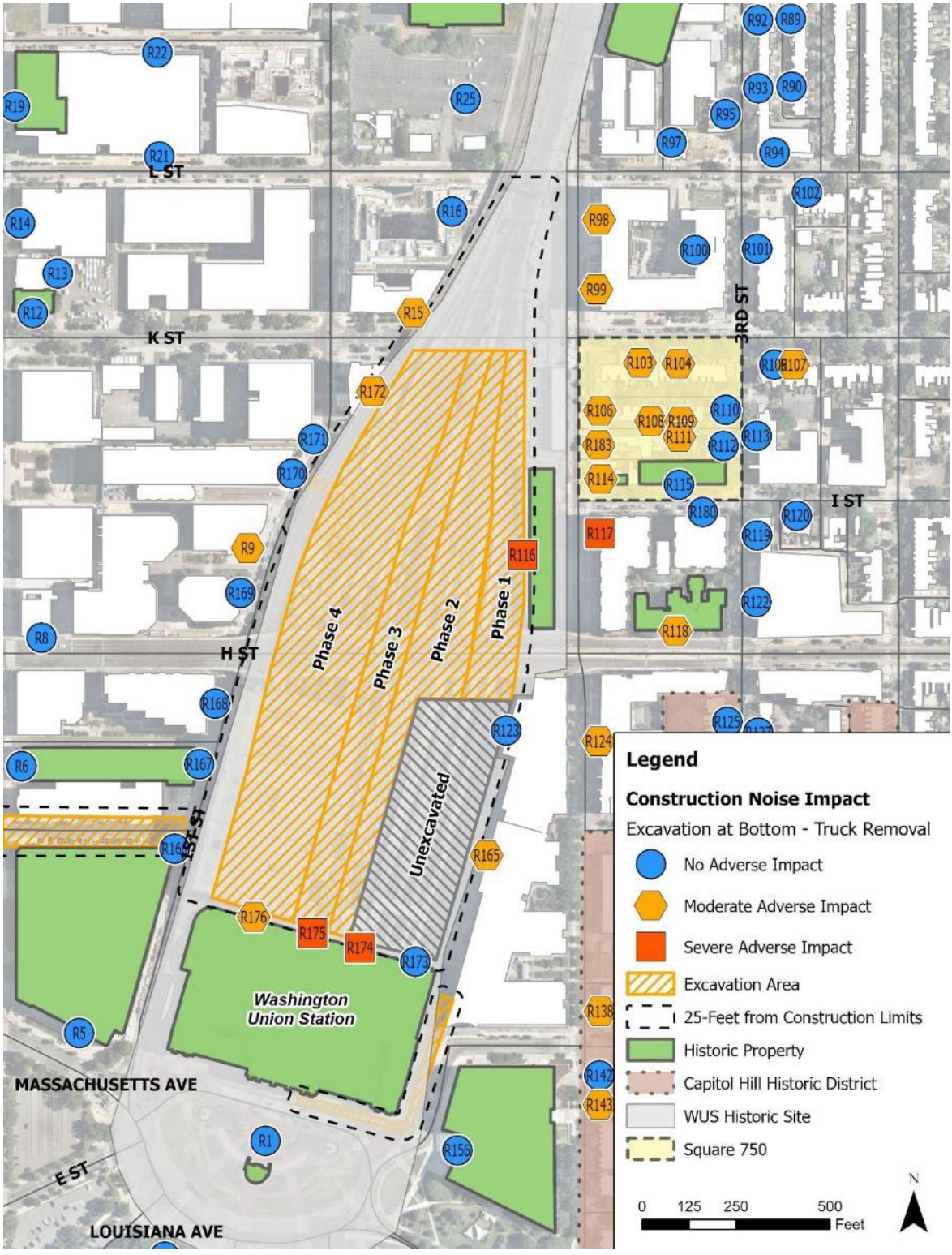


Figure 10-9. Preferred Alternative End of Excavation Noise Impacts (Work Train Scenario)

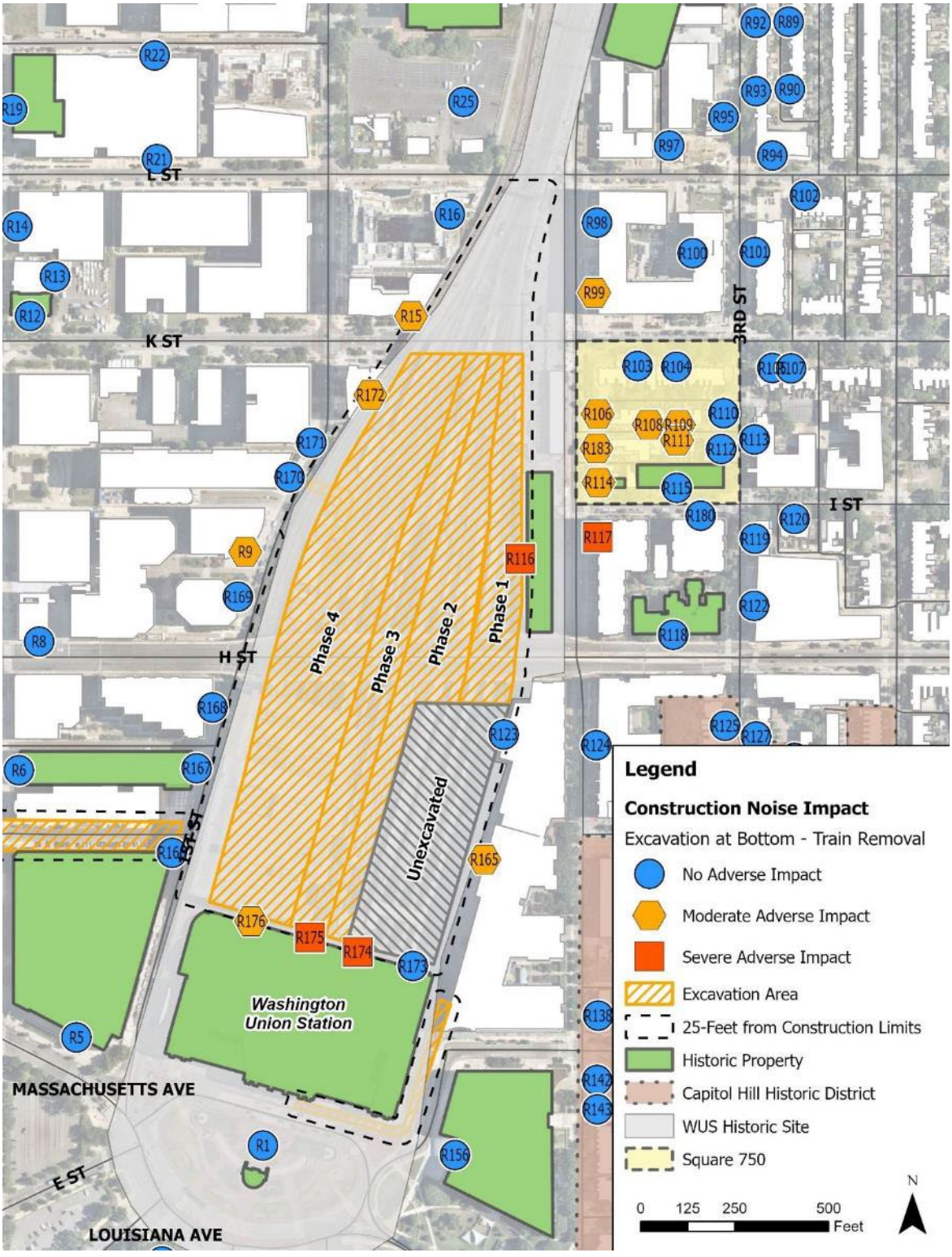


Table 10-4. Preferred Alternative End of Excavation Noise Impact Assessment

Receptor	Address	Land Description	Historic?	Noise Level (Ldn, dBA)					Impact	
				Existing	Long-Term Construction Noise Impact Criteria		Construction Noise (All Truck Scenario)	Construction Noise (Work Train Scenario	All Truck Scenario	Work Train Scenario
					Moderate	Severe				
R9	First Street NE	CNN TV Studio	No	61.2	58.5	64.0	61.9	59.5	Moderate	Moderate
R15	100 K Street NE	Equity Residential	No	71.8	65.0	70.8	69.4	67.4	Moderate	Moderate
R98	230 K Street NE	Toll Brothers City Living	No	68.9	63.5	68.7	65.1	63.0	Moderate	No Impact
R99	230 K Street NE II	Toll Brothers City Living Phase II	No	67.9	62.8	68.1	65.4	63.1	Moderate	Moderate
R103	203-219 K Street NE	Residential	Yes	65.3	61.0	66.4	61.1	56.7	Moderate	No Impact
R104	221-243 K Street NE	Residential	Yes	64.4	60.4	65.8	60.9	56.1	Moderate	No Impact
R106	917-923 2nd Street NE	Residential	Yes	64.7	60.6	66.0	65.4	62.6	Moderate	Moderate
R107	301-319 K Street NE	Residential	No	62.9	59.5	65.0	59.9	54.3	Moderate	No Impact
R108	208-224 Parker Street NE	Residential	Yes	53.6	54.7	60.7	58.9	56.6	Moderate	Moderate
R109	226-242 Parker Street NE	Residential	Yes	49.8	53.3	59.5	57.0	54.7	Moderate	Moderate
R111	219-231 Parker Street NE	Residential	Yes	49.3	53.1	59.4	56.8	54.5	Moderate	Moderate
R114	220 I Street NE	Intern Housing	Yes	62.5	59.2	64.7	64.5	61.5	Moderate	Moderate
R116	900 2nd Street NE	Center City Public Charter School	Yes	72.1	70.0	76.0	88.3	86.1	**Severe**	**Severe**
R117[1]	201 I Street NE	Senate Square Apartments (First-level)	No	60.2	57.9	63.5	62.5	58.8	Moderate	Moderate
		Senate Square Apartments (Mid-level)	No	59.9	57.7	63.3	66.2	63.5	**Severe**	**Severe**
		Senate Square Apartments (Top-level)	No	63.4	59.8	65.2	74.1	71.8		
R118	211 I Street NE	Landmark Lofts	Yes	68.0	62.9	68.1	64.0	60.0	Moderate	No Impact
R124	701 2nd Street NE	Station House Apartments	No	61.0	58.4	63.9	61.4	55.6	Moderate	No Impact
R138	603-607 2nd Street NE	Residential	Yes	58.3	56.9	62.6	59.2	49.6	Moderate	No Impact
R143	521-527 2nd Street NE	Residential	Yes	59.4	57.5	63.1	59.5	48.2	Moderate	No Impact
R165[1]	100 F Street NE	US Securities and Exchange Commission (Mid-level)	No	66.7	67.0	72.3	68.4	66.2	Moderate	No Impact
		US Securities and Exchange Commission (Top-level)	No	65.9	66.4	71.8	71.3	69.1		Moderate
R172	111 K Street NE	NASPA	No	75.1	70.0	78.3	72.0	70.0	Moderate	Moderate
R174	Union Station	WUS - Tracks 22-25	Yes	53.8	59.8	65.7	70.1	67.9	**Severe**	**Severe**
R175	Union Station	WUS - Tracks 10-12	Yes	54.5	60.1	66.0	78.6	76.4	**Severe**	**Severe**
R176	Union Station	WUS - Tracks 1-10	Yes	54.3	60.0	65.9	63.3	61.1	Moderate	Moderate
R183	911 2nd St NE	Pullman Place Condos	No	63.9	60.1	65.5	65.4	62.5	Moderate	Moderate

1. Receptors with multiple heights are assessed at each level but are considered a single impact. Receptors that would experience different impacts at different levels are reported as experiencing the greater impact.

10.5.3.3 Construction Vibration

In the Preferred Alternative, there would be a major adverse impact from vibration during SOE construction on the REA Building, the Kaiser Permanente Medical Center, and the Union Station historic station building due to potential risk of structural damage. Another major adverse impact with potential risk of structural damage would occur at the City Post Office (Postal Museum) during construction of the G Street ramp. There would be moderate adverse impacts from truck-generated vibration at 14 locations due to annoyance.

Vibration generated by construction equipment has the potential to cause structural damage to buildings close to the construction site and to annoy persons in nearby buildings. Activities that would generate vibration in the Preferred Alternative includes drilling during secant pile wall construction; vibratory sheet pile driving; dropping clam shovels and impact pile driving during slurry wall construction; use of hoe rams and jackhammers during concrete removal; use of excavators, back hoes, loaded trucks during excavation; mounted impact hammers during ramp construction; and use of vibratory rollers used for track re-construction. Vibratory pile driving associated with the sheet pile wall SOE has the potential to cause structural damage within 31 feet of the most fragile buildings and within 13 feet of buildings with reinforced concrete, steel, or timber frames. Drilling associated with secant pile wall SOE has the potential to cause structural damage within 20 feet of the most fragile buildings and within 8 feet of buildings with reinforced concrete, steel, or timber frames.

Figure 10-10 and **Table 10-5** present the results of the construction equipment vibration assessment for the Preferred Alternative. There would be major adverse impacts on the REA Building (R116, along the eastern edge of the rail terminal just north of H Street NE), the Kaiser Permanente Medical Center (R 123, along the eastern edge of the rail terminal just south of H Street NE), and the Washington Union Station historic station building (R173-176) because vibratory pile driving would occur within 10 to 16 feet of these structures, resulting in vibration levels of approximately 0.33 to 0.67 inches per second (in/s). Another major impact would occur at the City Post Office (Postal Museum) where mounted impact hammers could be used as close as 5 feet from the building, resulting in vibration levels of approximately 0.39 in/s. In its initial stages, the beginning of the column removal work may generate vibration impacts within the eastern part of the historic station building if jackhammers are to break the existing flooring and access girders and column from above. Such impacts would be of brief duration.

Vibration levels at the four above buildings may exceed the criterion for increased risk of structural damage, but this would depend on building sensitivity, which in turn is a function of the type of construction. All four buildings were designed within the context of an active rail terminal and are all large masonry structures. Therefore, they can be expected to have low sensitivity, reducing the risk of structural impact. However, as historic structures, the REA Building, the City Post Office (Postal Museum), and the historic station building may warrant the application of a lower criterion than the one applicable to buildings of similar construction but more recent. The sensitivity of the buildings would have to be assessed in the Construction Noise and Vibration Plan that would be prepared for the Project (see **Section 10.7**, *Avoidance, Minimization, and Mitigation Evaluation*).

Interior vibration conditions at the same four receptors may range from 80 to 90 VdB, which would exceed the threshold for human annoyance; however, these impacts would only occur when vibration-generating work is conducted near the buildings. Vibration annoyance typically would not occur beyond 50 feet of the vibration source.

Vibration from truck traffic would cause moderate adverse impacts by exceeding the threshold for annoyance at 14 other locations close to New York Avenue, North Capitol Street, Second Street NE, and 1st Street NE. These locations include UDC Community College (R8); the C&P Telephone Company/NPR Studio building (R19); the Hecht Warehouse lofts (R58); 203-219 K Street NE (R103), 917-923 Second Street NE (R106); residential and institutional receptors on the edge of the Capitol Hill Historic District, 603-607 Second Street NE (R138), 205 F Street NE (R142), 521-527 Second Street NE (R143); Landmark Lofts (R118) in the historic St. Joseph's Home building; the Selina Hotel (R62); and the New York Men's Emergency Shelter (R168). These impacts would occur in the All Truck Scenario. Vibration in the Work Train Scenario would be much less noticeable.

10.6 Summary of Impacts

Table 10-6 summarizes the impacts of the No-Action Alternative and the Preferred Alternative.

Figure 10-10. Preferred Alternative Construction Vibration Impacts

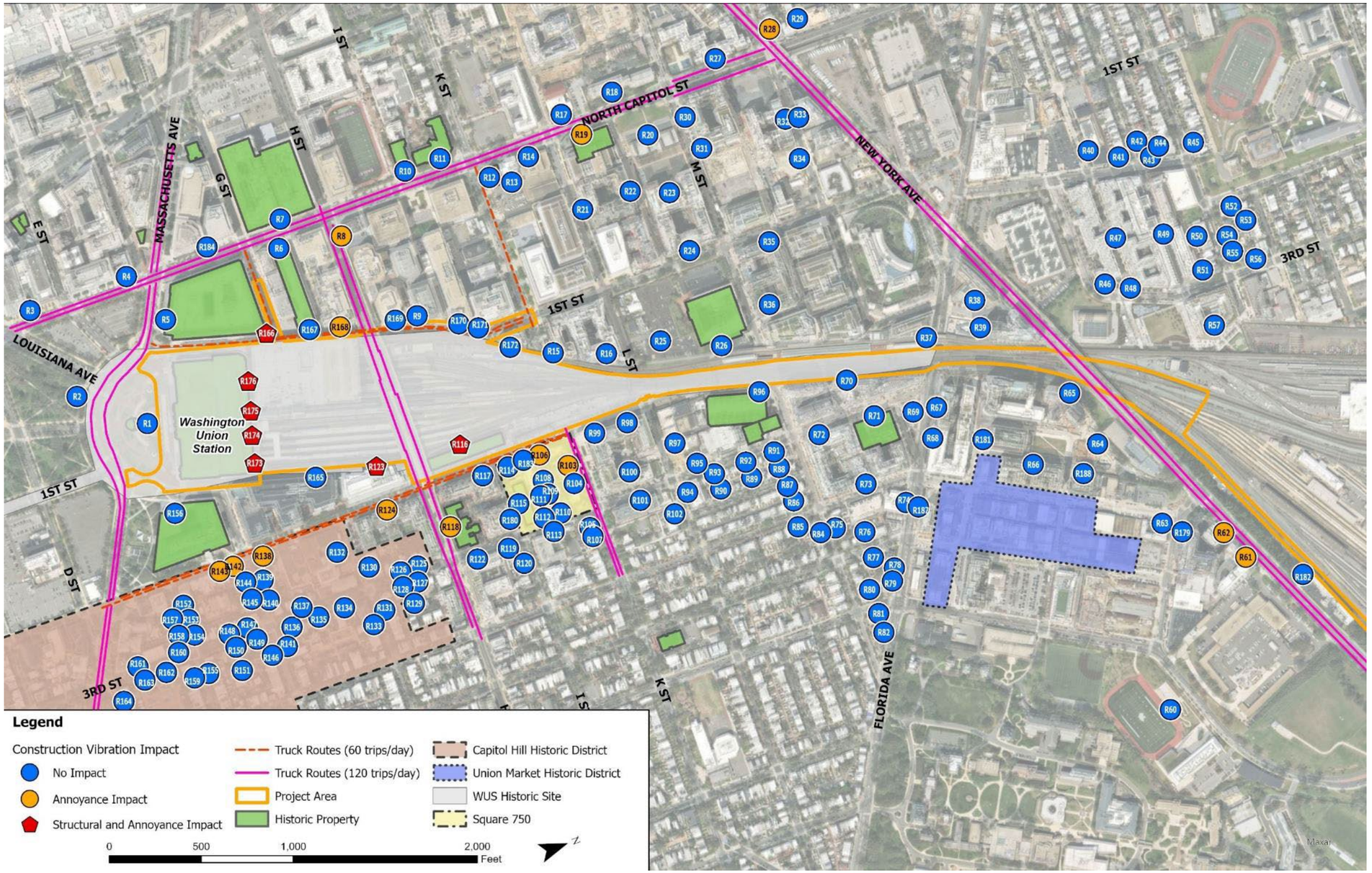


Table 10-5. Preferred Alternative Construction Vibration Impact Assessment

Receptor	Address	Land Description	Historic?	Equipment	Distance (feet)	PPV (in/s)	Exterior Vibration Level (VdB)	Building Coupling Loss (VdB)	Interior Vibration Level (VdB)	Impact Criteria for Annoyance (VdB)	Impact
R8	801 N Capitol Street NE	UDC Community College	-	Trucks	15	0.16	93.7	13	81	75	Annoyance
R19	1111 N Capitol Street NE	C&P Telephone Company/NPR Studio	Yes	Trucks	34	0.05	83.0	13	70	65	Annoyance
R28	3-9 New York Avenue NW	Residential	-	Trucks	30	0.06	84.8	7	78	72	Annoyance
R58[1]	1401 New York Avenue NE	Hecht Warehouse Lofts	-	Trucks	25	0.08	87.0	13	74	72	Annoyance
R61	501 New York Avenue NE	Homewood Suites and Hampton	-	Trucks	25	0.07	86.9	13	74	72	Annoyance
R62	411 New York Avenue NE	Selina Hotel	-	Trucks	19	0.12	90.7	13	78	72	Annoyance
R103	203-219 K Street NE	Square 750 / Residential	Yes	Trucks	45	0.03	79.5	7	72	72	Annoyance
R106	917-923 2nd Street NE	Square 750 / Residential	Yes	Trucks	38	0.04	81.4	7	74	72	Annoyance
R116	900 2nd Street NE	REA Building/Center City Public Charter School	Yes	Vibratory Pile Driver	16	0.33	99	13	86	75	**Structural**/ Annoyance
				Drill Rig	16	0.17	93	13	80	75	**Structural**/ Annoyance
R118	211 I Street NE	St Joseph's Home (Former)/Landmark Lofts	Yes	Trucks	25	0.08	87.2	13	74	72	Annoyance
R123	700 2nd Street NE	Kaiser Permanente	-	Drill Rig	10	0.35	99	13	86	75	**Structural**/ Annoyance
R124	701 2nd Street NE	Station House Apartments	-	Trucks	25	0.07	86.8	13	74	72	Annoyance
R138	603-607 2nd Street NE	Capitol Hill District / Residential	Yes	Trucks	28	0.06	85.6	7	79	72	Annoyance
R142	205 F Street NE	Capitol Hill District / National Community Church	Yes	Trucks	24	0.08	87.3	7	80	75	Annoyance
R143	521-527 2nd Street NE	Capitol Hill District / Residential	Yes	Trucks	25	0.08	87.2	7	80	72	Annoyance
R166	2 Massachusetts Avenue NE	City Post Office (Postal Museum)	Yes	Mounted Impact Hammer	5	0.39	100	13	92	75	**Structural**/ Annoyance

Receptor	Address	Land Description	Historic?	Equipment	Distance (feet)	PPV (in/s)	Exterior Vibration Level (VdB)	Building Coupling Loss (VdB)	Interior Vibration Level (VdB)	Impact Criteria for Annoyance (VdB)	Impact
R168	750 1st Street NE	New York Men's Emergency Shelter	-	Trucks	9	0.35	100	13	87	75	Annoyance
R173-176	Union Station	Washington Union Station	Yes	Vibratory Pile Driver	10	0.67	105	13	92	75	**Structural**/ Annoyance
				Drill Rig	10	0.35	99	13	86	75	**Structural**/ Annoyance

1. For the map to remain on a legible scale, this receptor is not shown in **Figure 10-10**.

Table 10-6. Summary of Impacts

Type of Impact	No-Action Alternative	Preferred Alternative
Direct Operational Noise Impacts	**Beneficial impacts**: Decreases in noise south of K Street NE due to private air rights development. **Negligible Adverse impacts**: Noise increases typically less than 1 dBA further away from private air rights development	**Moderate adverse** impacts at **14** locations
Noise Impacts during SOE Construction	N/A	**Major adverse** impacts at **32** locations and **moderate adverse** impacts at **8** locations
Noise Impacts at Start of Excavation	N/A	**All Truck Scenario:** **Major adverse** impacts at **29** locations and **moderate adverse** impacts at **14** locations
		Work Train Scenario: **Major adverse** impacts at **26** locations and **moderate adverse** impacts at **10** locations
Noise Impacts at End of Excavation	N/A	**All Truck Scenario:** **Major adverse** impacts at **4** locations and **moderate adverse** impacts at **20** locations
		Work Train Scenario: **Major adverse** impacts at **4** locations and **moderate adverse** impacts at **12** locations
Direct Operational Vibration Impacts	**Negligible adverse impacts:** Vibration would be similar to existing conditions at most locations and would remain below the FTA criteria	**Minor adverse**, localized vibration impacts
Construction Vibration Impacts	N/A	**Major Adverse** impacts at **4** locations **Moderate adverse** impacts at **14** locations

10.7 Avoidance, Minimization, and Mitigation Evaluation

Noise mitigation depends on the need, feasibility, reasonableness, and effectiveness of the potential options. Moderate impacts are caused by changes in the cumulative noise level that are noticeable to most people but may not be sufficient to generate strong, adverse reactions. Severe impacts are expected to highly annoy a significant percentage of the local population. The anticipated level of noise impact is an important factor in determining the need for mitigation. Severe noise impacts create the most compelling need for mitigation, though moderate noise impacts should also be considered for mitigation, especially when they are anticipated to last for a significant period.

For severe noise impacts, most rail infrastructure projects implement mitigation measures that account for safety, constructability, acoustical effectiveness, and cost effectiveness. For moderate noise impacts, mitigation is implemented accounting for the same factors but also considering where the impacts stand within the range of moderate noise impact criteria and the sensitivity of the affected receptors. The following sections describe mitigation measures FRA is proposing to avoid, minimize, or mitigate severe and moderate adverse impacts.

10.7.1 Operational Noise and Vibration

In the Preferred Alternative, there would be moderate noise impacts at 14 existing locations and severe impacts at no locations. These impacts would primarily be caused by increases in train operations and traffic. Future noise levels would typically be within 3 dBA or less of existing and No-Action Alternative levels, which is at the lower end of the moderate impact range.

Options for mitigating increases in traffic noise in an urban setting are very limited. Speed restrictions would not substantially reduce traffic noise and further truck route restrictions are generally not warranted. Noise barriers along the railroad corridor to reduce train noise would be ineffective at most upper-floor receptors and would conflict with planned developments and urban design considerations. Based on these considerations, FRA is not proposing to mitigate the moderate operational noise impacts of the Preferred Alternative.

10.7.2 Construction Noise and Vibration

Construction noise impacts would occur during SOE construction and throughout excavation in the Preferred Alternative. Construction noise levels would exceed the District's noise ordinance and FTA's long-term construction noise impact criteria. Without mitigation, this would result in major adverse impacts. Construction vibration would potentially create a risk of structural damage at up to four buildings adjacent to SOE or ramp activities, resulting in a major adverse impact without mitigation. The Preferred Alternative would cause moderate vibration impacts from truck traffic, potentially causing human annoyance at 14 receptors close to New York Avenue, North Capitol Street, and Second Street NE.

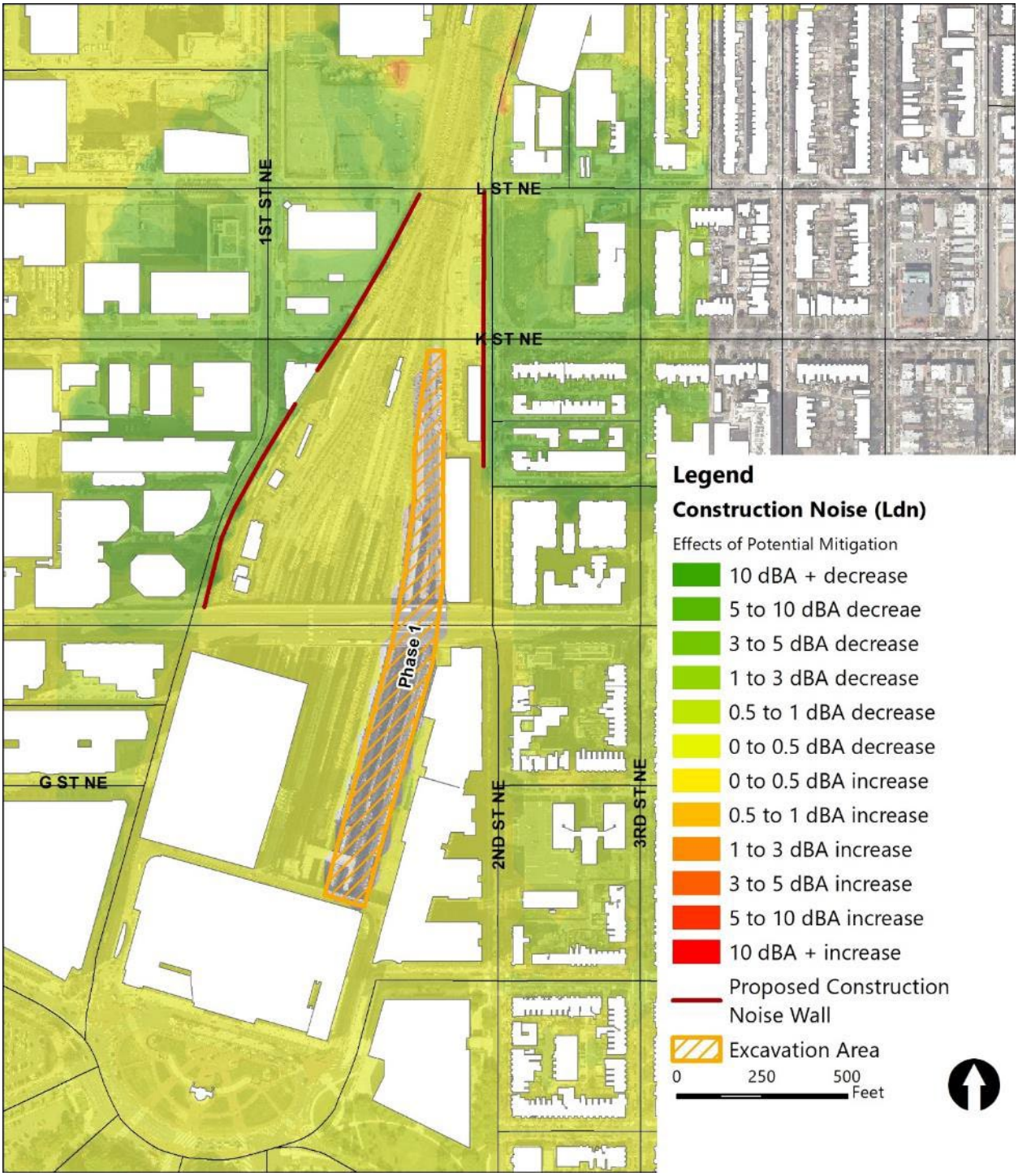
Therefore, given the long duration of construction activities in the Preferred Alternative and the proximity of sensitive receptors to the Project Area, USRC would require the construction contractor to prepare and implement a Construction Noise and Vibration Control Plan. This plan would include detailed predictions of construction noise and vibration levels; requirements for conducting construction noise and vibration monitoring; and, if necessary, detailed approaches to mitigate potential construction-period noise and vibration impacts. The plan would set acceptable vibration limits and address the need to conduct pre-construction crack surveys, install crack detection monitors, and conduct vibration monitoring. It would define a process to alert the contractor of any limit exceedances and implement corrective actions. The Construction Noise and Vibration Plan would also contain a public engagement plan specifying measures that would be implemented to inform neighbors and other relevant parties of anticipated noisy activities, noise or vibration level exceedances, and measures to be taken to remedy these exceedances.

The following are typical construction noise mitigation measures known to be effective in minimizing noise from both stationary equipment and truck traffic. At a minimum, these measures would be included in the Construction Noise and Vibration Control Plan unless equivalent, but more Project-or location-specific measures are identified during the preparation of the plan:

- Ensuring equipment is properly functioning and equipped with mufflers and other noise-reducing features.
- Locating especially noisy equipment as far from sensitive receptors as possible.
- Using quieter construction equipment and methods, as feasible.
- Using path noise control measures such as temporary noise barriers, portable enclosures for small equipment (such as jackhammers and concrete saws).
- Replacing back up alarms with strobes, if and as allowed by Occupational Safety and Health Administration (OSHA) regulations.
- Maintaining smooth truck route surfaces within and next to the Project Area.
- Establishing and implementing procedures to maintain robust communications with neighbors.

If warranted by the projections in the Construction Noise and Vibration Control Plan, USRC would require the construction of a temporary noise wall approximately 12 feet tall along the perimeter of the Project Area where there are no adjacent buildings. Such a wall would be effective in reducing construction noise at ground level by up to 10 dBA at receptors close to the Project Area, as shown in **Figure 10-11**.

Figure 10-11. Noise Reduction from Potential Perimeter Wall During Excavation



Construction vibration from drilling during secant pile wall construction, vibratory sheet pile driving, and clam shovel operation during slurry wall construction as well as mounted impact hammers for ramp construction may increase the risk of structural damage at four buildings, including the historic station building, the REA Building, the City Post Office (Postal Museum), and the Kaiser Permanente Medical Center. Therefore, USRC would require that, as part of the preparation of the Construction Noise and Vibration Control Plan, the buildings at risk be assessed to determine the appropriate threshold applicable to each based on its type of construction and condition. The plan would define measures to be taken to minimize the risk of damage based on these thresholds. As warranted by the assessment and projections in the Construction Noise and Vibration Control Plan, and as technically feasible, alternative construction methods would be implemented, including but not limited to:

- Using a hydromill instead of a clam shovel for slurry wall construction when working close to a building. A clam shovel may increase the risk of damage to fragile buildings within 34 feet, as opposed to eight feet for a hydromill.
- Using push-in type sheeting equipment rather than vibratory equipment to install sheet-pile walls.
- Using sonic drill rigs instead of traditional drill rigs. Sonic rigs help break up the soil, can speed up the drilling process, and reduce vibration levels at nearby buildings.

USRC would coordinate with Amtrak to evaluate and maximize to the extent practicable the use of work trains instead of dump trucks to haul away excavation spoil. This approach would substantially eliminate the work truck traffic associated with excavation. Typical construction truck traffic would be addressed by the Construction Management Plan.

Other measures USRC would require the Construction Noise and Vibration Control Plan to include in order to minimize annoyance from truck traffic are:

- When there is a choice, requiring construction trucks to use those truck routes with the fewest residential receptors.
- Limiting truck speeds or directing trucks to use the travel lanes farthest from receptors on multi-lane roads such as New York Avenue.

10.8 Permits and Regulatory Compliance

There are no formal permits required to demonstrate regulatory compliance with regard to operational noise and vibration impact assessment. Construction in the District is allowed without a permit only Monday through Saturday, from 7 AM to 7 PM. Construction work outside these times requires a permit.[211]

[211] District Department of Buildings. *Noise Regulations*. Accessed from https://dob.dc.gov/node/1620796. Accessed on March 13, 2023.

11 Aesthetics and Visual Quality

11.1 Overview

This section addresses the potential impacts of the Preferred Alternative on aesthetics and visual quality. Because of its size and high visibility, the Project has the potential to affect the visual quality and character of the Project Area and surrounding views and vistas. This section also identifies measures that the Federal Railroad Administration (FRA) is proposing to avoid, minimize, or mitigate potential adverse impacts as well as relevant permitting and regulatory compliance requirements.

11.2 Regulatory Context

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 11.2, *Regulatory Context*.

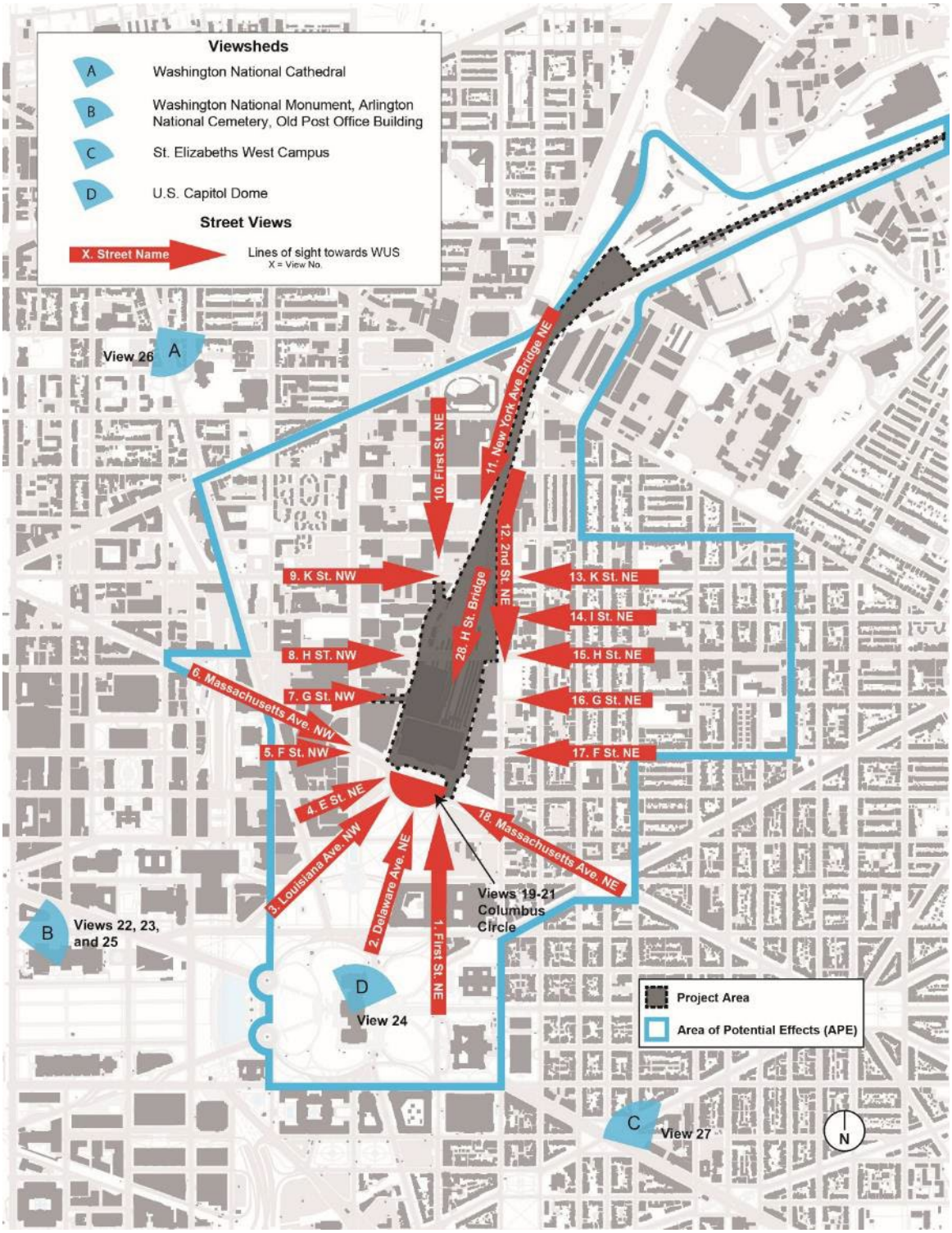
11.3 Study Area

Figure 11-1 shows the Local Study Area for aesthetic and visual impactsError! Reference source not found. It is identical to the Area of Potential Effects (APE) defined as part of the Section 106 review process for the Project. This is because of the close connection between impacts on visual quality and impacts on historic properties, as the visual setting of a historic property is often an important part of its historic integrity. Using a common study area allows the evaluation of aesthetic and visual impacts to inform the Section 106 evaluation.

The assessment of impacts on aesthetics and visual quality was conducted based on 22 significant street views and six culturally significant viewsheds (Arlington National Cemetery, the Old Post Office Building, the Washington Monument, the U.S. Capitol Dome, the Washington National Cathedral, and St. Elizabeths West Campus) with views to the Project Area (viewsheds A, C, and D contain one view each and viewshed B containing three views). A total of 28 views, shown in **Figure 11-1,** were assessed.

There is no Regional Study Area for this resource because there is no potential for visual impacts outside the Local Study Area as defined above.

Figure 11-1. Significant Street Views Towards the Project Area and Significant Viewsheds



11.4 Methodology

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 11.4, *Methodology*.

Like in the 2020 DEIS, the impacts analyses for the Preferred Alternative are based on visual simulations that were developed by superimposing building volumes that convey only building mass, height, and setbacks, without any specific design or architectural elements. However, in the 2020 DEIS, the building volumes for the private and potential Federal air rights developments were based on maximum allowable zoning volumes. In this SDEIS, they are based on more refined assumptions about mass, height, and setback, developed in collaboration with the private air rights developer during the post-2020 DEIS refinements.

Visual impacts were assessed by reviewing the compatibility and sensitivity of the visual changes for both the Preferred Alternative and the private and Federal air rights developments. The analysis does not consider architectural features that may affect compatibility and sensitivity and avoid or mitigate the impact.

11.5 Impacts of the Preferred Alternative

This section presents the impacts of the Preferred Alternative on aesthetics and visual quality. Impacts are first summarized in bold lettering, followed by a supporting description and analysis. Direct and indirect operational impacts, and construction impacts are considered. A brief assessment of the Preferred Alternative's impacts relative to existing conditions is also provided.

Appendix C3aS, *Aesthetics and Visual Quality: Supplemental Visual Assessment*, presents a detailed evaluation of the visual impacts of the Preferred Alternative, including photo-simulations, for each of the 28 views and viewsheds included in the Study Area. The findings below are based on the analyses presented in **Appendix C3aS**.

11.5.1 Direct Operational Impacts

Relative to the No-Action Alternative, the Preferred Alternative would result in negligible adverse direct operational visual impacts on two views and beneficial direct operational visual impacts on two views out of the 28 views that were assessed.

As detailed in **Appendix C3aS**, *Aesthetics and Visual Quality: Supplemental Visual Assessment*, the visual impact assessment conducted for the Preferred Alternative showed that the Preferred Alternative would have direct operational impacts on four views out of the 28 views evaluated. **Table 11-1** shows these impacts.

Table 11-1. Preferred Alternative Direct Operational Visual Impacts

Impact	Number of Views Affected	Views Affected[1]
Negligible Adverse	2	K Street NW, looking east (#9); Columbus Circle Drive, east side (#20)
Beneficial	2	G Street NW, looking east (#7); Columbus Circle Drive, west side (#21)

1. # refers to the number assigned to the view in **Figure 11-1**.

The Preferred Alternative would have a negligible direct operational impact on two views. While some Project elements would be somewhat visible from these views, they would be barely noticeable, either because they would occupy space currently occupied by similar built elements (as in View #9) or because the mass of the private air rights development would obscure or encompass them (as in View #20). Relative to the No-Action Alternative, the Preferred Alternative would not change the character of these views.

The Preferred Alternative features an east-west train hall and integrated bus facility that would expand the width of the rail terminal. The existing parking garage would be removed and the portion of the garage projecting over the service roadway on the west side would be eliminated, re-establishing views along First Street NE. This would result in a beneficial impact on the view from the west side of Columbus Circle Drive (View #21). There would also be a beneficial impact on the view from G Street NW, looking east (View #7), as the Preferred Alternative's elements would be less visible than the existing garage.

11.5.2 Indirect Operational Impacts

Relative to the No-Action Alternative, the Preferred Alternative would result in adverse indirect operational impacts on seven views out of the 28 views that were assessed.

As detailed in **Appendix C3aS**, *Aesthetics and Visual Quality: Supplemental Visual Assessment*, the visual impact assessment conducted for the Preferred Alternative showed that the Preferred Alternative would have direct operational impacts on seven views out of the 28 views evaluated. These indirect impacts would be caused by the mass and height of the potential Federal air rights development. They are listed in **Table 11-2**.

Table 11-2. Preferred Alternative Indirect Operational Visual Impacts

Impact	Number of Views Affected	Views Affected[1]
Moderate Adverse	1	Delaware Avenue NE, looking northeast (#2)
Minor Adverse	2	First Street NE, looking north (#1); Louisiana Avenue NW, looking northeast (#3)
Negligible Adverse	4	E Street NE, looking northeast (#4); F Street NW, looking east (#5), view from the U.S. Capitol Dome (#24); H Street Bridge, looking south (#28)

1. # refers to the number assigned to the view in **Figure 11-1**.

Delaware Avenue is one of three radial streets (the others being Louisiana Avenue NW and First Street NE) that provide direct views to WUS from the south, visually connecting it with the U.S. Capitol and Capitol Grounds. This relationship played an important role in determining the site and design of WUS. The existing view is dominated by the uninterrupted silhouette of the barrel-vault roof and wide tree-lined streets currently used for U.S. government parking. The views are characterized by the prominence of the historic station building and Columbus Plaza, designed by D.H. Burnham and Company and completed in 1908 and 1912, respectively.

Relative to the No-Action Alternative, the Preferred Alternative would have a moderate indirect impact on the view from Delaware Avenue NE (View #2) because the potential Federal air rights development would be highly noticeable from there, rising above the roofline of the west pavilion of WUS. The impact would be moderate because the Federal air rights and the private air rights developments would balance each other out, resulting in a visual symmetry behind WUS that would attenuate the impact.

The Preferred Alternative would also have minor indirect impacts on two views. It would be somewhat visible from First Street (View #1) and Louisiana Avenue (View #3) but would also be balanced out by the private air rights development, and generally would not change the character of the views.

Finally, the potential Federal air rights development would have negligible impacts on four views. While visible from these views (barely so in the case of View #5), it would blend in with its surroundings, which would be dominated by the private air right development or other existing buildings.

11.5.3 Construction Impacts

Construction of the Preferred Alternative would result in negligible adverse impacts on twelve views and minor adverse impacts on six views out of the 28 views that were assessed. One view would have a moderate construction-related visual impact.

Construction of the Preferred Alternative would change the appearance of the rail terminal and its immediate surroundings for the duration of the construction period, approximately 13 years. Features typical of a large construction site such as perimeter fencing, cranes and other large equipment, stockpiles of materials or debris, and partially built structures would be fully or partially visible from outside the Project Area. This would affect the visual quality of several views around WUS.

Based on distance, perspective, and the anticipated location and height of heavy construction equipment and activities, construction of the Preferred Alternative would result in negligible adverse impacts on the following views: Views #1, 2, 3, 4, 8, 9, 13, 16, 19, 20, 21, and 24. Distance or intervening structures would hide most of the construction equipment or activities from those views.

The Preferred Alternative would result in minor adverse impacts on Views #7, 10, 11, 12, 14, and 15. Construction equipment and activities would be distinctly visible from those views for at least part of the construction period. Impacts would be minor for the following reasons. The function of the Project Area as a rail terminal already gives it a semi-industrial appearance. Visually, construction would accentuate this aspect of the Project Area rather than represent a major change in visual quality. Also, although construction would take place over more than a decade, the focus of activities, and the corresponding impacts, would change over time. This would make the impacts of constructing the Preferred Alternative on any single view similar to those of most large-scale construction projects in the District despite the long overall duration of the construction activities. In general, impacts would be greater during Phases 1 and 4, when the focus would be on the eastern and western edges of the terminal, respectively, than during Phases 2 and 3, when activities would be in the middle of the terminal and less visible from outside. Impacts would be least during the 12-month period when only column removal work in the First Street Tunnel would take place.

Construction would have a moderate impact on one view from the H Street Bridge (#28) due to the proximity of the construction relative to the bridge and passers-by.

11.5.4 Comparison to Existing Conditions

Relative to existing conditions, the Preferred Alternative would result in adverse direct and indirect operational visual impacts on 17 views and a beneficial impact on two views, as shown in **Table 11-3**. In general, impacts relative to existing conditions would be greater than relative to the No-Action Alternative because the changes caused by the Preferred Alternative would be more noticeable without the private air-rights development.

Table 11-3. Direct and Indirect Impacts Relative to Existing Conditions

Impact	Number of Views Affected	Views Affected[1]
Major Adverse	3	First Street NE, looking north (#1); Delaware Avenue NE, looking northeast (#2); H Street Bridge, looking south (#28)
Moderate Adverse	5	Louisiana Avenue NW looking northeast (#3); First Street NE, looking south (#10); New York Avenue Bridge, looking south (#11); view from Second Street NE and K Street NE, looking south (#12); view from U.S. Capitol Dome, looking northeast (#24)
Minor Adverse	2	H Street NE, looking west (#15); Columbus Circle Drive, east side (#20)
Negligible Adverse	7	E Street NE, looking northeast (#4); F Street NW, looking east (#5); H Street NW, looking east (#8); K Street NW, looking east (#9); K Street NE, looking west (#13); G Street NE, looking west (#16); view from the Washington Monument (#22)
Beneficial	2	G Street NW, looking east (#7); Columbus Circle Drive, west side (#21)

1. # refers to the number assigned to the view in **Figure 11-1**.

11.6 Summary of Impacts

Table 11-4 provides a summary of the operational, permanent impacts of the No-Action Alternative and the Preferred Alternative (relative to the No-Action Alternative) for all views.

Table 11-4. Summary of Impacts

View	No-Action Alternative	Preferred Alternative[1]
1. First Street NE, view looking north	Major adverse	*Minor adverse*
2. Delaware Avenue NE, view looking northeast	Major adverse	*Moderate adverse*
3. Louisiana Avenue NW, view looking northeast	Major adverse	*Minor adverse*
4. E Street NE, looking northeast	Moderate adverse	*Negligible adverse*
5. F Street NW, view looking east	None	*Negligible adverse*
6. Massachusetts Avenue NW, view looking east	None	None
7. G Street NW, view looking east	None	Beneficial
8. H Street NW, view looking east	Minor adverse	None
9. K Street NW, view looking east	Minor adverse	Negligible adverse
10. First Street NE, view looking south	Moderate adverse	None
11. New York Avenue Bridge NE, view looking south	Major adverse	None
12. Second Street NE, view looking south	Major adverse	None
13. K Street NE, view looking west	Moderate adverse	None

View	No-Action Alternative	Preferred Alternative[1]
14. I Street NE, view looking west	Moderate adverse	None
15. H Street NE, view looking west	Minor adverse	None
16. G Street NE, view looking west	Minor adverse	None
17. F Street NE, view looking west	Negligible adverse	None
18. Massachusetts Avenue NE, view looking northwest	Negligible adverse	None
19. View from Columbus Plaza	Minor adverse	None
20. View from Columbus Circle Drive – East Side	Moderate adverse	Negligible adverse
21. View from Columbus Circle Drive – West Side	None	Beneficial
22. View from Washington Monument	Negligible adverse	None
23. View from Arlington House at Arlington National Cemetery	None	None
24. View from U.S. Capitol Dome	Moderate adverse	*Negligible adverse*
25.View from the Old Post Office Building	Negligible adverse	None
26. View from Washington National Cathedral	None	None
27. View from St. Elizabeths West Campus	None	None
28. View from H Street Bridge	Major adverse	*Negligible adverse*
Total Views with No Impact	7	17
Total Views with Negligible Adverse Impact[2]	4 (2)(0)	6 (2)(4)
Total Views with Minor Adverse Impact[2]	5 (5)(0)	2 (0)(2)
Total Views with Moderate Adverse Impact[2]	6 (6)(0)	1 (0)(1)
Total Views with Major Adverse Impact[2]	6 (6)(0)	0
Total Views with Beneficial Impacts[2]	0	2 (2)(0)

1. Italics indicate an indirect impact.
2. Total/(direct impact)/(indirect impact)

11.7 Avoidance, Minimization, and Mitigation Evaluation

To avoid, minimize, or mitigate adverse impacts, FRA is proposing that USRC design the Project with context-compatible architecture and materials, and in a manner that is sensitive to surrounding structures. Decisions regarding the design of the future private air-rights development would be made by the property owner.

11.8 Permits and Regulatory Compliance

The National Capital Planning Commission (NCPC) and the Commission of Fine Arts (CFA) would review the Project for final approval, including perimeter and exterior security elements. Typically, NCPC reviews at pre-design/programming, during schematic design (preliminary review), and at design development (final review). CFA reviews at the concept design phase and the final design phase.

In addition, any reviews stipulated as part of a Programmatic Agreement resulting from the Section 106 process or as part of the Record of Decision would have to be performed. The approval of the design is critical because design would contribute greatly to the compatibility and sensitivity of the aesthetic and visual quality of the Project. For all views where the Preferred Alternative was found to cause an adverse impact, the Project design may contribute to avoiding this impact.

All further regulatory compliance would follow Federal and District regulations and guidelines concerning aesthetics or changes to the visual resource including:

- Urban Design Element: The Comprehensive Plan for the National Capital (from NCPC)
- National Capital Urban Design and Security Plan Objectives and Policies (NCPC, 2005)
- Executive Order 1259 – CFA Review of Public Buildings in the District of Columbia Proposed by the Federal or DC governments;
- Shipstead-Luce Act of 1930 (Public Law 71-231, Public Law 76-248);
- Executive Order 1862 – CFA Review of New Structures and Matters of Art Proposed by the Federal Government in DC;
- Executive Order 11593 – Protection and Enhancement of the Cultural Environment;
- The Historic Landmark and Historic District Protection Act of 1978 (D. Law 2-144, as amended through October 1, 2016); and
- The Height of Buildings Act of 1910.

12 Cultural Resources

12.1 Overview

This section describes the impacts of the Preferred Alternative on cultural resources. "Cultural resources" for the purposes of this section include the historic properties evaluated as part of the Section 106 of the National Historic Preservation Act of 1966 (Section 106) process for the Washington Union Station (WUS) Expansion Project (Project). These historic properties consist of districts, buildings, sites, structures, and objects included in or eligible for inclusion in the National Register of Historic Places (NRHP) and the District of Columbia Inventory of Historic Sites (DC Inventory); properties that fall within the purview of the Architect of the Capitol (AOC) and are listed as AOC Heritage Assets; and properties that are under the jurisdiction of the National Park Service's National Mall and Memorial Parks.

The Federal Railroad Administration (FRA) completed a Supplemental Assessment of Effects (SAOE) in compliance with Section 106 to evaluate how the Preferred Alternative would affect historic properties. The SAOE is included in the Supplemental Draft Environmental Impact Statement (SDEIS) as **Appendix D1S**.

The cultural resource impact assessment presented in this section derives from the findings of the SAOE. It also incorporates information from the September 2017 *Identification of Historic Properties for the Washington Union Station Expansion Project Report*, which can be found in Appendix D1a of the 2020 DEIS.

This section also identifies measures that FRA is proposing to avoid, minimize, or mitigate potential adverse impacts as well as relevant permitting and regulatory compliance requirements.

12.2 Regulatory Context

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 12.2, *Regulatory Context*.

12.3 Study Area

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 12.3, *Study Area*.

The Local Study Area consists of the Area of Potential Effects (APE) defined in consultation with the District State Historic Preservation Office (SHPO) and the Section 106 Consulting Parties as part of the Section 106 review process. The APE is the geographic area in which an undertaking may directly or indirectly affect historic properties.[212] A description of the process for developing the APE is available in Appendix D1a, *WUS Expansion Project, Area of Potential Effects Report* of the 2020 DEIS.[213] The inventory of historic properties in the APE is documented in Appendix D1, *WUS Expansion Project, Draft Assessment of Effects Report*, of the 2020 DEIS.

The Local Study Area contains 55 cultural resources (see **Figure 12-1**), including six culturally significant viewsheds (Washington National Cathedral, Washington National Monument, Old Post Office Building, Arlington National Cemetery, U.S. Capitol Dome, and St. Elizabeths West Campus). The viewsheds represent topographic high points or are referenced in the *Federal Urban Design Element of the Comprehensive Plan for the District of Columbia*.[214]

There is no Regional Study Area because the Project has no potential to affect cultural resources beyond the Local Study Area.

12.4 Methodology

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 12.4, *Methodology*.

12.5 Impacts of the Preferred Alternative

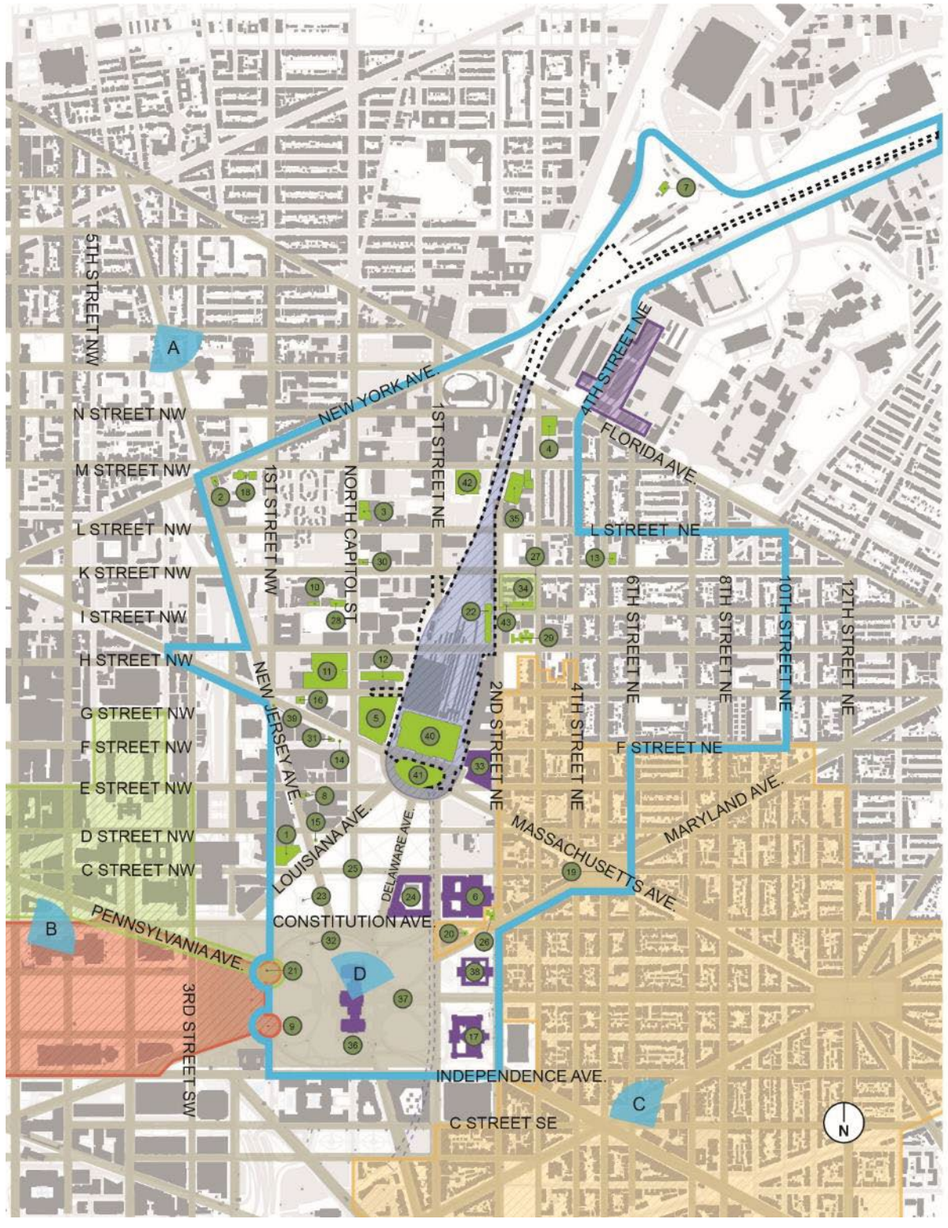
This section presents the impacts of the Preferred Alternative on cultural resources. Impacts are first summarized in bold lettering, followed by a supporting description and analysis. Direct and indirect operational impacts, and construction impacts are considered. The analysis of impacts and the proposed avoidance, minimization, and mitigation measures are based on the SAOE. A NEPA finding of major adverse impact corresponds to a finding of Adverse Effect or Potential Adverse Effect under Section 106. NEPA findings of negligible, minor, or moderate impacts correspond to a finding of No Adverse Effect under Section 106. Operational impacts are assessed relative to existing conditions, as in the SAOE. This approach is required for the Section 106 process and maintains consistency between the National Environmental Policy Act (NEPA) and Section 106 reviews. A briefer assessment relative to the No-Action Alternative is also provided.

[212] 36 CFR 800.16. *Protection of Historic Properties*. 2004. Accessed from https://www.achp.gov/sites/default/files/regulations/2017-02/regs-rev04.pdf. Accessed on March 10, 2023.

[213] The DC SHPO concurred with the APE by letter dated September 29, 2017.

[214] National Capital Planning Commission. 2016. *The Comprehensive Plan for the National Capital: Federal Elements*. Accessed from https://www.ncpc.gov/plans/compplan/. Accessed on March 10, 2023.

Figure 12-1. APE and Cultural Resources



Project Area

Area of Potential Effects (APE)

Washington Union Station Expanion Project Section 106 Area of Potential Effects and Identification of Historic Properties

Historic Districts and Sites

Capitol Hill Historic District	NR; DC	Pennsylvania Avenue National Historic Site	NR; DC
National Mall Historic District	NR; DC	Union Market Historic District	NR; DC
L'Enfant - McMillan Plan	NR; DC	Washington Union Station Historic Site	[NR and DC Eligible]
		First Street Tunnel (Below-grade)	

Historic Properties

Architect of the Capitol Heritage Assets

AOC Architect of the Capitol
NHL National Historic Landmark
NR National Register of Historic Places
NPS National Park Service
DC District of Columbia Inventory of Historic Sites

1	Acacia Building	[Potentially NR and DC Eligible]	24	Russell Senate Office Building	AOC
2	Augusta Apartment Building (and Louisa Addition)	NR; DC	25	Senate Parks, Underground Garage, and Fountains	AOC
3	C&P Telephone Company Warehouse	NR; DC	26	Belmont-Paul Women's Equality National Monument	NHL; NR; DC
4	Capital Press Building (Former)	[Potentially NR and DC Eligible]	27	Square 750 Rowhouse Development	[Potentially NR and DC Eligible]
5	City Post Office (Postal Museum)	DC	28	St. Aloysius Catholic Church	NR; DC
6	Dirksen and Hart Senate Office Buildings	AOC	29	St. Joseph's Home (Former)	[Potentially NR and DC Eligible]
7	Eckington Power Plant; Coach Yard Power Plant	[DC Eligible]	30	St. Phillip's Baptist Church	DC
8	Engine Company No. 3	DC	31	SunTrust Bank (Former Childs Restaurant)	[Potentially NR and DC Eligible]
9	Garfield Memorial	AOC	32	The Summerhouse	AOC
10	Gonzaga College High School	[Potentially NR and DC Eligible]	33	Thurgood Marshall Federal Judiciary Building	AOC
11	Government Printing Office	DC	34	Topham's Luggage Factory (Former)	[Potentially NR and DC Eligible]
12	Government Printing Office Warehouse No. 4	[Potentially NR and DC Eligible]	35	Uline Ice Company Plant and Arena Complex	NR; DC
13	Hayes School	DC	36	United States Capitol	AOC
14	Holodomor Ukrainian Holocaust Memorial	NPS	37	United States Capitol Square	AOC
15	Japanese American Memorial to Patriotism During WWII	NPS	38	United States Supreme Court	AOC
16	Joseph Gales School	DC	39	Victims of Communism Memorial	NPS
17	Library of Congress, Thomas Jefferson Building	AOC	40	Washington Union Station (WUS)	NR; DC
18	M Street High School (Perry School)	NR; DC	41	WUS Plaza (Columbus Plaza) and Columbus Fountain	NR; DC
19	Major General Nathaneal Greene Statue	NR; DC	42	Woodward and Lothrop Service Warehouse	NR; DC
20	Mountjoy Bayly House	NHL; NR	43	901 Second Street NE	[Potentially NR and DC Eligible]
21	Peace Monument	AOC			
22	Railway Express Agency Building	[DC Eligible]			
23	Robert A. Taft Memorial	AOC			

Viewsheds

- A Washington National Cathedral
- B Washington Monument, Arlington National Cemetery, Old Post Office Building
- C St. Elizabeths West Campus
- D U.S. Capitol Dome

Effect analysis indicated that of the cultural resources included in the Study Area, 27 (including the Arlington National Cemetery, St. Elizabeths West Campus, Old Post Office, and Washington National Cathedral viewsheds) would experience no noticeable changes in the Preferred Alternative. This is because these resources are too far from the Project Area to be physically affected; experience changes in noise or vibration levels; or afford distinct views of the Project. Therefore, there would be no impacts on those resources. The unaffected resources are identified in **Table 12-3** below (grayed out rows). These 27 resources are not discussed further in this section.

12.5.1 Direct Operational Impacts

12.5.1.1 Physical Impacts

Relative to existing conditions, the Preferred Alternative would have major adverse direct operational physical impacts on WUS and the WUS Historic Site, a minor adverse direct operational physical impact on the L'Enfant-McMillan Plan, and a potential adverse direct operational physical impact on the REA Building.

Washington Union Station

The Preferred Alternative would result in a major physical adverse direct operational impact on WUS. It would involve the demolition of the Claytor Concourse (a non-historic portion of the station constructed in 1988) and construction of a new passenger concourse (Concourse A) and train hall north of the historic station building. This would affect the north façade of the Retail and Ticketing Concourse, which was previously altered by the construction of the Claytor Concourse. The Retail and Ticketing Concourse originally featured an immense opening leading to the tracks and platforms. It was punctuated by a colonnade of nine steel-plated Doric columns with cast-iron capitals spaced evenly along its length. Currently, a section of the entablature, supported by the Doric columns, is the only original fabric that remains visible from within the Claytor Concourse, but it is possible that the Doric columns are still in place, encapsulated by the Claytor Concourse.

The Preferred Alternative also includes work to remove columns in the portion of the First Street Tunnel below the Retail and Ticketing Concourse. This would involve accessing the tunnel from above and demolishing a portion of the floor (approximately 15,000 square feet). The floor is constructed of steel girders and I-beams spaced at intervals of 4 to 5 feet on center. The current marble finish was installed in the 1980s and is not part of the historic fabric of the building. However, the spaces between these beams are filled with terra cotta-tile arches that are part of the original fabric. Adverse physical effects due to the demolition of the original floor structure and removal of the original steel columns would be minimized or avoided, as the design would adhere to the *Secretary of the Interior's Standards for the Treatment of Historic Properties*.

Washington Union Station Historic Site

The Preferred Alternative would result in a major adverse direct operational physical impact to the WUS Historic Site. The Preferred Alternative would involve extensive modifications to the railroad terminal,

including the reconstruction of all tracks, platforms, and associated infrastructure. Reconstruction of the rail terminal would require the removal of numerous contributing structures throughout the historic site. These would include the K Tower, all existing platforms, umbrella sheds, catenary poles, catenary with cross beam, signal bridges, and pneumatic switch valves. The bridge underpass at H Street NE (which was closed and used to support WUS after the construction of the H Street Bridge in 1976) would be removed and converted to a concourse. Ventilation intake may require the insertion of vents in the southwest portion of the historic retaining walls (Burnham Wall).

New ramps, replacing existing parking garage ramps, would be constructed along the eastern and western sides of WUS. The new ramps would allow for bicycle, pedestrian, and—in rare occasions—vehicular circulation between the new deck or the bus facility and the front of the station at Columbus Plaza. On the east side, there would also be a one-way ramp from the belowground facility to the front of the station. The new bicycle and pedestrian ramps would be smaller than the existing ones. The new ramp from the below-ground facility would create an additional physical and visual change on the east side. Originally, the areas where the ramps are located were bordered by the wings of the Retail and Ticketing Concourse. The wings were removed in the 1970s to enable the construction of the Metrorail station and the existing parking garage ramps. The new ramps would continue conditions that affect the integrity of design of the WUS Historic Site.

The multiple changes in the defining features of the WUS Historic Site that would occur in the Preferred Alternative would be detrimental to the site's integrity of design, setting, materials, workmanship, feeling, and association.

L'Enfant-McMillan Plan

The Preferred Alternative would construct a two-way ramp on G Street NE, a street that that is part of the L'Enfant Plan for the City of Washington. The ramp would provide access to and from the below-ground pick-up and drop-off facility. Such a change would be a minor impact on the L'Enfant-McMillan Plan's overall integrity of design, which covers approximately 3,565 acres in the District. The affected section of G Street NE would remain active and continue to connect North Capitol and First Streets NE. The site's integrity of feeling and association are connected to its design, which is characterized by the relationships between the diagonal and orthogonal streets, the open space geometries, and the views and vistas created by the streets and open space. Such relationships would not be affected by the Preferred Alternative. The physical impact of the Preferred Alternative on this resource would be minor.

Railway Express Agency (REA) Building

As defined in the NRHP Nomination Form, the REA Building occupies Lot 812 of Square 717 in the District. The historic property boundary, which is the same as the parcel boundary, is approximately 63,000 square feet in size. It is located between Second Street NE and the eastern edge of the WUS rail terminal. To the south, the parcel partially overlaps with the old H Street alignment (H Street Tunnel), with direct access from the tunnel into the basement of the REA Building.

In the Preferred Alternative, construction of the new H Street Concourse along the alignment of the H Street Tunnel would require using the part of the historic property parcel that overlaps with the

alignment (approximately 9,800 square feet). Construction of the H Street concourse would also require modifying or eliminating the connection between the tunnel and the building. At the present stage of design, it cannot be determined how this would affect the REA Building. However, there is potential for a direct adverse impact on the REA Building.

12.5.1.2 Visual Impacts

Relative to existing conditions, in the Preferred Alternative, visual changes would result in major adverse direct operational impacts on WUS, the WUS Historic Site, and REA Building; moderate adverse direct operational impacts on two other cultural resources; minor adverse direct operational impacts on six, and negligible adverse direct operational impacts on two. The Preferred Alternative would also result in a beneficial direct operational impact on two cultural resources.

The Preferred Alternative would result in direct changes to the visual environment of 15 cultural resources, as described below. Visual changes caused by the Preferred Alternative would have major adverse impacts on WUS, the WUS Historic Site, and the REA Building.

These major adverse impacts would result from the reconstruction of the rail terminal and construction on Project elements south of H Street NE, including the new train hall. This would eliminate or substantially alter historic visual connections between and within these properties, adversely affecting their integrity of setting, feeling, and association.

In various degrees, the Preferred Alternative would also affect views toward the properties, although these alterations, described in the SAOE (**Appendix D1S**), would not by themselves constitute a major impact. Visual changes from the Preferred Alternative would cause moderate adverse impacts on two resources: the City Post Office (Postal Museum) and the Thurgood Marshall Building.

The Preferred Alternative would be visible from the east elevation of the City Post Office (Postal Museum). The G Street NE vehicular ramp providing access to the below-ground pick-up and drop-off facility would be visible from the north elevation. Details on the wayfinding for the new ramp and other WUS-related wayfinding, which are still undefined, may add to the visual impacts. Based on the visibility and sensitivity of the resource to these changes, this would be a moderate visual impact because, while readily noticeable, the changes would not diminish the integrity of the resource. The building's architectural characteristics would not be affected. Its setting, defined by connections to WUS, Columbus Plaza, Massachusetts Avenue, and the Senate parks, would remain unaffected as well.

Elements of the Project, including the train hall and ramps along the east side to the station, would be visible from the Thurgood Marshall Building. Based on the visibility and sensitivity of the resource to these changes, this would be a moderate visual impact. It would not diminish the resource's integrity of setting, which is characterized by existing, modern institutional buildings to the north, open space to the west, and the visual connection to the WUS historic building, Columbus Plaza, and the AOC campus to the south. These connections would not be affected.

Visual changes from the Preferred Alternative would cause minor adverse impacts on six resources: Square 750 Rowhouse Development; St. Joseph's Home (Former); Woodward and Lothrop Service Warehouse; Capitol Hill Historic District; the U.S. Capitol Dome Cultural Viewshed; and the L'Enfant-

McMillan Plan. While elements of the Project would be visible from the first four of these resources, they have low sensitivity to these changes, as they do not derive their significance from their visual connection to WUS. Views from the U.S. Capitol dome are more sensitive to WUS, and the new train hall would be visible behind the historic station building. However, the train hall would not rise above the horizon, and no other element of the viewshed would be changed.

Visual changes would occur along multiple streets of the L'Enfant-McMillan Plan, with varying degrees of visibility and sensitivity, depending on the street and the distance from the Project Area. Project elements would be visible from the south, east, and west. Views from First Street NE looking north; Delaware Ave NE looking north/northeast; and Louisiana Avenue NE looking northeast are the most sensitive. Although elements of the Project would be visible from these locations, no spatial corridors or vistas along contributing streets and avenues would be obstructed. The removal of the existing parking garage would open up the view to the station from G Street NE, resulting in a beneficial visual impact, even with the addition of a new ramp and associated signage. Similarly, removal of the existing parking garage would have a beneficial impact on views from the west side of Columbus Circle, as it would reestablish the view along First street NE. As a whole, while the Preferred Alternative would have potential major visual effects from two contributing streets south of WUS (Delaware Avenue and First Street NE), the setting of the L'Enfant-McMillan Plan, which is connected to the site's architectural design and the resulting vistas, would not change from the existing conditions. The Preferred Alternative would not diminish the L'Enfant-McMillan Plan's significance or integrity. The adverse impact would be minor.

Visual changes from the Preferred Alternative would cause negligible adverse impacts on two resources: Uline Ice Company Plant and Arena Complex, and the Washington National Monument Cultural Viewshed. From these resources, the Project would be barely noticeable and this slight change in the visual environment would not affect their integrity.

The Preferred Alternative would have beneficial impacts on two resources: the Government Printing Office (GPO) building and GPO Warehouse No. 4. In both cases, the beneficial impact would result from the removal of the existing parking garage.

12.5.1.3 Noise and Vibration

Relative to existing conditions, noise and vibration in the Preferred Alternative would result in minor adverse direct operational impacts on three cultural resources and negligible adverse direct operational impacts on 18 other cultural resources.

Noise from traffic in the Preferred Alternative would result in minor adverse operational impacts on the following cultural resources: St. Joseph's Home (Former); Square 750 Rowhouse Development (K Street NE side); and Uline Ice Company Plant and Arena Complex. The operational noise and vibration analysis presented in **Section 10.5.1.1**, *Operational Noise,* shows that increased street traffic would cause noise levels to exceed the Federal Transit Administration (FTA) criterion for a moderate impact at or near these three resources. However, the resulting adverse impact would be minor because the noise increase would be less than 3 dBA, which would be imperceptible to most people. Such a change would not compromise the resources' integrity of setting, feeling, or association. Additionally, all three

resources have experienced increased traffic on nearby streets and the construction of adjacent multi-story residential, commercial, and mixed-use developments, which have already altered their respective settings. The minimal additional noise from the Preferred Alternative would not compromise their integrity of setting (St. Joseph's Home and Square 750 Rowhouse Development) or association (Uline Ice Company Plant and Arena Complex) further.

There would be negligible adverse impacts from increases in ambient noise relative to existing conditions at or near 18 other cultural resources: the C&P Telephone Company Warehouse; the City Post Office (Postal Museum); GPO Building; GPO Warehouse No.4; Holodomor Ukrainian Holocaust Memorial; REA Building; Senate Parks, Underground Garage, and Fountains; St. Aloysius Catholic Church; St. Phillip's Baptist Church; Thurgood Marshall Federal Judiciary Building; Topham's Luggage Factory (Former); WUS; WUS Historic Site; Columbus Plaza; Woodward and Lothrop Service Warehouse; 901 Second Street NE; the Capitol Hill Historic District (along Second Street NE); and the L'Enfant-McMillan Plan. At these locations, noise levels would increase by be less than 3 dBA and the resulting noise levels would not exceed FTA criteria. The change in noise would not compromise the resources' integrity of setting, feeling, or association.

The operational vibration analysis for the Preferred Alternative indicated that changes in vibration levels throughout the Local Study Area would be negligible and would not affect the integrity of any cultural resource.

12.5.1.4 Traffic

Increased traffic volumes in the Preferred Alternative would result in a minor adverse direct operational impact on the Capitol Hill Historic District and in negligible adverse direct operational impacts on 18 other cultural resources.

Noise and vibration are the main source of traffic-related impacts on cultural resources; however, increases in traffic volumes along nearby streets may cause visual impacts, conflicts with pedestrians and bicyclists, and disturbances affecting access to homes and businesses that can potentially affect the integrity of a cultural resource's setting, feeling, or association.

In general, urban resources and resources with periods of significance later than the generalization of motor vehicle travel may be assumed to be less sensitive to such impacts than rural resources or resources pre-dating the widespread use of the automobile. In urban settings, such as the District of Columbia, resources originally designed for institutional, commercial, and industrial uses, or those within long-established commercial, industrial, and high-density areas can be assumed to be less sensitive than resources originally intended for residential, cultural, or recreational uses, or resources located in residential or low-density neighborhoods. Given its residential character and period of significance, the Capitol Hill Historic District may be considered especially sensitive to impacts from increases in vehicular traffic.

Anticipated traffic impacts in the Preferred Alternative are addressed in **Section 5.5.1.12**, *Vehicular Traffic*. Relative to existing conditions, the Preferred Alternative is anticipated to see an increase in traffic volumes in the vicinity of WUS caused by greater station activity, in combination with the

development of the private air rights above the rail terminal and general background economic and demographic growth. Traffic impact modeling indicates that adverse impacts would be concentrated along a few major thoroughfares, especially North Capitol Street and K Street as well as, to a lesser extent, H Street and Massachusetts Avenue. H Street and Massachusetts Avenue border or traverse the Capitol Hill Historic District. There could potentially be an adverse impact on the Capitol Hill Historic District if congestion in the district increased, including because of drivers taking short cuts through residential streets as a result of congestion on nearby thoroughfares.

Table 12-1 shows the intersections included in the traffic impact analysis that are in or along the edges of the historic district, along with existing and future levels of service (LOS) in the Preferred Alternative.

Table 12-1. Existing and Preferred Alternative Levels of Service at Intersections in or near the Capitol Hill Historic District

Intersection	Existing Condition Peak LOS (AM/PM)	Preferred Alternative Peak LOS (AM/PM)
H and 3rd Streets NE	E/C	F/D
H and 4th Streets NE	B/B	C/B
Second and G Streets NE	B/B	C/B
Second and F Streets NE	B/B	C/C
Second Street and Massachusetts Avenue NE	C/C	C/D
Second and D Streets NE	D/F	D/D
4th Street and Massachusetts Avenue NE	C/D	D/D

While several LOS would deteriorate, several would not change, and in one case, there would be an improvement from F to D at Second and D Streets NE in the PM peak. With one exception (H and 3rd Streets NE in the AM peak), all LOS would be acceptable (D or better). The Third and H Street NE intersection is adjacent to but not in the Capitol Hill Historic District. Whether the AM LOS condition at this intersection could affect traffic volumes along streets in the Historic District cannot be reliably determined at this time. Synchro traffic modeling cannot account for the potential reactive and discretionary behavior of drivers diverting their course from the known travel routes because of increased congestion. Projecting such activity with any degree of accuracy is not possible because it deviates substantially from the observed and modeled data that are the basis for understanding traffic impacts. Additionally, a number of access restrictions already apply to the Capitol Hill Historic District. Standard practice precludes modeling behavior that would violate posted signs. Based on anticipated acceptable LOS in the vicinity of the Historic District—grade of “D” or better in most cases—there is low likelihood of significant diversion through the residential streets of the district.

Even if drivers reacted by diverting course through the neighborhood, the volume of diverted traffic would not diminish the integrity of setting and feeling in the district. Increases in operational traffic volumes conditions along H Street NE, Massachusetts Avenue NE, and Second Street NE would not alter their existing, busy, traffic-heavy urban setting. The significance of the Capitol Hill Historic District, as characterized in the NRHP nomination, is primarily derived from its architectural significance and its

historical contribution to the development of the District of Columbia. National Park Service guidelines state that historic districts or components of historic districts lose significance if they contain so many alternations or new intrusions that they no longer convey a sense of historic environment.[215] The Capitol Hill Historic District currently experiences a high volume of traffic. Based on information provided by the District Department of Transportation, there are currently ten intersections spread throughout the Historic District that operate at an unacceptable LOS (E or F) during at least one peak period. Despite this, the Historic District still maintains the characteristics that qualify it for inclusion in the NRHP and still conveys a sense of historic environment. Traffic impacts from the Preferred Alternative would not reach a level that would diminish the integrity and significance of the Capitol Hill Historic District. Any impacts would be minor.

Several other resources are located along streets where operational traffic is expected to increase incrementally. These resources include C&P Telephone Company Warehouse; City Post Office (Postal Museum); GPO; GPO Warehouse No. 4; the Holodomor Ukrainian Holocaust Memorial; Joseph Gales School; the REA Building; Square 750 Rowhouse Development; St. Aloysius Catholic Church; St. Joseph's Home (Former); St. Phillip's Baptist Church; the Suntrust Building (Former Childs Restaurant); the Thurgood Marshall Federal Judiciary Building; WUS; Columbus Plaza; 901 Second Street NE; L'Enfant-McMillan Plan; and WUS Historic Site. Given the urban environment of these resources, incremental impacts on traffic are not anticipated to diminish integrity or significance. Impacts would be negligible.

12.5.2 Indirect Operational Impacts

Relative to existing conditions, with the potential Federal air rights development, visual changes in the Preferred Alternative would have the following indirect operational impacts on cultural resources in addition to the direct impacts: moderate adverse visual impact on two cultural resources; and negligible adverse visual impacts on seven cultural resources.

In the Preferred Alternative, the potential Federal air rights development would occupy part of the area currently occupied by the existing WUS parking garage. This would result in the following indirect impacts, in addition to the direct impacts described above:

- Moderate adverse visual impacts on WUS and the U.S. Capitol Dome Viewshed.
- Negligible adverse visual impacts on City Post Office (Postal Museum); GPO Building; GPO Warehouse No, 4; Dirksen and Hart Senate Office Buildings; Senate Parks, Underground Garage and Fountains; Library of Congress, Thomas Jefferson Building; and Russel Senate Office Building.

The potential Federal air rights development would be adjacent to the expanded WUS and add new elements the station's visual environment. The impact would be moderate based on the respective scale of the structures. Additionally, the potential transfer of the air rights out of Federal ownership could

[215] National Park Service. *National Register Bulletin: How to Apply the National Register Criteria for Evaluation*. Accessed from https://www.nps.gov/subjects/nationalregister/upload/NRB-15_web508.pdf. Accessed on February 12, 2023.

include measures that ensure any new development would be implemented in a manner sensitive to WUS's historic and aesthetic environment.

The Preferred Alternative would also have a moderate indirect adverse visual impact on the U.S. Capitol Dome Viewshed. The potential Federal air rights would be highly visible from the dome. However, the structure would not rise above the horizon or block any views along North Capitol Street. It would not disrupt views along Delaware Avenue toward Columbus Plaza and the historic station building.

The City Post Office (Postal Museum); GPO Building; GPO Warehouse No, 4; the Dirksen and Hart Senate Office Buildings; Library of Congress Thomas Jefferson Building; Senate Parks, Underground Garage and Fountains; and Russel Senate Office Building would experience negligible adverse visual impacts. The potential Federal air-rights development in the Preferred Alternative may be visible from these resources. However, because of distance and intervening structures or vegetation, the change would be barely noticeable and would not affect the resources' integrity.

The potential Federal air-rights development would also be visible from several of the resources that would experience direct visual impacts. However, it would not create greater impacts than the Preferred Alternative.

12.5.3 Construction Impacts

12.5.3.1 Physical Impacts

Construction of the Preferred Alternative would potentially result in an adverse impact on unidentified archaeological resources within the WUS rail terminal.

Construction of the Preferred Alternative would require excavating most of the rail terminal to reconstruct the tracks and platforms, construct concourses, and set foundations and columns supporting the overbuilt structures south of H Street NE Based on an archaeological assessment completed in 2015, much of the terminal was identified as having moderate to high archaeological potential, although it contains no known archaeological resources.[216] It is possible that excavations and ground disturbance could inadvertently damage or destroy unknown significant archaeological deposits, potentially resulting in an adverse impact. Any resources present would likely be related to the Swampoodle neighborhood and may include building foundations, wells, privies, infrastructure, and trash pits. Railroad infrastructure dating to the late 19th century and earlier may also be present.

[216] The archaeological assessment was conducted as part of the 2015 *Washington Union Station Historic Preservation Plan* (Accessed from https://www.usrcdc.com/projects/historic-preservation-plan/; accessed on April 3, 2023). The assessment found that there is low to moderate potential that significant prehistoric material is present, and moderate to high potential that significant historic material is present. Historic material would mostly date from the 19th and early 20th centuries.

12.5.3.2 Visual Impacts

Visual changes during construction of the Preferred Alternative would result in moderate adverse impacts on three cultural resources; minor adverse impacts on one cultural resource; and negligible adverse impacts on 15 cultural resources.

Construction would take place in phases over approximately 13 years. During much of that time, fencing around the construction site, staging areas, heavy construction equipment, excavated areas, and structures under construction would affect the visual setting of the cultural resources from which they would be visible. Because the focus of construction activities would move across the Project Area depending on the phase, the visually affected resources and the intensity of the impacts would vary over time. Construction activities would likely be visible for at least some time from the same resources that would experience operational visual impacts (see **Section 12.5.1.2**, *Visual Impacts*).

WUS, the WUS Historic Site, and the REA Building would experience the greatest visual impacts throughout construction, which would occur within or directly next to them. The reconstruction of the rail terminal and construction of the various Project elements to the north of the historic station building would turn the WUS Historic Site into an active construction site for more than a decade. Inside WUS, column removal work in the Retail and Ticketing Concourse would require setting up partitions to seal the work area from the rest of the station for more than a year. This would be a highly visible change that would affect the interior appearance of the station and how it is experienced by visitors and passengers.

While the visibility of construction activities would be high, the three affected resources' sensitivity is moderate. The resources' significance and integrity of setting, feeling, and association do not depend on keeping them or their immediate surroundings permanently free of construction activities. Given the phased character of the work, large sections of WUS and the WUS Historic Site would remain operational and free of visual disruptions for much of the construction period, and it would not be a permanent condition. Visual impacts from construction would not in themselves cause a loss of historic integrity that could endanger the historic status of the affected resources. While construction work and associated disturbances would make WUS less attractive to visitors, it would not entirely prevent them from appreciating its architectural and historic importance. Impacts would be adverse but moderate.

The Capitol Dome Viewshed would also be affected, as construction activities at WUS would be highly visible from the dome. However, the sensitivity of the viewshed to such disruption is low, given the distance and the common occurrence of construction in the District. The resulting adverse impact would be minor.

Construction would be visible from 15 other cultural resources to a degree that would vary with distance and the phase of construction. These resources include: the City Post Office (Postal Museum); Dirksen and Hart Senate Office Buildings; GPO; GPO Warehouse No. 4; Library of Congress, Thomas Jefferson Building; Russell Senate Office Building; Senate Parks, Underground Garage, and Fountains; Square 750 Rowhouse Development; St. Joseph's Home (Former); Thurgood Marshall Federal Judiciary Building; Uline Ice Company Plant and Arena Complex; Columbus Plaza; Woodward and Lothrop Service Warehouse; Capitol Hill Historic District; and the L'Enfant-McMillan Plan. Distance combined with the

moving focus of construction make the sensitivity of the affected cultural resources to construction activities at WUS low. Additionally, as previously noted, construction sites are a common sight in the District. Visual impacts from construction would not affect the characteristics that give these resources their historic significance. Impacts would be negligible.

12.5.3.3 Noise and Vibration

Noise and vibration from construction activities in the Preferred Alternative would result in major adverse impacts on WUS, the REA Building; and the City Post Office (Postal Museum); moderate adverse impacts on six cultural resources; and minor adverse impacts on four cultural resources.

Construction of the Preferred Alternative would result in major adverse impacts from noise and vibration on WUS, the REA Building, and the City Post Office (Postal Museum). Vibratory pile driving would occur within 10 to 16 feet of these structures, resulting in vibration levels of approximately 0.33 to 0.67 inches per second (in/s). Another major impact would occur at the Postal Museum where mounted impact hammers could be used as close as 5 feet from the building, resulting in vibration levels of approximately 0.39 in/s. Depending on the sensitivity of the buildings, which has not been determined, this could exceed the threshold for structural damage and compromise the physical integrity of the buildings. Additionally, noise levels at all three resources would exceed the FTA threshold for severe impacts. These impacts would be temporary but noticeable and they would potentially compromise the resources' integrity of setting, feeling, and association.

Construction-related noise and vibration from constructing the Preferred Alternative would result in moderate adverse impacts on the following six cultural resources during support of excavation (SOE) activities and at the beginning of excavation: GPO Warehouse No. 4; Columbus Plaza; Thurgood Marshall Federal Judiciary Building; Square 750 Rowhouse Development; 901 Second Street NE; and St. Joseph's Home (Former). Noise levels at or near these resources would exceed the FTA thresholds for severe impacts. These impacts would be noticeable but temporary and they would not compromise the resources' integrity of setting, feeling, or association. The significance of these resources is not dependent on a quiet environment; rather, it is linked to their architecture, their connection to the historical development of the District, and the spatial relationships they have with WUS or each other. None of these characteristics would be affected by temporarily high noise or vibration levels.

Construction noise and vibration impacts would have minor adverse impacts on the following four cultural resources: C&P Telephone Company Warehouse, Topham's Luggage Factory (Former), the Capitol Hill Historic District (northwestern edge); and the L'Enfant-McMillan Plan.

At the C&P Telephone Company Warehouse, vibration from construction truck traffic would exceed the FTA threshold for annoyance. The adverse impact would be minor because the projected level of vibration, while noticeable, would not create any risk of structural damage and the integrity of the resource does not depend on a quiet and vibration-free setting.

At Topham's Luggage Factory, noise would exceed the FTA threshold for a moderate impact. However, this would not diminish the property's integrity or historical significance, which is related to its historical association with commercial development and industry in the District.

During excavation activities, if trucks are used to haul away spoil, locations on the northwestern edge of the Capitol Hill Historic District would experience noise levels in excess of the FTA threshold for moderate impacts. These locations include 603-607 Second Street NE and 521-527 Second Street NE. The same locations, along with a third one, 205 F Street NE would experience vibrations above the FTA threshold for annoyance. This would result in minor adverse impacts on the Capitol Hill Historic District for several reasons. The impacts would be localized and limited to locations on the edge of the Capitol Hill Historic District bordering Second Street NE. The District permits trucks to use Second Street NE, which is classified as a major collector street. The street's setting has been substantially altered over the years by modern high-density development. The majority of the historic district would experience no noise or vibration impacts from the Preferred Alternative. Outside of Second Street NE, construction trucks would only use designated truck routes to travel to and from the Project Area. They would not circulate along the residential streets that are one of the historic district's character-defining features. For instance, the District forbids heavy trucks on 3rd and 4th Streets NE between Massachusetts Avenue NE and H Street NE, and on F Street NE between Second Street NE and 6th Street NE.

Although they would occur during a long period – construction of the Preferred Alternative would take approximately 13 years to complete – impacts would not be continuous, and they would cease entirely after excavation operations end. Excavation operations that would affect Second Street NE would take place during Phase 1 of construction and last for approximately 5 months (out of a total phase duration of 2 years and 4 months).

Throughout the construction period, street and sidewalk segments around WUS could be subject to temporary closures. The only street in or adjacent to the Capitol Hill Historic District potentially affected by these closures would be Second Street NE. During closures, non-truck traffic may temporarily move to another street in the Historic District, such as 4th Street NE. Such impacts, and the resulting noise, would be of short duration. Road closures would last from 5 to 6 minutes on average and no more than 20 minutes.

The noise and vibration from constructing the Preferred Alternative would not compromise or diminish the late 19th- and early 20th-century architectural characteristics of the Capitol Hill Historic District or its significance to the development of the District.

Noise and vibration impacts would occur along several portions of the L'Enfant-McMillan Plan, especially First Street NE, Second Street NE, Columbus Circle, G Street NE, K Street, and North Capitol Street. Such temporary effects would not diminish the property's integrity or historical significance, which is related to its 18th and early 20th century urban design and association with the history of the development of Washington, DC. Impacts would be minor.

12.5.4 Comparison to the No-Action Alternative

The physical and noise and vibration-related operational impacts of the Preferred Alternative on cultural resources relative to the No-Action Alternative would generally be the same as those relative to existing conditions. Column removal, demolition of the Claytor Concourse, and reconstruction of the rail terminal would affect WUS and the WUS Historic Site in the same manner, regardless of the baseline. Noise-related impacts would also be the same because the operational noise and vibration impact

analysis showed that noise levels in the Preferred Alternative would be within 3 dBA of what they would be in the No-Action Alternative. This difference is not likely to be noticeable. For the purposes of the analysis of noise-related impacts on cultural resources, therefore, the two baselines are equivalent.

Visual impacts on cultural resources relative to the No-Action Alternative would generally be less than relative to existing conditions. This is because in the No-Action Alternative, the mass of the private air rights development above the rail terminal would mask Project elements from certain locations, eliminating or reducing visual impacts on several resources. **Table 12-2** summarizes the impacts of the Preferred Alternative to various historic properties relative to the No-Action Alternative. All other visual impacts would remain the same.

Table 12-2. Historic properties with differing visual impacts when compared to the No-Action Alternative

Historic Property	Impact relative to the No-Action Alternative	Impact relative to existing conditions
Dirksen and Hart Senate Office Building	No visual impact	Negligible indirect adverse impact
REA Building	No visual impact	Major direct adverse impact
Square 750	No visual impact	Minor direct adverse impact
St. Joseph's Home (Former)	No visual impact	Minor direct adverse impact
Thurgood Marshall Federal Judiciary Building	Minor visual impact	Moderate direct adverse impact
Uline Ice Company Plant and Arena Complex	No visual impact	Negligible indirect adverse impact
Woodward and Lothrop Service Warehouse	No visual impact	Minor direct adverse impact
Capitol Hill Historic District	Negligible visual impact	Minor direct adverse impact
L'Enfant-McMillan Plan	Minor visual impact	Moderate indirect adverse impact
WUS Historic Site	Minor visual impact	Major direct adverse impact
U.S. Dome Viewshed	Negligible visual impact	Moderate indirect adverse impact

12.6 Summary of Impacts

Table 12-3 summarizes the impacts of the Preferred Alternative on each of the 55 cultural resources in the Local Study Area. The table also indicates the Section 106 finding for each property.

Table 12-3. Summary of Impacts

Cultural Resource	Impact Type	NEPA Impact[1]	Section 106 Finding
1. Acacia Building	All	No impact	No Effect
2. August Apartment Building	All	No impact	No Effect
3. C&P Telephone Company Warehouse	Direct Operational	Negligible (N/V, Tr)	No adverse effect
	Indirect Operational	No impact	
	Construction	Minor (N/V)	
4. Capitol Press Building (former)	All	No impact	No effect
5. City Post Office (Postal Museum)	Direct Operational	Moderate (V)	Potential adverse effect
	Indirect Operational	Negligible (V)	
	Construction	Major (N/V)	
6. Dirksen and Hart Senate Office Buildings	Direct Operational	No impact	No adverse effect
	Indirect Operational	Negligible (V)	
	Construction	Negligible (V)	
7. Eckington Power Plant; Coach Yard Power Plant	All	No impact	No Effect
8. Engine Company No. 3	All	No impact	No Effect
9. Garfield Memorial	All	No impact	No Effect
10. Gonzaga College High School	All	No impact	No Effect
11. Government Printing Office (GPO)	Direct Operational	Negligible (N/V, Tr)	No adverse effect
	Indirect Operational	Negligible (V)	
	Construction	Negligible (V)	
12. Government Printing Office Warehouse No. 4	Direct Operational	Negligible (N/V, Tr)	No adverse effect

Cultural Resource	Impact Type	NEPA Impact[1]	Section 106 Finding
	Indirect Operational	Negligible (V)	
	Construction	Moderate (N/V)	
13. Hayes School	All	No impact	No effect
14. Holodomor Ukrainian Holocaust Memorial	Direct Operational	Negligible (N/V, Tr)	No adverse effect
	Indirect Operational	No impact	
	Construction	No impact	
15. Japanese American Memorial to Patriotism During WWII	All	No impact	No effect
16. Joseph Gales School	Direct Operational	Negligible (Tr)	No adverse effect
	Indirect Operational	No impact	
	Construction	No impact	
17. Library of Congress, Thomas Jefferson Building	Direct Operational	No impact	No adverse effect
	Indirect Operational	Negligible (V)	
	Construction	Negligible (V)	
18. M Street High School (Perry School)	All	No impact	No effect
19. Major General Nathanael Greene Statue	All	No impact	No effect
20. Mountjoy Bayly House	All	No impact	No effect
21. Peace Memorial	All	No impact	No effect
22. REA Building	Direct Operational	Major (V)	Adverse effect
	Indirect Operational	No impact	
	Construction	Major (N/V)	
23. Robert A. Taft Memorial	All	No impact	No effect
24. Russell Senate Office Building	Direct Operational	No impact	No adverse effect
	Indirect Operational	No impact	
	Construction	Negligible (V)	

Cultural Resource	Impact Type	NEPA Impact[1]	Section 106 Finding
25. Senate Parks, Underground Garage, and Fountains	Direct Operational	Negligible (N/V, Tr)	No adverse effect
	Indirect Operational	Negligible (V)	
	Construction	Negligible (N/V)	
26. Belmont-Paul Women's Equality National Monument (Formerly the Sewall-Belmont House)	All	No impact	No effect
27. Square 750 Rowhouse Development	Direct Operational	Minor (V)	No adverse effect
	Indirect Operational	Minor (V, N/V)	
	Construction	Moderate (N/V)	
28. St. Aloysius Catholic Church	Direct Operational	Negligible (N/V, Tr)	No adverse effect
	Indirect Operational	No impact	
	Construction	No impact	
29. St. Joseph's Home (Former)	Direct Operational	Minor (V, V/N)	No adverse effect
	Indirect Operational	No impact	
	Construction	Moderate (N/V)	
30. St. Phillip's Baptist Church	Direct Operational	Negligible (N/V, Tr)	No adverse effect
	Indirect Operational	No impact	
	Construction	No impact	
31. Suntrust Building (Former Child's Restaurant)	Direct Operational	Negligible (Tr)	No adverse effect
	Indirect Operational	No impact	
	Construction	No impact	
32. The Summerhouse	All	No impact	No effect
33. Thurgood Marshall Federal Judiciary Building	Direct Operational	Moderate (V)	No adverse effect
	Indirect Operational	No impact	
	Construction	Moderate (N/V)	

Cultural Resource	Impact Type	NEPA Impact[1]	Section 106 Finding
34. Topham's Luggage Factory (Former)	Direct Operational	Negligible (N/V, Tr)	No adverse effect
	Indirect Operational	No impact	
	Construction	Minor (N/V)	
35. Uline Ice Company Plant and Arena Complex	Direct Operational	Minor (V, N/V)	No adverse effect
	Indirect Operational	No impact	
	Construction	Minor (V)	
36. United States Capitol	All	No impact	No effect
37. United States Capitol Square	All	No impact	No effect
38. United States Supreme Court	All	No impact	No effect
39. Victims of Communism Memorial	All	No impact	No effect
40. Washington Union Station	Direct Operational	Major (P, V)	Adverse effect
	Indirect Operational	Moderate (V)	
	Construction	Major (N/V)	
41. Washington Union Station Plaza (Columbus Plaza) and Columbus Fountain	Direct Operational	Negligible (N/V, Tr)	No adverse effect
	Indirect Operational	No impact	
	Construction	Moderate (N/V)	
42. Woodward and Lothrop Service Warehouse	Direct Operational	Minor (V)	No adverse effect
	Indirect Operational	No impact	
	Construction	Negligible (V)	
43. 901 Second Street NE	Direct Operational	Negligible (N/V, Tr)	No adverse effect
	Indirect Operational	No impact	
	Construction	Moderate (N/V)	
44. Capitol Hill Historic District	Direct Operational	Minor (V, Tr)	No adverse effect
	Indirect Operational	No impact	

Cultural Resource	Impact Type	NEPA Impact[1]	Section 106 Finding
	Construction	Minor (N/V)	
45. L'Enfant-McMillan Plan	Direct Operational	Minor (P, V)	No adverse effect
	Indirect Operational	No impact	
	Construction	Minor (N/V)	
46. National Mall Historic District	All	No impact	No effect
47. Pennsylvania Avenue National Historic Site	All	No impact	No effect
48. Union Market Historic District	All	No impact	No effect
49. Washington Union Station Historic Site	Direct Operational	Major (P, V)	Adverse effect
	Indirect Operational	No impact	
	Construction	Major (N/V)	
50. Arlington National Cemetery Viewshed	All	No impact	No effect
51. Old Post Office Building Viewshed	All	No impact	No effect
52. St. Elizabeth's West Campus Viewshed	All	No impact	No effect
53. U.S. Capitol Dome Viewshed	Direct Operational	Minor (V)	No adverse effect
	Indirect Operational	Moderate (V)	
	Construction	Minor (V)	
54. Washington National Cathedral Viewshed	All	No impact	No effect
55. Washington National Monument Viewshed	Direct Operational	Negligible (V)	No adverse effect
	Indirect Operational	No impact	
	Construction	No impact	

1. When a resource would experience different types of impacts, the greatest impact is reported.
V = visual impact; N/V = noise/vibration impact; P = physical impact; Tr = Traffic impact.

12.7 Avoidance, Minimization, and Mitigation Evaluation

Impacts on cultural resources that would or may experience adverse effects under Section 106—WUS, WUS Historic Site, REA Building, City Post Office (Postal Museum)—would be avoided, minimized or mitigated through the Section 106 process. Per 36 CFR 800.6, a finding of adverse effect requires that Section 106 consultation continue to avoid, minimize, or mitigate effects to historic properties that would alter the characteristics that qualify the properties for inclusion in the NRHP.

Union Station Redevelopment Corporation (USRC) would implement the mitigation stipulations outlined in the Project's Programmatic Agreement (PA) to resolve the known adverse effects of the Project in accordance with 36 CFR § 800.14(b)(1)(ii). A draft of the PA is provided for review in **Appendix D2**. Measures included in the draft PA include:

- Prior to any transfer of real property out of Federal ownership, FRA would seek to include a historic preservation covenant in the transfer instrument to be recorded in the real estate records of the District of Columbia.
- USRC would establish and implement a Design Review process to review design and engineering documents at various phases of design.
- USRC would establish Design Guidelines that will guide the future design of development within the Federally owned air rights.
- USRC would prepare individual Level II Historic American Building Survey (HABS) and Historic American Engineering Record (HAER) written, drawing, and photographic documentation for various contributing resources within the WUS Historic Site.
- USRC would prepare an Architectural Salvage Plan to establish a process for determining which contributing resources to the WUS Historic Site that require removal or relocation could be salvaged.
- USRC would develop and implement an Interpretation Plan that communicates the history, evolution, and significance of the WUS Historic Site, especially the WUS Historic Site as originally constructed and used until the implementation of the Project.
- USRC would prepare an NRHP Nomination Form for the WUS Historic Site, based on the Determination of Eligibility Form for the WUS Historic Site completed in 2019.
- USRC would prepare a Historic Properties Construction Protection and Signage Plan to protect against, monitor for, and manage construction-related effects to identified historic properties.
- USRC would require the construction contractor to prepare and implement a Construction Noise and Vibration Control Plan that incorporates an assessment of buildings at risk of structural damage from construction vibration, as identified in this report.
- Prior to 35% design or prior to any ground disturbing activities, USRC would complete a Phase IB archaeological assessment and survey; if archaeological sites are identified in the

Phase IB assessment and survey, prior to any ground disturbing activities, USRC would complete one or more Phase II survey(s) and resolve any adverse effects.

- If a previously undiscovered archeological or cultural resource that is or could reasonably be a historic property is encountered or a previously known historic property would be affected in an unanticipated manner during construction, USRC would follow the Unanticipated Discovery or Effect to Cultural Resources procedures outlined in the PA.

Impacts to historic properties that would not experience an adverse effect under Section 106 would be avoided, minimized, or mitigated through the measures proposed for each type of impact (visual, noise and vibration, traffic) in the corresponding sections of this report.

12.8 Permits and Regulatory Compliance

After the execution of the PA, Project design would proceed and undergo further review by the National Capital Planning Commission and the Commission of Fine Arts (CFA) in the context of Federal and District of Columbia regulations and guidelines including:

- The National Capital Planning Commission, The Comprehensive Plan for the National Capital Urban Design Element and Historic Preservation Element;
- Executive Order (EO) 1259, Commission of Fine Arts Review of Public Buildings in the District of Columbia Proposed by the Federal or DC governments;
- EO 1862, CFA Review of New Structures and Matters of Art Proposed by the Federal Government in DC;
- EO 11593, Protection and Enhancement of the Cultural Environment;
- The Historic Landmark and Historic District Protection Act of 1978 (D. Law 2-144, as amended through March 1, 2020);
- The Height of Buildings Act of 1910; and
- District of Columbia Municipal Regulations, DCMR Title 10A Historic Preservation, Zoning Regulations Special Purpose Zones, and 11K DCMR 305.

Any future archaeological excavations or removal of archaeological resources from the Project Area may be subject to the permitting requirements of the Archaeological Resources Protection Act (ARPA), 36 CFR § 296.5.

13 Parks and Recreation Areas

13.1 Overview

This section addresses the potential impacts of the Preferred Alternative on parks and recreation areas. These include public parks, private parks open to the public, off-street bicycle trails and walking paths, and other areas used for general recreation. This section also identifies measures that the Federal Railroad Administration (FRA) is proposing to avoid, minimize, or mitigate potential adverse impacts as well as relevant permitting and regulatory compliance requirements.

13.2 Regulatory Context

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 13.2, *Regulatory Context*.

13.3 Study Area

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 13.3, *Study Area*. The Study Area for parks and recreation areas includes the Project Area and the part of the District within up to two city blocks of the Project Area. Because impacts to parks and recreation areas on a regional scale are not anticipated, there is no Regional Study Area.

13.4 Methodology

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report,* Section 13.4*, Methodology.*

13.5 Impacts of the Preferred Alternative

This section presents the impacts of the Preferred Alternative on parks and recreation areas. Impacts are first summarized in bold lettering, followed by a supporting description and analysis. Direct and indirect operational impacts as well as construction impacts are considered. The operational impacts of the Preferred Alternative are assessed relative to the No-Action Alternative. A brief assessment of the impacts relative to existing conditions is also provided.

13.5.1 Direct Operational Impacts

Relative to the No-Action Alternative, the Preferred Alternative would have a minor beneficial direct operational impact on Columbus Plaza due to improved access from Columbus Circle.

The Preferred Alternative would not physically affect any parks or recreation areas. It would not require using or taking any part of a park or recreation area, or permanently incorporating it into the Project. The First Street NE cycle track to K Street, which ultimately connects to the Metropolitan Branch Trail, would be maintained along its existing alignment. Improvements, such as a railing, would be included to minimize potential conflicts with pedestrians crossing to or from the H Street Concourse entrance. The intersection of First Street NE and the ramp to and from the below-ground pick-up and drop-off facility would be signalized, which would minimize conflicts between bicycles using the cycle track and car entering or exiting the facility. The Preferred Alternative would not reduce or otherwise affect the overall connectivity or functionality of the trail or the cycle track. Thus, it would not adversely affect either resource.[217]

The Preferred Alternative includes improvements to Columbus Circle in front of WUS. These improvements would facilitate access to Columbus Plaza from the station, resulting in a minor beneficial impact on Columbus Plaza because of improved access. The Preferred Alternative would eliminate the ramp connecting southbound First Street NE and Massachusetts Avenue. This would make it easier and safer for pedestrians and bicyclists to reach Columbus Plaza from WUS because they would need to cross only one roadway instead of two, as would be the case in the No-Action Alternative. The larger pedestrian zone created by the removal of the ramp would generally make Columbus Plaza more accessible and integrated with WUS, enhancing visitor experience. The pedestrian and bicycle ramp to H Street on the west side of WUS would also enhance access to Columbus Plaza.

13.5.2 Indirect Operational Impacts

Relative to the No-Action Alternative, the Preferred Alternative would have a minor adverse indirect operational impact on parks and recreation areas, including Columbus Plaza, the Upper and Lower Senate Parks, and the Metropolitan Branch Trail.

Relative to the No-Action Alternative, the Preferred Alternative would result in an increase in the number of passengers transiting through WUS. Annual train and bus passengers would change from

[217] Impacts pertaining to bicycle safety are addressed in **Section 5.5.1.7**, *Bicycle Activity*.

approximately 20.8 million in the No-Action Alternative to approximately 35 million. The number of visitors may also increase because of the additional retail that would be available in the various concourses.

Like in the No-Action Alternative, this may result in more people using or passing through nearby parks, especially Columbus Plaza and the Upper and Lower Senate Parks. It may also generate additional traffic along the Metropolitan Branch Trail if visitors or commuters use it for local travel. The provision of additional Bikeshare capacity and bike storage space may encourage use of the trail for local travel to and from WUS. Private and public park in the vicinity of WUS may also experience some increase in users.

In the long term, increased use would result in accelerated wear and tear of pavements and landscaped areas in the affected parks and in increased maintenance costs. This impact would be minor. Only a small part of the additional passengers and visitors would likely make use of the nearby parks and recreation areas. Most would only transit through WUS toward other destinations in and outside the District. The Preferred Alternative would be a small contributor to the general visitations to parks and recreation area in the Study Area.[218] By itself, the Preferred Alternative would not cause a marked degradation of user experience.

Relative to the No-Action Alternative, in the Preferred Alternative, the potential development of the Federal air rights would have a negligible adverse indirect operational impact on parks and recreation areas.

In the Preferred Alternative, the Federal air rights development would consist of 310,00 square feet of office uses; 175,000 square feet of residential uses; and 15,000 square feet of retail uses. As explained in **Section 14.5.2**, *Indirect Operational Impacts*, this would bring approximately an additional 390 residents and 1,290 employees to the Project Area, some of whom may use nearby parks and recreation areas during the day. However, at any given time, the number of additional visitors attributable to the development would be a fraction of the new workers, residents, and travelers that would be present in the Project Area in the No-Action Alternative. Any adverse impacts would be negligible.

13.5.3 Construction Impacts

Construction of the Preferred Alternative would cause moderate adverse impacts on Columbus Plaza and the Metropolitan Branch Trail.

In the Preferred Alternative, construction-related traffic and sidewalk or lane closures on Second Street NE would affect the Metropolitan Branch Trail and may lead to temporary closures or rerouting of the trail at this location and diminish the connectivity of the trail to the front of WUS and points south. These disruptions would adversely affect the experience of users at the south end of the trail. Temporary closure of the First Street cycle track in Phase 4 of construction would also reduce

[218] For instance, 3 to 5 million people visit the U.S. Capitol every year (https://www.aoc.gov/capitol-buildings/about-us-capitol-building. Accessed on October 31, 2022), many of whom may be reasonably assumed to visit or walk through the Upper and Lower Senate Parks as well.

connectivity. However, these impacts would occur at different times, with those along Second Street concentrated during parts of Phase 1 (first 2 years and 4 months of construction) and those along First Street concentrated during Phase 4 (last 4 years and 3 months of construction). When one of the two facilities would be closed, the other would be operational and could provide an alternative route. Only a small portion of the eight-mile Metropolitan Branch Trail would be affected. Between Phases 1 and 4 (approximately 5 years and 3 months), disruptions would be minimal though adjacent construction traffic and activities may detract from user experience. Overall, the anticipated disruptions would be a moderate adverse impact.

The Preferred Alternative includes the realignment of the roadways in front of WUS, adjacent to Columbus Plaza. This would result in a moderate adverse impact on this resource. While Columbus Plaza itself would not be physically affected, construction would temporarily limit pedestrian access from the front of WUS to the plaza. Access would remain available from the south, however. Construction of the ramp from the below-ground pick-up and drop-off facility on the east side of WUS would generate noise during the excavation phase that would be audible from Columbus Plaza. In general, construction activities on the adjacent roadways would make Columbus Plaza less attractive to visit and diminish visitor experience. The impact would be moderate because, although it has not been established how long the construction of the improvements in the vicinity of Columbus Plaza would take, it would be much less than the entire construction period. All other construction activities associated with the Preferred Alternative would take place to the north of the historic station building and would not cause impacts on Columbus Plaza.

13.5.4 Comparison to Existing Conditions

The impacts of the Preferred Alternative relative to existing conditions would be the same as those relative to the No-Action Alternative. The increase in the numbers of visitors or users of Columbus Plaza, the Upper and Lower Senate Parks, and the Metropolitan Branch Trail would represent a larger increment relative to existing conditions, but the total number would remain small, and the adverse impact would be minor. The beneficial impact on Columbus Plaza would be the same because there is no difference between the two baselines with respect to this impact.

13.6 Summary of Impacts

Table 13-1 summarizes the impacts of the No-Action Alternative and the Preferred Alternative.

Table 13-1. Summary of Impacts

Type of Impact	No-Action Alternative	Preferred Alternative
Direct Operational	No impact	Minor beneficial impact on Columbus Plaza
Indirect Operational	Minor adverse impact	Minor or negligible adverse impact.
Construction	Minor Adverse Impact	Moderate adverse impact on Columbus Plaza and Metropolitan Branch Trail

13.7 Avoidance, Minimization and Mitigation Evaluation

To avoid or minimize construction impacts on Columbus Plaza and the Metropolitan Branch Trail, FRA is proposing the following measures:

- Union Station Redevelopment Corporation would coordinate with the National Park Service (NPS) during construction planning to develop measures to maintain, as much as possible, access to Columbus Plaza during the construction of the Columbus Circle improvements.
- USRC would prohibit the construction contractor from using Columbus Plaza as a staging area during construction.
- USRC would coordinate with the District Department of Transportation (DDOT) to plan and maintain alternative routes for users of the Metropolitan Branch Trail when parts of the trail would be closed.
- USRC would work with DDOT to appropriately advertise construction-related closures of the Metropolitan Branch Trail and establish alternative routes, as needed.

13.8 Permits and Regulatory Compliance

The Project is subject to Section 4(f) of the United States Department of Transportation Act of 1966 which requires avoidance and minimization of impacts to public park and recreation lands, wildlife and waterfowl refuges, and public or private historic properties, during the planning and design of transportation projects. A Section 4(f) Evaluation has been prepared for the Project.

Section 6(f) of the Land and Water Conservation Act requires that the conversion to anything other than public outdoor recreational use of lands or facilities acquired with Land and Water Conservation Act (LWCA) funds under the State Assistance program be coordinated with NPS.[219] The Project would not require the conversion of any land, including land acquired with LWCA funds. Therefore, a Section 6(f) evaluation is not required.

[219] 16 U.S.C 460-4 to 460-11.

14 Social and Economic Conditions

14.1 Overview

This section addresses the potential impacts of the Preferred Alternative on social and economic conditions. These include impacts on demographics, jobs, taxes, community disruption, commercial activity, and local government services. This section also identifies measures that the Federal Railroad Administration (FRA) is proposing to avoid, minimize, or mitigate potential adverse impacts.

14.2 Regulatory Context

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 14.2, *Regulatory Context*.

14.3 Study Area

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 14.3, *Study Area*. The Local Study Area includes the Project Area from the historic station building to K Street NE as well as the Census block groups within one half-mile of the Project Area. The Regional Study Area is comprised of the entirety of the District. Conditions in the Local and Regional Study Areas are described in Appendix C2, *Washington Union Station (WUS) Expansion Project Affected Environment Technical Report*, Section 14, *Social and Economic Conditions*.

14.4 Methodology

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report,* Section 14.4*, Methodology.*

14.5 Impacts of the Preferred Alternative

This section presents the impacts of the Preferred Alternative. Direct and indirect operational impacts as well as construction impacts are considered. Operational impacts are assessed relative to the No-Action Alternative. A brief assessment of the impacts relative to existing conditions is also provided.

14.5.1 Direct Operational Impacts

14.5.1.1 Demographics

Relative to the No-Action Alternative, the Preferred Alternative would have a negligible direct operational impact on demographic conditions.[220]

The expansion of WUS in the Preferred Alternative would change the amount of residential uses in the private air right development from an assumed 1,050,000 square feet in the No-Action Alternative to 979,250 square feet. Assuming an average of 950 feet per unit and an average household size of 2.1 persons, after rounding, this would reduce the residential population in the Project Area by approximately 160 persons in the Preferred Alternative relative to the No-Action Alternative. This would be a small, negligible impact in the context of the Local Study Area (27,465 residents) and the District of Columbia (689,546 residents).[221]

14.5.1.2 Community Disruption and Other Social Benefits or Impacts

Relative to the No-Action Alternative, the Preferred Alternative would have major beneficial direct operational impacts on local communities.

Relative to the No-Action Alternative, the Preferred Alternative would have a major beneficial impact because it would improve community cohesion by providing new pedestrian connections between WUS and the surrounding neighborhoods. While there would be increases in peak hour vehicular traffic along several thoroughfares around WUS, including North Capitol Street, K Street NE, First Street NE, and Second Street NE (see the analysis of traffic impacts in **Section 5.5.1.12**, *Vehicular Traffic*, of this report), continued implementation of the District Vision Zero strategy would help maintain safe pedestrian and bicycle travel through the area.[222] The new street-level pedestrian entry points along First Street NE and Second Street NE under the H Street Bridge as well as new entry points from the bridge would make WUS easier to access from both the east and west neighborhoods while also improving the connectivity between neighborhoods on either side of the station. The pedestrian and bicycle ramp along the west side of WUS would improve connectivity between the front of the station, the private air rights development, and H street.

[220] This demographic impact is not qualified as adverse or beneficial because a small change in residential population in a dense urban environment does not in itself represent a favorable or unfavorable outcome.

[221] Population numbers per the 2020 U.S. Census.

[222] District of Columbia. *Vision Zero DC*. Accessed from https://visionzero.dc.gov/. Accessed on January 23, 2023.

The Preferred Alternative would also provide approximately 64,000 square feet of new retail space in WUS. The provision of additional shopping opportunities and services located in WUS would benefit neighborhood residents as well as travelers and commuters. The access improvements mentioned in the previous paragraph would make it easier for residents to use these new amenities.

At the regional level, expanded and improved multimodal connections at WUS would result in easier and more efficient travel in and out of the District. This would benefit all District residents and visitors.

14.5.1.3 Employment

Relative to the No-Action Alternative, the Preferred Alternative would have a minor adverse direct operational impact on employment.

The Preferred Alternative would add up to approximately 1,421 jobs at WUS relative to the No-Action Alternative. The Preferred Alternative would add approximately 64,000 square feet of WUS retail space to WUS, which would generate approximately 192 new jobs.[223] It would also provide additional space for Amtrak to support expanded rail operations, which would be staffed with approximately 1,629 persons, representing a 1,229-employee increase at WUS over the No-Action Alternative.[224]

In the Preferred Alternative, the private air rights development would differ from what it would be in the No-Action Alternative, affecting the number of jobs that the Project Area is anticipated to support by 2040. In the Preferred Alternative, the private air rights development would provide 1,060,00 square feet of office instead of 2,160,000 square feet in the No-Action Alternative, amounting to approximately 4,400 fewer jobs. The amount of retail uses would change from 120,000 square feet to 85,000 square feet, reducing anticipated employment in the Project Area by about 100 jobs in the Project Area. Finally, hotel uses would change from 480 rooms to 716 rooms, increasing the anticipated number of jobs in the Project Area by approximately 90. Overall, the total change in private air rights development jobs would reduce anticipated employment in the Project Area by approximately 4,410 jobs. Accounting for the additional WUS jobs the Preferred Alternative would support, and after rounding, there would be a net reduction of approximately 2,990 in the number of jobs the Project Area is anticipated to support in the Preferred Alternative relative to the No-Action Alternative.

The Preferred Alternative would reduce anticipated employment in the Project Area by about 33 percent in the Project Area relative to the No-Action Alternative. This adverse impact would be minor because, while large in the context of Project Area, it would be small in the context of the District. According to the most recent information available from the Deputy Mayor for Planning and Economic Development (DMPED) Economic Intelligence Dashboard, as of July 2019, there were an estimated

[223] For the purposes of estimating job generation, the following standard planning multipliers are used: 3 employees per 1,000 square feet of retail space; 1 employee per 250 square feet of office space; 1 employee per 2.67 hotel rooms.

[224] Amtrak. 2018. *WUS-TI Space Program*.

802,000 jobs in the District.[225] The reduction in anticipated jobs within the Project Area in the Preferred Alternative would represent approximately 0.4 percent of this total.

As another benchmark for comparison, District of Columbia Office of Planning (DCOP) projections indicate that the District would have a total of 1,012,000 jobs by 2040, with an average growth of 8,995 jobs per year during the 2015-2035 period. [226] The reduction in anticipated Project Area employment associated with the Preferred Alternative would amount to about 33 percent of an average year worth of projected growth but only 0.3 percent of the total projected 2040 employment. Additionally, it is possible that the approximately 2,990 anticipated Project Area jobs would simply be accommodated elsewhere in the District, amounting to no net loss.

14.5.1.4 Washington Union Station Revenue

Relative to the No-Action Alternative, the Preferred Alternative would have a major adverse operational direct impact on WUS revenue.

The Preferred Alternative would reduce the number of revenue-generating parking spaces at the station from approximately 2,205 in the No-Action Alternative to no more than 550, or a reduction of approximately 75 percent. Based on Union Station Redevelopment Corporation (USRC)'s financial report for 2019, parking accounts for 70 percent of USRC's annual revenue.[227] As noted in the report, this revenue "subsidizes USRC's financial responsibilities with regard to historic preservation." Assuming direct proportionality between parking capacity and parking revenue, the Preferred Alternative would cause at least a 52.5 percent decrease in total revenue.[228]

Several factors may contribute to offset some of this financial impact. For instance, decreasing the number of available parking spaces may increase the revenue generated by each space due to reduced supply if demand remains steady or increases.[229] Also, the additional retail to be provided in the Preferred Alternative would likely generate additional revenue for USRC. However, existing revenue from retail may decrease if some of the outlets displaced during construction (see **Section 14.5.4.3**, *Washington Union Station Revenue*) do not return after completion of the work and are not replaced. How this would affect WUS' revenue from retail would depend on the current and future conditions

[225] *DMPED Economic Intelligence Dashboard*. Accessed from http://open.dc.gov/economic-intelligence/. Accessed on November 1, 2022.

[226] DCOP. *Forecasting the District's Growth. Results and Methodology*. November 2016. Accessed from https://planning.dc.gov/sites/default/files/dc/sites/op/publication/attachments/Forecasting%20DC%20Growth%202015-2045%20-%20Results%20and%20Methodology%20-%20FINAL_011217.pdf. Accessed on November 1, 2022.

[227] USRC. *2015-2021 Annual Reports*. Accessed from https://www.usrcdc.com/annual-reports/. Accessed on November 1, 2022. In 2020-2021, operations and revenue were affected by the COVID-19 pandemic, with 2019 being the most recent "normal" year for which financial information is available.

[228] The northern part of the below-ground facility, within which most parking would be located, is outside the area currently covered by the lease from FRA under which USRC operates WUS. This estimate assumes that the lease would be amended to cover the entirety of the below-ground facility as well as the new concourses and retail areas outside the scope of the current lease.

[229] Increased revenue, in that case, could be generated by increased utilization, ability to raise prices, or both.

under which retail at WUS is managed. In general, increased revenue from retail is not likely to fully compensate for the loss in parking revenue and USRC would have to identify and secure new sources of funding to replace the lost parking revenue. Thus, the Preferred Alternative would have a major adverse operational impact on WUS revenue.

14.5.1.5 Other Direct Economic Impacts

Relative to the No-Action Alternative, the Preferred Alternative would have a minor beneficial direct operational impact on the local and regional economy.

The Preferred Alternative would have a minor beneficial impact on the local and regional economy because it would add approximately 64,000 square feet of retail at WUS, with a net increase in retail within the Project Area and Local Study Area of 29,000 square feet after accounting for the reduction in private air rights retail uses. The new retail would generate revenue for its operators as well as new jobs and sales taxes at WUS, which in turn would generate further economic activity. Existing retail and services at WUS would also benefit from anticipated increases in sales due to greater Amtrak, MARC, VRE, and intercity bus ridership. Relative to the No-Action Alternative, approximately 50,700 additional passengers would transit through WUS daily. This would likely increase activity and spending at WUS's retail and service establishments, which in turn would stimulate demand for retail space and potentially drive rents up.[230] These impacts would be minor in the context of the local and regional economy.

14.5.2 Indirect Operational Impacts

14.5.2.1 Demographics

Relative to the No-Action Alternative, the Preferred Alternative would have a minor indirect operational impact on demography.[231]

Potential development of the Federal air rights would include approximately 175,000 square feet of residential space. Assuming an average of 950 square feet per unit, and an average household size of 2.1 persons, this would add approximately 390 residents to the Project Area and the Local Study Area (after rounding). This would be a small, minor impact in the context of the Local Study Area and District of Columbia.

More broadly, improved connectivity and increased activity at WUS in the Preferred Alternative, as well as increased employment opportunities, may indirectly encourage or accelerate development near WUS, including residential development, in addition to what would occur in the No-Action Alternative. This would result in an increase in the population of the Local Study Area and the District. This impact is

[230] These beneficial impacts may be partially offset by a reduction in existing retail space if some of the outlets displaced during construction (see *Washington Union Station Revenue* above and **Section 14.5.3**, *Construction Impacts, Washington Union Station Revenue*) do not return after completion of the work and are not replaced.

[231] This demographic impact is not qualified as adverse or beneficial because a small change in residential population does not in itself represent a favorable or unfavorable outcome.

not readily quantifiable but likely would be negligible in the context of anticipated demographic growth in the District through 2040.

14.5.2.2 Community Disruption and Other Social Benefits or Impacts

Relative to the No-Action Alternative, the Preferred Alternative would have a minor beneficial indirect operational impact on local communities.

In combination with the private air rights development, potential development of the Federal air rights would fill in a gap in the urban fabric, better connecting together the neighborhoods surrounding WUS via the H Street Bridge and the pedestrian/bicycle ramp along the west side of the station. This would have a beneficial impact on the local community.

The Preferred Alternative may also indirectly encourage development outside the Project area near WUS. This would not result in adverse impacts on local communities. District zoning regulations and applicable plans would continue to guide the density and character of potential future development. This would avoid the development of land uses that could disrupt or dislocate local communities. As explained in **Appendix C3**, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report,* Section 14.5.1.2, *Indirect Operational Impacts*, *Community Disruption and Other Social Benefits or Impacts*, the census tracts in the Local Study Area lack the typical characteristics of neighborhoods susceptible to gentrification.

14.5.2.3 Employment

Relative to the No-Action Alternative, the Preferred Alternative would have a minor beneficial indirect operational impact on employment.

Potential development of the Federal air rights would include approximately 310,000 square feet of office space. This would support approximately 1,240 jobs in the Project Area. The Federal air rights development would also include 15,000 square feet of retail, adding another 45 jobs, for a total (after rounding) of approximately 1,290 jobs.

This beneficial impact would be minor because, while large in the context of Project Area, it would be small in the context of the Local Study Area and the District. As noted above, according to the DMPED Economic Intelligence Dashboard, as of July 2019, there were an estimated 802,000 jobs in the District. The additional jobs supported by the potential Federal air rights development would represent approximately 0.2 percent of this total. Also as noted above, DCOP projections indicate that the District would have a total of 1,012,000 jobs by 2040, with an average growth of 8,995 jobs per year during the 2015-2035 period. The jobs associated with the potential development of the Federal air rights would amount to about 14 percent of an average year worth of projected growth but only 0.1 percent of the total projected 2040 employment. Additionally, while the approximately 1,290 jobs may be new to the District, they may also be relocated from other areas, further reducing the impact.

More broadly, the Preferred Alternative would have a beneficial indirect impact on employment because new retail and station workers at WUS and greater numbers of passengers and visitors would increase consumer demand for goods and services in the Local and Regional Study Areas. This would

support employment both locally and regionally. Purchases of materials and supplies to support increased retail and transportation operations would also indirectly support employment in other sectors. This beneficial impact is not quantifiable. It likely would be minor in the context of the District's economy.

14.5.2.4 Washington Union Station Revenue

Relative to the No-Action Alternative, the Preferred Alternative would have a minor beneficial indirect operational impact on WUS Revenue.

The potential transfer and development of the Federal air rights with a mix of residential, office, and retail uses would have a beneficial impact on WUS revenue through the lease of the space (or other mechanism through which transfer and development would be achieved), as the area is within USRC's lease area. This impact cannot be quantified at this time and can be considered to be minor.

14.5.2.5 Other Indirect Economic Impacts

Relative to the No-Action Alternative, the Preferred Alternative would have a minor beneficial indirect operational impact on tax revenues in the District.

Generally, the Preferred Alternative would contribute to expanding tourism and economic activity in the Regional Study Area by making it possible for WUS to overcome capacity constraints and resolve operational inefficiencies. Thanks to these improvements, WUS would continue to be a major transportation hub that supports and bolsters the local and regional economy, with attendant tax benefits. The net benefit in tax revenue that would result is not quantifiable, but it is likely to amount to a minor beneficial impact in the context of the District as a whole, whose total tax revenue in fiscal year 2021 was $8.8 billion.[232]

14.5.3 Construction Impacts

14.5.3.1 Demographics

Construction of the Preferred Alternative would have no impacts on demography.

The construction of the Preferred Alternative would cause neither an influx nor a displacement of residential populations in the Local or the Regional Study Area**.**

14.5.3.2 Community Disruption and Other Social Benefits or Impacts

Construction of the Preferred Alternative would have moderate adverse impacts on local communities.

[232] Government of the District of Columbia, Office of Chief Financial Officer, Office of Revenue Analysis. *D.C. Tax Facts. 2022*. Accessed from https://cfo.dc.gov/node/1606201. Accessed on November 1, 2022.

There would be adverse impacts on local communities at various times throughout the construction of the Preferred Alternative. Construction would take place over an estimated span of approximately 13 years. Throughout, to accommodate construction activities, there would be periods of rerouting passengers, closing off sections of WUS, and closing some retail space. The column removal component of the Project would close part of the Retail and Ticketing Concourse. Retail outlets located within this part of the concourse and the mezzanine above would have to close for at least the duration of the work, which is anticipated to take place over approximately 2 years and 6 months, overlapping with Phases 1 and 2 of construction. Parking and bus loading and unloading activities would be displaced between the demolition of the existing garage and the completion of the new below-ground facility. Outside of WUS proper, construction traffic and noise as well as partial closures of sidewalks and traffic lanes would adversely affect residents, commuters and workers. These impacts are described in greater detail in other sections of this report, including **Section 5**, *Transportation;* **Section 9**, *Land Use, Land Planning, and Property*; **Section 10**, *Noise and Vibration;* **Section 13**, *Parks and Recreation Areas*; and **Section 15**, *Public Health, Elderly, and Persons with Disabilities*.

The impact from this disruption on local communities would be moderate for the following reasons. Although various disruptive activities would occur during the entire construction period, most would last for only a part of it and would be localized. The displacement of parking and bus activities would occur only in Phase 4 (last 4 years and 3 month of construction). Outside of WUS, disruptions would largely concentrate along Second Street NE (south of K Street) during Phase 1 of construction (lasting approximately 2 years and 4 months) and along First Street NE (also south of K Street) during Phase 4. Although adversely affected, access to WUS would remain available throughout the construction period and the phased construction would help minimize reductions in rail operations. While the various inconveniences construction of the Preferred Alternative would create would be highly noticeable and would make WUS and the parts of the Local Study Area closest to WUS less attractive to new residents or businesses while construction is ongoing, the directly affected areas would be small and the adverse impacts would decrease quickly with distance.

14.5.3.3 Construction Employment

Construction of the Preferred Alternative would have a minor beneficial impact on employment.

Construction of the Preferred Alternative would support numerous jobs during the entire construction period. While this would be a beneficial impact, it would be minor in the context of regional employment in the Washington-Arlington-Alexandria Metropolitan Statistical Area, where most of the induced jobs are likely to be located.

Table 14-1 shows the estimated cost of constructing the Preferred Alternative, broken down by phase.[233] Escalation is factored in to account for changes in cost over the duration of the construction period. The Preferred Alternative would cost approximately $11.12 billion (in 2021 dollars) over a construction period of 13 years, broken into four phases.

Table 14-1. Estimated Preferred Alternative Construction Duration and Costs

	Phase 1	Phase 2	Phase 3	Phase 4	Total
Construction Duration	3.3 Years	2.7 Years	2.7 Years	4.3 Years	13 Years
Total Construction Cost	$1,567,365,405	$2,434,550,499	$2,026,325,291	$5,089,194,791	$11,117,435,986

Values in 2021 dollars. Durations rounded.

Construction activities and costs would vary over the course of construction. Therefore, the number of jobs supported by construction spending would vary depending on the year of the construction period. The analysis considers full- and part-time annual average jobs for both employees and self-employed workers, including seasonal workers. **Table 14-2** shows the estimated annual number of jobs that construction of the Preferred Alternative would support. These estimates were developed using the software model IMPLAN as described in Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 14.4.2, *Construction Impacts*.

On average, the Preferred Alternative would support annually approximately 4,390 direct jobs and 1,956 indirect and induced jobs, for a total of approximately 6,346 jobs. Direct jobs would occur within the construction and architectural, engineering and related services industries. The indirect and induced jobs would occur in a wider range of industries such as wholesale trade; restaurants; real estate; hospitals; retail; and physicians.

For purposes of comparison, the total annual average number of direct jobs that the Preferred Alternative would support for the duration of the construction period represent approximately 0.6 percent of total jobs in the two relevant sectors in the Washington-Arlington-Alexandria Metropolitan Statistical Area as of August 2022. [234]

[233] The estimates used for modeling construction job impacts are rough-order-of-magnitude estimates taken from Amtrak's *Washington Union Station, Terminal Infrastructure Project, Cost and Schedule Analysis: Revised Alternative* (August 2022). These estimates include the construction of the entire overbuild deck above the rail terminal between the back of WUS and K Street NE.

[234] Bureau of Labor Statistics *Economy at a Glance. Washington-Arlington-Alexandria, DC-VA-MD-WV.* Accessed from https://www.bls.gov/eag/eag.dc_washington_md.htm. Accessed on November 2, 2022. The two sectors considered are Mining, Logging, and Construction (130,600 jobs) and Professional and Business Services (666,600 jobs).

Table 14-2. Preferred Alternative Construction Employment Estimates

Phase	Construction Year	Direct Employment	Indirect Employment	Induced Employment	Total Employment
1	**1**	3,085	345	1,030	4,460
1	**2**	3,085	345	1,030	4,460
1	**3**	3,085	345	1,030	4,460
1 and 2	**4**	4,004	448	1,336	5,788
2	**5**	4,359	488	1,455	6,302
2	**6**	4,359	488	1,455	6,302
3	**7**	3,763	421	1,256	5,440
3	**8**	3,763	421	1,256	5,440
3 and 4	**9**	4,389	491	1,465	6,345
4	**10**	5,794	648	1,934	8,376
4	**11**	5,794	648	1,934	8,376
4	**12**	5,794	648	1,934	8,376
4	**13**	5,794	648	1,934	8,376
Annual Average		4,390	491	1,465	6,346

14.5.3.4 Washington Union Station Revenue

Construction of the Preferred Alternative would have a major adverse impact on WUS revenue.

Construction of the Preferred Alternative would affect the two main sources of WUS revenue: retail and parking. The retail closures due to the column removal work would affect the revenue derived from the retail lease. At this stage, it is not possible to quantify the resulting financial impact on the affected retail outlets, lease holders, and USRC. However, given the duration of the anticipated closure (at least approximately 2 years and 6 months overlapping with Phases 1 and 2 of construction), it is likely to be major. There is also the possibility that, given the duration of the closure, the displaced outlets would not return to WUS after the completion of the work. If this occurs, and if new tenants do not replace the displaced businesses, the construction impacts could become permanent.

Construction-related disruptions in WUS access and the demolition of the parking garage would further cause a major reduction in the revenue accruing to WUS from parking operations. During the first three phases of construction, some parking would remain available but changes in access and rerouting may reduce the number of users and the revenue generated by parking. During Phase 4, which would start approximately 8 years and 9 months after the beginning of construction and last approximately 4 years and 3 months, parking would no longer be available.

14.5.3.5 Other Economic Benefits or Impacts

Construction of the Preferred Alternative would have a moderate beneficial impact on the regional economy.

Construction of the Preferred Alternative would have a moderate regional beneficial economic impact from the spending of the income generated by the jobs construction of the Project would generate. **Table 14-3** shows annual estimates of this income. The Preferred Alternative construction would produce from $296 to $557 million in estimated annual labor income (including employee compensation and proprietor income) depending upon the year. Annual value added, which is the combination of labor income, other property type income and indirect business taxes, would range from $414 million to $778 million depending upon the year. Annual total output, or the value of production, would range from $688 to $1,293 million depending upon the year. These economic outputs would spread benefits throughout the Washington DC metropolitan region. While substantial, the impact would be moderate in the context of the Washington-Arlington-Alexandria Metropolitan Area. In 2020, the gross domestic product of this area was approximately $561 billion.[235]

Table 14-3. Preferred Alternative Construction Annual Labor Income, Value, and Output

Phase	Construction Year	Annual Labor Income	Annual Value	Annual Total Output
1	**1**	$296,409,926	$414,377,805	$688,287,562
1	**2**	$296,409,926	$414,377,805	$688,287,562
1	**3**	$296,409,926	$414,377,805	$688,287,562
1 and 2	**4**	$384,694,863	$537,799,173	$893,292,250
2	**5**	$418,846,225	$585,542,399	$972,594,444
2	**6**	$418,846,225	$585,542,399	$972,594,444
3	**7**	$361,601,684	$505,515,164	$839,668,041
3	**8**	$361,601,684	$505,515,164	$839,668,041
3 and 4	**9**	$421,718,952	$589,558,441	$979,265,147
4	**10**	$556,720,252	$778,288,769	$1,292,748,967
4	**11**	$556,720,252	$778,288,769	$1,292,748,967
4	**12**	$556,720,252	$778,288,769	$1,292,748,967
4	**13**	$556,720,252	$778,288,769	$1,292,748,967

Values in 2019 dollars.

[235] U.S. Bureau of Economic Analysis. *Gross Domestic Product by Metropolitan Area, 2020.*Accessed from BEA Interactive Data Application. Accessed on November 2, 2022.

14.5.4 Comparison to Existing Conditions

The Preferred Alternative, which would have an adverse impact on employment relative to the No-Action Alternative because of the smaller size of the private air rights development, would have a beneficial impact relative to existing conditions, as it would only add to employment in the Project Area. Other impacts would generally be the same relative to both baselines. However, because the District's economy would grow between the present and 2040, the impacts of the Preferred Alternative would be relatively greater when compared to existing conditions than they would be when compared to No-Action Alternative conditions. But given the respective size of the existing economy and the impacts, the difference would be small.

14.6 Summary of Impacts

Table 14-4 and **Table 14-5** summarize the impacts of the No-Action Alternative and the Preferred Alternative.

14.7 Avoidance, Minimization and Mitigation Evaluation

The Preferred Alternative would result in a substantial permanent loss of revenue to WUS due to a loss of parking space. USRC would work to identify and securing new potential sources of funding.

14.8 Permits and Regulatory Compliance

There are no compliance efforts or permits applicable to this resource.

Table 14-4. Summary of Impacts

Impact Category	Type of Impact	No-Action Alternative	Preferred Alternative
Demographics	**Direct Operational**	Minor impact	Negligible impact
	Indirect Operational	Negligible impact	Minor impact
	Construction	No Impact	No impact
Community Disruption and Other Social Benefits	**Direct Operational**	Moderate beneficial impact	Major beneficial impact
	Indirect Operational	No impact	Minor beneficial impact
	Construction	Minor adverse impact	Moderate adverse impact
Employment	**Direct Operational**	Moderate beneficial impact	Minor adverse impact
	Indirect Operational	Minor beneficial impact	Minor beneficial impact
	Construction	Minor beneficial impact	Minor beneficial impact
WUS Revenue	**Direct Operational**	No Impact	Major adverse impact
	Indirect Operational	Negligible beneficial impact	Minor beneficial impact
	Construction	Minor adverse impact	Major adverse impact
Other Economic Impacts	**Direct Operational**	Minor beneficial impact	Minor beneficial impact
	Indirect Operational	Minor beneficial impact	Minor beneficial impact
	Construction	Moderate beneficial impact	Moderate beneficial impact

Table 14-5. Quantitative Estimates of Impacts by Alternative[1]

Alternative	Area Employment	WUS Revenue	Construction Employment	Construction Economic Impacts
No-Action	+8,500 new jobs from private air rights development	No change	Not available	Not available
Preferred Alternative	+1,421 jobs from WUS expansion; -4,410 jobs from reduction in size of private air rights development; +1,290 jobs from potential Federal air rights development	52.5 percent reduction in revenue	Annual average of 6,346 jobs supported for 13 years	Total construction cost of $11.12 billion would spur economic output of $688 to $1,293 million annually to the region

1. All numbers are approximate estimates.

15 Public Safety and Security

15.1 Overview

This section addresses the potential impacts of the Preferred Alternative on public safety and security conditions. This section also identifies measures that the Federal Railroad Administration (FRA) is proposing to avoid, minimize, or mitigate potential adverse impacts as well as relevant permitting and regulatory compliance requirements.

15.2 Regulatory Context

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 15.2, *Regulatory Context*.

15.3 Study Area

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 15.3, *Study Area*. The Local Study Area includes the Project Area with a half-mile buffer. The Regional Study Area includes the relevant service boundaries for fire, law enforcement, and emergency services in the District. These include Amtrak Police, Amtrak Emergency Management and Corporate Security (EMCS), Metro Transit Police, U.S. Park Police, and U.S. Capitol Police.

15.4 Methodology

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report,* Section 15.4*, Methodology.*

15.5 Impacts of the Preferred Alternative

This section presents the impacts of the Preferred Alternative on public safety and security. Impacts are first summarized in bold lettering, followed by a supporting description and analysis. Direct and indirect operational impacts as well as construction impacts are considered. Operational impacts are assessed relative to the No-Action Alternative. A brief assessment of the impacts relative to existing conditions is also provided.

15.5.1 Direct Operational Impacts

Relative to the No-Action Alternative, the Preferred Alternative would have a major beneficial direct operational impact on public security and a moderate adverse direct operational impact on public safety.

The Preferred Alternative could potentially have adverse impacts on security at WUS due to the increase in passenger and visitor volumes. Relative to the No-Action Alternative, combined average daily passenger volumes for Amtrak, Maryland Area Regional Commuter Train (MARC), Virginia Railway Express (VRE), and intercity buses would increase from 77,500 to 128,200, or a 65 percent growth based on projections generated for this Environmental Impact Statement. Increased passenger and visitor volumes, deliveries, support services, and maintenance would generate additional car and truck traffic next to, above, and within the rail terminal. The new below-ground pick-up and drop-off, and parking facility would bring vehicles directly under the rail terminal and deck-level development via a ramp below the Metrorail Red Line tunnel. The integrated bus facility would bring vehicles directly under the deck, next to the train hall and the private air rights development. These features would increase the risk of vehicle-related crashes and vehicle-based attacks such as the use of vehicle-borne improvised explosive devices (VBIED), as well as chemical, biological, radiological, nuclear and explosive (CBRNE) threats.

This potential impact would be offset by the security improvements that would result from the Preferred Alternative, resulting in a net impact that would be beneficial and major. The Project Proponents coordinated with the Federal Protective Service (FPS) and Department of Homeland Security when planning concourses, new loading dock, and new bus facility. [236] During the initial stages of planning for the Project, FRA and the Project Proponents completed a Threat, Vulnerability, and Risk Assessment (TVRA) to identify threats to WUS. At a minimum, the design and operation of the Preferred Alternative would incorporate recommended safety and security principles, such as clear sightlines, adequate and intuitive access for emergency responders, appropriate levels of patrol and video surveillance, and spatial flexibility for future security measures. The design of the Preferred Alternative would allow for the potential screening of passengers and their luggage when entering the ticketed area to board trains. Amtrak would review and approve plans to ensure that applicable vertical clearances are met, resulting in no adverse impacts on the safety of rail operations.

In contrast to the No-Action Alternative, in which no pre-screening of the goods delivered through the WUS loading docks would occur, FPS would provide screening services at an existing or to-be-constructed screening facility in the Preferred Alternative.[237] These services would be provided in coordination with Amtrak EMCS and Union Station Redevelopment Corporation (USRC). FPS confirmed

[236] FRA and the Project Proponents engaged in coordination with FPS over the development of the Project. See Appendix A5b, *Washington Union Station Expansion Project Action Alternatives Refinement Report*, Section 1, *Introduction*; Section 2, *Preliminary Alternatives Planning and Design Refinements;* and Appendix A-2, *Compendium of Relevant Studies*, of the 2020 DEIS.

[237] Loading dock deliveries includes those for the Commissary (food and beverage for Amtrak trains), retail (including restaurants), and Package Express, a service that ships packages via Amtrak trains.

that it could accommodate expected deliveries to WUS via road in 2040. Bus operations would be subject to some level of screening through authentication and passenger screening practices, but not through physical screening of buses at WUS. Bus or train maintenance activities would not be affected, as they take place outside the Project Area at facilities owned by the bus and train operators.

Increased activity at WUS would also result in greater demands on emergency services at WUS, with potential increases in personnel and equipment maintenance costs. The Amtrak Police Department (APD) and Amtrak EMCS would likely need to add staff in order to continue effectively policing the station and to coordinate further with the Metropolitan Police Department (MPD) and U.S. Capitol Police. Emergency responders would need to allocate additional resources to firehouses and police service areas to cover the additional passengers. Additionally, medical responders would have to deal with changing traffic patterns and additional entry/exit points. Additional resources would need to be allocated to training personnel in navigating this new geography. While this would adversely affect emergency services, the adverse impact would be moderate because growth would take place over time and the various affected services would have time to plan to avoid personnel shortages or a significant deterioration of response times.

15.5.2 Indirect Operational Impacts

Relative to the No-Action Alternative, the Preferred Alternative would have minor adverse indirect operational impacts on public safety and security.

The potential transfer and development of the Federal air rights in the Preferred Alternative would bring additional resident and working population to WUS and place another large development over the station's tracks and platforms. This would increase further the risk of vehicle-based crashes and attacks as well as potential demand on emergency services. This indirect impact would be minor in the context of the total number of vehicles trips and activities at WUS. Planning for the rail terminal and requirements for the Federal air rights development would address communications devices that may interfere with train signaling and radio frequency devices.

15.5.3 Construction Impacts

Construction of the Preferred Alternative would have major adverse impacts on security and moderate adverse impacts on public safety.

Construction of the Preferred Alternative would have major adverse impacts on security because construction operations would require granting access to WUS and the rail terminal to a large number of workers and vehicles for approximately 13 years. Entrance and exit points would change depending on the phase but at any time, deliveries and loading of construction materials would use multiple access points.

Physical and non-physical access by workers would pose risks as well. Physical access to the construction site may make it a target for terrorism and criminal activity. Non-physical access to construction information, such as scheduling dates, storage locations, and management activities may also make the site vulnerable to criminality.

Construction would also affect operational station security. Vehicles and workers may have access to internal station areas not normally accessible to the public. Construction vehicles and large construction equipment such as cranes may disrupt video monitoring and patrolling of select areas of WUS, leading to diminished security monitoring.

All these security risks would be compounded by the size of the construction site, the sensitivity of WUS as a major transportation hub and potential target, and the duration of the construction, which would involve large numbers of workers on multiple shifts for more 13 years.

Construction of the Preferred Alternative would have adverse impacts on public safety because construction inherently poses safety risks. These risks result from the wide range of simultaneous activities large construction projects involve. Adverse impacts on safety may arise from the physical disturbance associated with construction. Examples include the excavation of open trenches or pits; the movement and operation of large motorized equipment and trucks; or the closure of sidewalks, disruption of well-used pathways, and changes in traffic patterns.

The impacts on public safety would be moderate because most construction-related activities would take place within the Project Area; members of the public would not have access to the construction zone; and appropriate measures, as described in **Section 15.7**, *Avoidance, Minimization and Mitigation Evaluation*, would be implemented.

On site, work would comply with applicable Occupational Safety and Health Administration (OSHA) requirements and guidelines for general and construction industries. Construction activities within the rail terminal would also be subject to Amtrak's requirements and authorization. Construction occurring within 25 feet of any rail track or overhead catenary system requires Amtrak approval, compliance with Amtrak safety requirements and training, and the use of track protection personnel. Specific clearances to active track and catenary must be maintained during construction. Joint Development Crane operations are subject to strict policies when operating over live tracks. Emergency egress in accordance with the standards defined in National Fire Protection Association (NFPA) 130 would be maintained at all times.[238] Construction work in the vicinity of the DC Streetcar would require contractors to comply with the safety training requirements of the DC Streetcar Track Allocation Program. Safety issues related to tunneling below the existing Metrorail tunnel to build the access ramp to the below-ground facility would be addressed in coordination with the Washington Metropolitan Area Transit Authority (WMATA) as part of Joint Development and Adjacent Construction (JDAC) Program coordination.

Within WUS, the First Street Tunnel column removal work would potentially involve the demolition of existing flooring and structural elements within parts of the Retail and Ticketing Concourse. As explained in **Section 15.7**, *Avoidance, Minimization and Mitigation Evaluation*, physical risks to persons (for instance trip and fall accidents) would be avoided by closing off the area and ensuring it is only accessible to authorized personnel.

[238] NFPA 130 (available at https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=130) specifies fire protection and life safety requirements for underground, surface, and elevated fixed guideways transit and passenger rail systems.

Outside the construction site, construction of the Preferred Alternative would require operating and moving equipment and other materials on public streets throughout each phase of construction over most of the entire construction period of approximately 13 years. The movement of heavy trucks and heavy material would pose safety risks. Trucks traveling on public streets could cause conflicts and accidents with other vehicles, pedestrians, and bicyclists. Sidewalk, bike lane, and road closures as well as the creation of temporary drop-off and pick-up areas may cause confusion for drivers, bicyclists and pedestrians in a changing environment, increasing the risk of conflicts. Construction may diminish lines of sight. These risks would be minimized and mitigated as described in **Section 15.7**, *Avoidance, Minimization and Mitigation Evaluation.*

Construction would potentially affect emergency response services when road closures are in effect. Lane closures with various timing plans may take place throughout the construction period. Construction activities would not affect nearby schools or other public facilities from a public safety perspective, as they would take place at least one block away from these facilities.

There would likely be hazardous materials (such as fuel, lubricants, or solvents among others) and hazardous waste stored on the construction site. These must be contained securely, and in accordance with all applicable occupational health and safety regulations. Spills or leaching of these materials can cause danger to people and property in the vicinity (see **Section 4.5.3**, *Construction Impacts*). Emergency and security personnel would need to be prepared to encounter potentially hazardous materials if they respond to an emergency at WUS during construction.

15.5.4 Comparison to Existing Conditions

Relative to existing conditions, the Preferred Alternative would have a major beneficial direct operational impact on security and moderate adverse direct operational impacts on public safety. Although the increase in passenger and visitor volumes at WUS would be greater when compared to existing conditions than when compared to the No-Action Alternative (from 58,400 to 128,200, or a 120 percent growth instead of 65 percent), the security features included in the alternative would offset this increase and improve conditions as would be the case relative to the No-Action Alternative. The potential increase in demand on police and emergency services would also be proportionately greater when compared to existing conditions than when compared to the No-Action Alternative, since existing conditions do not include the private air rights development and its residential and working population. The adverse impact would be moderate, as affected services would have ample time to plan for the increase.

15.6 Summary of Impacts

Table 15-1 summarizes the impacts of the No-Action Alternative and the Preferred Alternative.

Table 15-1. Summary of Impacts

Resource Category	Type of Impact	No-Action Alternative	Preferred Alternative
Security	**Direct Operational**	Major adverse impact	Major beneficial impact
	Indirect Operational	Minor adverse impact	Minor adverse impact
	Construction	Moderate adverse impact	Major adverse impact
Safety	**Direct Operational**	Moderate adverse impact	Moderate adverse impact
	Indirect Operational	Minor adverse impact	Minor adverse impact
	Construction	Moderate adverse impact	Moderate adverse impact

15.7 Avoidance, Minimization and Mitigation Evaluation

Based on the determination of impacts relative to the No-Action Alternative, FRA is proposing the following minimization and mitigation measures:

- **Safety and Security Staffing Levels due to Increased Passenger Volumes:** The growth in use of WUS would have a major impact on the safety and security of the traveling public. Additionally, while the Preferred Alternative allows for the potential screening of railroad passengers, the specific manner of screening or the impacts of such screening on the rail service desirability are not known at this time. To address the increased risks due to increased passenger volumes, Union Station Redevelopment Corporation (USRC), in coordination with relevant Federal agencies, would develop a *Safety and Security Operations Plan***.** The plan would identify procedures appropriate to the level of passenger activity; evaluate appropriate passenger screening practices; and identify funding for these purposes.
- **Increased Safety risks and security threats due to Increased Vehicular Volumes:** The planned growth in the use of WUS would result in growth in vehicular travel in and around WUS. This anticipated growth would increase the risk of vehicle-based attacks, including VBIEDs; traffic accidents; and vehicle-pedestrian accidents. To address this risk, USRC, in coordination with relevant Federal law enforcement and security agencies, would identify security features, such as for example bollards, that the Project design would incorporate, including measures recommended in the TVRA, as appropriate.
- **Public Safety and Security Threats impacts from Construction:** Construction activities in the Preferred Alternative would pose risks to public safety due to both the general nature of

construction and WUS's specific operational constraints. Security threats would arise from the movement of goods, equipment, and people in and out of the Project Area. USRC would develop a Construction Safety and Security Plan for the Project. This plan would include procedures to screen people, equipment, and goods, and to reduce the risk of injury to workers, passengers, and passers-by from construction activities. It may also include background checks for contractors and their employees.

- **Public Safety Risks from Construction Traffic:** To minimize risks to the public, USRC would require the construction contractor to ensure that the movement of heavy motorized equipment and trucks in and out of the construction site is through designated access points and designated truck routes only. USRC would also require the construction contractor to use flaggers as needed to prevent conflicts between trucks and street traffic; the construction contractor would be required to ensure that construction-related traffic proceeds in compliance with applicable speed limitations and other District traffic laws.
- **Public Safety Risks from Column Removal Work:** USRC would require the construction contractor to put in place temporary walls and partitions to close off the portions of the historic station building where the column removal work would be conducted from the areas remaining accessible to the public or to station or Amtrak employees. These walls and partitions would be sufficient to provide fire protection at least equal to that provided by the existing floor and walls. Only authorized personnel would have access to the closed off area.
- **Potential Risks to WUS from bus facility integrated within the Deck Structure**: USRC would ensure that the facility and deck are designed in accordance with the recommendations of the TVRA and in a manner that minimizes risks to adjacent development.
- **Indirect Impacts of Federal Air rights Development on Safety and Security:** To mitigate the impacts of the potential Federal air rights development, FRA would ensure that any new owner, transferee, or lessee develop a safety and security plan that Amtrak and FRA would review and approve in any sale, transfer, or lease of the Federal air rights.

15.8 Permits and Regulatory Compliance

Table 15-2 lists the regulatory requirements and processes that the Project would follow.

Table 15-2. Permits and Regulatory Compliance for Safety and Security[239]

Permitting Entity	Description and Laws/Regulations	Potential Permits and Processes
FRA	Is responsible for the safety of the railroad system. - FRA Safety Standards (49 Code of Federal Regulations [CFR] 200 – 299) - US Code on Railroad Safety (49 United States Code [USC] 20101 et seq);	Compliance with safety standards and railroad safety statute. FRA may inspect the Project for adherence to these regulations.
Amtrak	Is responsible for assessing and implementing safety and security measures for the Northeast Corridor (NEC) and its trains in the Study Area and commuter services, in collaboration with Amtrak, are responsible for assessing and implementing safety and security measures for their trains in the Study Area.	Meeting Amtrak Safety and Security Regulations. Amtrak would have approval authority over measures taken to address the safety of the railroad operations and Station activity as identified.
Transportation Security Administration (TSA)	Oversees the security of the transportation system. - Department of Homeland Security/Transportation Security Administration Regulations concerning Rail Transportation Security (49 CFR 1580)	TSA may perform inspections of WUS for compliance with Federal law.
WMATA	WMATA's JDAC program reviews, approves and coordinates projects adjacent to Metrorail and Metrobus property, facilities, and operations in order to Protect WMATA infrastructure, operations, and ensure passenger safety from adjacent work. It provides coordination of design, safety, operations, constructability and compliance with WMATA standards.	Section 5, *Safety, Operational Requirements and Compliance*, of the *Adjacent Construction Project Manual* outlines procedures and requirements pertaining to safety and security.
District Public Space Committee	The District Public Space Committee reviews and renders decisions on a range of permit applications for the use and occupancy of the public right of way. The committee is staffed by the District Department of Transportation, the District Department of Buildings, the Office of Planning, and the Secretary of the District of Columbia.	The committee reviews and approves items that do not fall within the regular permitting process such as over-height retaining walls; over-height fences; and security bollards.

[239] See **Table 9-2** of this report for Federal Aviation Administration requirements related to the height of Federal air rights development structures.

16 Public Health, Elderly and Persons with Disabilities

16.1 Overview

This section addresses the impacts of the Preferred Alternative on public health and the welfare of the elderly and persons with disabilities. In accordance with the Federal Railroad Administration (FRA)'s *Procedures for Considering Environmental Impacts*, it also considers the impacts of the Preferred Alternative on the transportation and general mobility of the elderly and persons with disabilities.[240] This section also identifies measures FRA is proposing to avoid, minimize, or mitigate potential adverse impacts as well as permitting and regulatory compliance requirements.

16.2 Regulatory Context

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 16.2, *Regulatory Context*.

16.3 Study Area

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 16.3, *Study Area*. The Local Study Area for impacts on public health, the elderly, and persons with disabilities includes the Project Area and a half-mile buffer. There is no Regional Study Area because impacts on a regional level are not anticipated. Potential impacts to public health, the elderly, and persons with disabilities would be local.

[240] Federal Railroad Administration. 1999. *Procedures for Considering Environmental Impacts*. 64 Federal Register (FR) 28545, Section 12, May 26, 1999 as updated by 78 FR 2713, January 14, 2013.

16.4 Methodology

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 16.4, *Methodology*.

16.5 Impacts of the Preferred Alternative

This section presents the impacts of the Preferred Alternative on public health and the transportation and mobility of the elderly and persons with disabilities. Impacts are first summarized in bold lettering, followed by a supporting description and analysis. Direct and indirect operational impacts as well as construction impacts are considered. Operational impacts are assessed relative to the No-Action Alternative. A brief assessment of the impacts relative to existing conditions is also provided.

16.5.1 Direct Operational Impacts

Relative to the No-Action Alternative, the Preferred Alternative would have negligible adverse direct operational impact on public health. It would have a major beneficial direct operational impact on the transportation and mobility of the elderly or persons with disabilities at WUS.

The Preferred Alternative would not introduce in the Study Area functions or activities that could adversely affect public health. The Preferred Alternative would include an air conditioning strategy that would isolate areas within which fumes, heat, and noise associated with operating diesel trains occur from areas where passengers and visitors would wait or remain for any significant amount of time. The tracks and platform areas would ventilate to the outside of the station.

Relative to the No-Action Alternative, ambient noise levels would increase at several locations under the Preferred Alternative, as explained in **Section 10.5.1.1**, *Operational Noise*. However, increases would generally not exceed 3 A-weighted decibels (dBA) and, as such, would be barely perceptible and negligible. Nowhere would noise levels reach levels that could cause noise-induced hearing loss (NIHL).[241] Noise levels would reach or exceed 70 dBA (day-night average) in the Preferred Alternative but not the No-Action Alternative at three modeled locations (**Section 10.5.1.1**, **Table 10-1**). The U.S. Environmental Protection Agency (EPA) has identified 70 decibels as the level of environmental noise which will prevent any measurable hearing loss over a lifetime.[242] The standard assumes 24-hour, 365-day exposure over a period of 40 years. It is unlikely that anyone would be exposed to noise generated by the Preferred Alternative long and steadily enough to experience hearing loss. Impacts would be

[241] NIHL from long-term exposure to elevated noise levels becomes a consideration only with long and repeated exposure to noise levels of 85 decibels (dBA) and higher (National Institute on Deafness and Other Communication Disorders, *Noise-Induced Hearing Loss*. Accessed from https://www.nidcd.nih.gov/health/noise-induced-hearing-loss, accessed on November 10, 2022).

[242] U.S. Environmental Protection Agency. Noise Effects Handbook. Accessed from https://www.nonoise.org/library/handbook/handbook.htm. Accessed on November 10, 2022. (https://www.epa.gov/archive/epa/aboutepa/epa-identifies-noise-levels-affecting-health-and-welfare.html; accessed on November 11, 2022).

negligible. Vibration impacts in the Preferred Alternative would be minor, with no potential to affect public health.

The Preferred Alternative would have a major beneficial impact on the transportation and mobility of the elderly and persons with disabilities by making it easier to access and navigate WUS. It would bring WUS into full compliance with applicable accessibility codes and regulations. These include the *2010 Americans with Disabilities Act (ADA) Standards for Accessible Design* and provisions of Chapter 11 of the *2017 District of Columbia Building Code.*[243] The latter incorporates Appendix E of the *International Building Code* as they relate to design and construction of facilities for accessibility by persons with physical disabilities. This would remedy accessibility shortcomings that the No-Action Alternative would not address. Elevators and wheelchair ramps would be provided as required. The parking facility would contain sufficient handicapped and van spaces (at least nine for a facility with 401 to 500 spaces, or at least two percent for a facility with more than 500 spaces, including van-accessible space).[244] The new platforms would be wider and would allow for level boarding, addressing a significant existing shortcoming.

Several other features would benefit the elderly and persons with disabilities as well as the general public. New entrances to WUS on First, Second, and H Streets NE would reduce the distance many persons must travel within WUS to reach their trains or buses. Improved private pick-up and drop-off areas in front of WUS and new ones on First and Second Streets NE, next to the train hall, and in the new below-ground facility would also facilitate access.

The new concourses and train hall would provide climate-controlled, more spacious transitional spaces than the existing Claytor Concourse, which would remain in the No-Action Alternative. The new bus facility would provide upgraded waiting spaces and other amenities relative to the existing ones, which the No-Action Alternative would keep in their current condition. The bus facility would be integrated with the train hall and provide more direct, easier and friendlier access to the historic station building than in existing conditions.

By making boarding and alighting from trains or buses easier and reducing congestion in transitional spaces such as concourses, the Preferred Alternative would reduce trip, slip, and fall risks, which are a consideration in an environment where people are often moving hurriedly and encumbered with luggage. While this would benefit all passengers and visitors, it would particularly benefit the elderly and persons with disabilities, making it easier for them to navigate the station and move between multimodal elements.

Increased accessibility at WUS would also provide direct access to the Kaiser Permanente Capitol Hill Medical Center on 700 Second Street, NE at the corner of Second Street NE and H Street NE. The new H

[243] US Department of Justice. *2010 ADA Standards for Accessible Design*. Accessed from https://www.ada.gov/2010ADAstandards_index.htm. Accessed on November 10, 2022; District of Columbia. *2017 Building Codes*. Accessed from https://dob.dc.gov/node/1615636. Accessed on October 26, 2022.

[244] Americans with Disabilities Act National Network. 2017. *Accessible Parking*. Accessed from https://adata.org/factsheet/parking. Accessed on November 9, 2022.

Street entrance to the station would provide the public, the elderly, and persons with disabilities a new access to the medical center when using public transportation.

16.5.2 Indirect Operational Impacts

Relative to the No-Action Alternative, the Preferred Alternative would have negligible adverse indirect operational impacts on public health and minor adverse indirect operational impacts on the transportation and mobility of the elderly and persons with disabilities outside WUS.

As explained in **Section 6.5.2**, *Indirect Operational Impacts*, of this report, the Preferred Alternative would result in increased emissions of air pollutants at a regional level. No indirect impacts on public health would result from mesoscale air quality emissions. The air quality mesoscale analysis indicates that the Preferred Alternative would cause additional emissions of all criteria pollutants relative to the No-Action Alternative. However, these emissions would not result in exceedances of the National Ambient Air Quality Standards (NAAQS). The purpose of the NAAQS is in part to provide public health protection and protect the health of sensitive populations such as asthmatics, children, and the elderly. While there are health risks associated with any level of air pollution, emissions associated with the Preferred Alternative are not likely to measurably increase these risks. Additional emissions of mobile source air toxics (MSAT) cannot be quantified but are expected to be minor and regional MSAT levels expected to be lower by 2040 than currently. Public health impacts linked to air pollution would be negligible.

There would be minor adverse indirect impacts on the transportation and mobility of the elderly and persons with disabilities in the Preferred Alternative. Increased roadway traffic may create an actual or perceived barrier to the transportation and mobility of such persons near WUS because of the greater potential for conflict between pedestrians and vehicles. This would occur in the No-Action Alternative as well, but the Preferred Alternative would generate more traffic than the No-Action Alternative, especially along H Street NE, Second Street NE, North Capitol Street, and the north side of Columbus Circle (**Section 5.5.1.12**, *Vehicular Traffic* describes traffic impacts in details).

However, most intersections near WUS have high visibility sidewalks across major approaches, with wheelchair ramps and detectable warning surfaces to aid visually impaired individuals. Most intersections also have accessible pedestrian signal (APS) equipment. Those that do not currently have such equipment are expected to be rebuilt or retrofitted in the next few years. In general, current and future programmed improvements associated with the District's *Vision Zero* goals would improve pedestrian safety for all.[245] The Preferred Alternative has several features that would contribute to offsetting potential risks to pedestrians. These include additional access points (on First, Second, and H Streets NE), which would reduce the distance some persons would need to walk on public streets to reach the station. Also, the reconfiguration of the multiple pick-up and drop-off lanes in front of WUS and the reconfiguration of sidewalks in front of the station would facilitate access to WUS, with fewer

[245] District of Columbia. *Vision Zero*. Accessed from https://visionzero.dc.gov/. Accessed on November 10, 2022.

roadways to cross. The removal of hop-on hop-off and tour bus traffic from that area would also make access to the front of WUS easier.

16.5.3 Construction Impacts

Construction of the Preferred Alternative would result in minor adverse impacts on public health and major adverse impacts on the transportation and mobility of the elderly and persons with disabilities.

Construction of the Preferred Alternative would take approximately 13 years to complete. Construction would take place in four phases moving from east to west plus an Intermediate Phase between Phases 1 and 2 during which only First Street Tunnel column removal work would be conducted. Construction activities, especially on the scale of the Project, inherently generate public-health-related risks. Direct impacts may arise from the physical disturbance associated with construction. Examples include the excavation of open trenches or pits; the movement and operation of large motorized equipment and trucks; or the closure of sidewalks, disruption of known pathways, and changes in traffic patterns.

Potential adverse impacts on public health from these activities would be minor because best management practices that are standard for all large construction sites would minimize risks from physical disturbance. All areas under construction would be fenced, screened, and inaccessible to the public either from the surrounding neighborhoods or from within WUS.

Public health impacts may arise from the air pollution and noise caused by construction work or if a large spill of fuel or hazardous material occurred. For the reasons described in the following paragraphs, these impacts would be minor.

During construction, fuel and hazardous materials would be stored and used on site. Accidental spills may occur, which could pose a risk to public health. As explained in **Section 4.5.3**, *Construction Impacts*, compliance with Federal laws and regulations, including the Emergency Planning and Community Right-to-Know Act (EPCRA), Oil Pollution Act (OPA), and Resource Conservation and Recovery Act (RCRA) requirements would minimize the risk of spilled materials migrating outside the Project Area and coming into contact with the public.

Construction activities would cause air pollutant emissions from the operation of motorized equipment and movement of construction trucks to and from the site. The quantity of emissions would vary with each construction phase, and within each phase, with the type of activity. Quantitative estimates of construction-related emissions of criteria pollutants in the Preferred Alternative are presented in **Section 6.5.3**, *Construction Impacts*, of this report. The estimates include each phase's most emissions-intensive activities. The analysis showed that there would be no exceedance of the applicable *de minimis* levels. As such, these emissions would not adversely affect public health.

During column removal work, when part of the Retail and Ticketing Concourse would be demolished and the tunnel underneath exposed, there is potential for fumes from train engines to enter the station – both public areas and back of house areas – because several tracks would remain active at all times to minimize impacts on train service. These impacts would be avoided by closing off the construction area as described in **Section 16.7**, *Avoidance, Minimization and Mitigation Evaluation*.

Construction of the Preferred Alternative would also cause noise impacts (see **Section 10.5.3**, *Construction Impacts*). Construction workers who are exposed to noise as part of their occupation have an increased risk of NIHL when there is a time-weighted average (TWA) noise exposure of 85 dBA or greater over 8-hours according to the United States Occupational Safety and Health Administration (OSHA). For a 12-hour work shift, the risk of NIHL occurs at a TWA level of 83 dBA. For routine exposure to noise over a 20-hour period, the threshold for NIHL is approximately 81 dBA. Above these noise thresholds, OSHA requires an employer to implement a hearing conservation program, including annually testing employees, monitor sound, and require hearing protection or other engineering noise controls,

These requirements would ensure that workers are protected from NIHL if they are exposed to noise above the relevant thresholds. Members of the general public or WUS workers would not be at risk of exposure to noise levels capable of causing hearing loss. Although noise levels would exceed the 70 dB EPA standard at multiple locations, this standard assumes 24-hour, 365-day exposure over 40 years, well in excess of the duration of any construction activity associated with the Preferred Alternative. Non-authorized persons would not be allowed within the construction site or near noisy equipment. The partitions used to close off the part of the station where the column removal work would take place from the rest of the building would be designed to provide an adequate level of noise shielding. Passers-by or neighbors would be exposed to noise for periods of time short enough for exposure to remain well below the EPA standard. There would be no impacts on public health from noise.

Construction of the Preferred Alternative would have major adverse impacts on the transportation and mobility of elderly persons and persons with disabilities. WUS would continue to operate throughout the construction period of approximately 13 years. During that time, depending on the phase of construction, parts of WUS would be closed to the public. This would result in congested conditions during periods of peak passenger activity. Areas that would remain open to the public may have to be temporarily reconfigured. Access to and from train platforms, bus facility, and parking facility would be relocated as construction proceeds. The disruption of usual pathways within WUS may be confusing to everyday riders and may make WUS more challenging to navigate for occasional users. Combined with increased congestion, it would create a heightened risk of trip, slip, and fall accidents or make access by elderly persons or persons with disabilities more difficult. During Phase 4 of construction, the unavailability of parking would restrict options for access to WUS. It may be more difficult or costly for the elderly and persons with disabilities to switch to alternative modes of access such as transit or for-hire vehicles. During Phase 4, the existing bus facility would be demolished and temporarily replaced with an interim bus facility or bus loading zones on the completed portion of the structural deck (see **Section 5.5.3.4**, *Intercity, Tour/Charter, and Sightseeing Buses*, of this report). These interim facilities would have fewer amenities that the existing and proposed ones and may be more difficult for the elderly and persons with disabilities to use. Phase 4 would last approximately 4 years and 3 months in the Preferred Alternative.

Outside of WUS, temporary sidewalk and lane closures would occur at various times during construction. Temporary relocation of bus stops and rerouting may be necessary. During Phase 1 of construction (lasting approximately 2 years and 4 months), sidewalk or lane closures may make access

to the Kaiser Permanente Medical Building (700 Second Street NE) more challenging, although ADA-compliant access would be maintained at all times.

Although much of the main public spaces in the station, including those in the historic station building, would remain open and unencumbered, access to and from WUS during construction, as well as internal circulation, would unavoidably remain more challenging than normal for the elderly and persons with disabilities. Because of the length of construction (approximately 13 years), this would be a major adverse impact. **Section 16.7**, *Avoidance, Minimization, and Mitigation Evaluation* identifies measures to mitigate this impact.

16.5.4 Comparison to Existing Conditions

The operational impacts of the Preferred Alternative relative to existing conditions would generally be similar to its impacts relative to the No-Action Alternative. The Preferred Alternative would have no adverse direct operational impact on public health and a major beneficial direct operational impact on the transportation and mobility of the elderly and persons with disabilities at WUS. However, it would represent a greater improvement relative to existing conditions than relative to the No-Action Alternative.

Relative to existing conditions, the Preferred Alternative would also have no adverse indirect operational impacts on public health and minor adverse indirect operational impacts on transportation and mobility of the elderly or persons with disabilities outside WUS. Indirect impacts on the transportation and mobility of the elderly and persons with disabilities would be similar as those relative to the No-Action Alternative because, while there would be a proportionately greater increase in traffic, the improvements associated in the Preferred Alternative would similarly offset these impacts. The intensity of impacts from air pollutant emissions and noise would be the same because, for air pollutants, the intensity depends on the absolute level of impacts and, for noise, the resulting noise levels would remain below the level that can cause NIHL.

16.6 Summary of Impacts

Table 16-1 summarizes the impacts of the No-Action Alternative and the Preferred Alternative.

Table 16-1. Summary of Impacts

Impact Category	Type of Impact	No-Action Alternative	Preferred Alternative
Public Health	**Direct Operational**	No impact	Negligible adverse impact
	Indirect Operational	No impact	Negligible adverse impact
	Construction	Minor adverse impact	Minor adverse impact
Transportation and Mobility of Elderly and Persons with Disabilities	**Direct Operational**	Moderate beneficial impact	Major beneficial impact
	Indirect Operational	Negligible adverse impact	Minor adverse impact
	Construction	Moderate adverse impact	Major adverse impact

16.7 Avoidance, Minimization, and Mitigation Evaluation

To avoid, minimize, or mitigate major adverse impacts on public health and on transportation and mobility of the elderly or persons with disabilities during construction, FRA is proposing the following measures:

- Within WUS, Union Station Redevelopment Corporation (USRC) would require the construction contractor to install temporary walls and partitions to close off the portions of the Retail and Ticketing Concourse where the column removal work would be conducted from the areas remaining accessible to the public or to station or Amtrak employees. Only authorized personnel would have access to the area. These walls and partitions would be sufficient to prevent the fumes from train operations in the tunnel, as well as dust from the demolition or construction work and emissions from construction equipment, from entering these areas. They would also provide adequate shielding from noise.
- USRC would ensure that within WUS, accessibility is maintained during construction in compliance with ADA requirements and the District Department of Transportation (DDOT) *Pedestrian Safety and Work Zone Standards*.[246] Pathways within and outside WUS would be planned to avoid creating narrow passages, bottlenecks, or areas otherwise difficult for persons with disabilities or elderly persons with reduced mobility to navigate. Specific

[246] District Department of Transportation. 2010. *Pedestrian Safety and Work Zone Standards: Covered and Open Walkways*. Accessed from https://ddot.dc.gov/publication/ddot-pedestrian-safety-and-work-zone-standards-covered-and-open-walkways. Accessed on November 10, 2022.

consideration should be given to elements that can address situational safety issues for persons with disabilities or elderly persons.

- Outside WUS, where construction would require work within the public right-of-way and the closing of sidewalks, alternative, USRC would require the construction contractor to provide alternative protected pedestrian passages, along with appropriate signage. Signs would be clear and concise and designed to communicate information to visually impaired persons. Where possible, audible directions would be incorporated. Pedestrian pathways would be kept clear of debris and obstructions, adequately drained, and would provide adequate passing spaces. Pedestrian pathways would also have detectable edges or channelizing equipment. Crash-worthy barriers would be used to protect pedestrians from vehicular traffic. Barriers would be equipped with reflective material on the side exposed to traffic.
- USRC would require the construction contractor to ensure that lane closures, detours, alternative parking access, or use of metal plates to cover temporary trenches across roadways are appropriately advertised.
- USRC would require the construction contractor to notify the owners and occupants of the Kaiser Permanente Medical Building of any planned road or sidewalk closures sufficiently in advance to allow them to publicize these disruptions to their patients and customers as appropriate. Temporary entrances or pathways would be clearly marked and advertised. ADA-compliant access to the building would be maintained at all times.

16.8 Permits and Regulatory Compliance

In terms of accessibility and mobility for the elderly and persons with disabilities, the Project must comply with ADA regulations, as well as meet standards set forth by the Transportation Services for Individuals with Disabilities (49 CFR 37) and the U.S. Access Board's ADA Accessibility Guidelines adopted by the U.S. Department of Transportation in 2006. The Project must also meet the District of Columbia Building Code, which includes requirements for accessibility and indoor environmental quality, and is enforced through the building permitting process administered by the District Department of Buildings.

17 Environmental Justice

17.1 Overview

This section evaluates the potential of the Preferred Alternative to cause disproportionately high and adverse impacts on environmental justice (EJ) populations in accordance with Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. EO 12898 requires that Federal agencies identify and address disproportionately high and adverse impacts resulting from Federal projects on minority and low-income communities.

As stated in Federal Transit Administration (FTA) Circular 4703.1, *Environmental Justice Policy Guidance for Federal Transit Administration Recipients*, the United States Department of Transportation (U.S. DOT) must make EJ part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of programs, policies, and activities on minority populations or low-income populations. Consistent with this directive, the Federal Railroad Administration (FRA) is committed to the EJ principles, which include:

- Avoiding, minimizing, or mitigating disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations;
- Ensuring the full and fair participation by all potentially affected communities in the transportation decision-making process; and
- Preventing the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

17.2 Regulatory Context

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 17.2, *Regulatory Context*.

In 2021, the District of Columbia's mayor established the Office of Racial Equity (ORE), which focuses on developing infrastructure to ensure policy decisions and District programs are evaluated through a racial

equity lens.[247] ORE carries forward the implementation of the Racial Equity Achieves Results (REACH Act).[248]

In November 2022, the District released a Draft Racial Equity Action Plan that identified the following goals for the District government:

- Employ staff who understand and are committed to achieving racial equity.
- Commit to eliminating racial and ethnic inequities.
- Commit to meaningfully engaging community in government decision-making processes and strengthening community partnerships.
- Be an equitable employer and engage in racially equitable hiring, promotion, and retention practices.[249]

The draft plan was under public review until January 31, 2023.

17.3 Study Area

Like the 2020 DEIS EJ Study Area (see Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 17.3, *Study Area*), the EJ Study Area for this SDEIS includes Census blocks and block groups that are wholly or partially within one-half mile of the Project Area. This half-mile buffer includes the areas within which the impacts of the Project would be felt.

The Study Area has been updated to reflect current conditions more accurately. Census block level data from the 2020 Census was used to update the description of the racial and ethnic breakdown of the Local Study Area. **Figure 17-1** shows the distribution of minority populations across the Local Study Area. **Table 17-1** shows the total number of minority residents in the Local Study Area and in the District compared to the total population. Minority residents are residents reporting to be of any race or ethnicity except "Not Hispanic or Latino, White alone." **Table 17-2** shows a more detailed breakdown by race or ethnicity.

Table 17-1. Total Minority Population

Area	Total Population	Total Minority Population[1]
Local Study Area	27,465	12,456 (45%)
District	689,546	427,774 (62%)

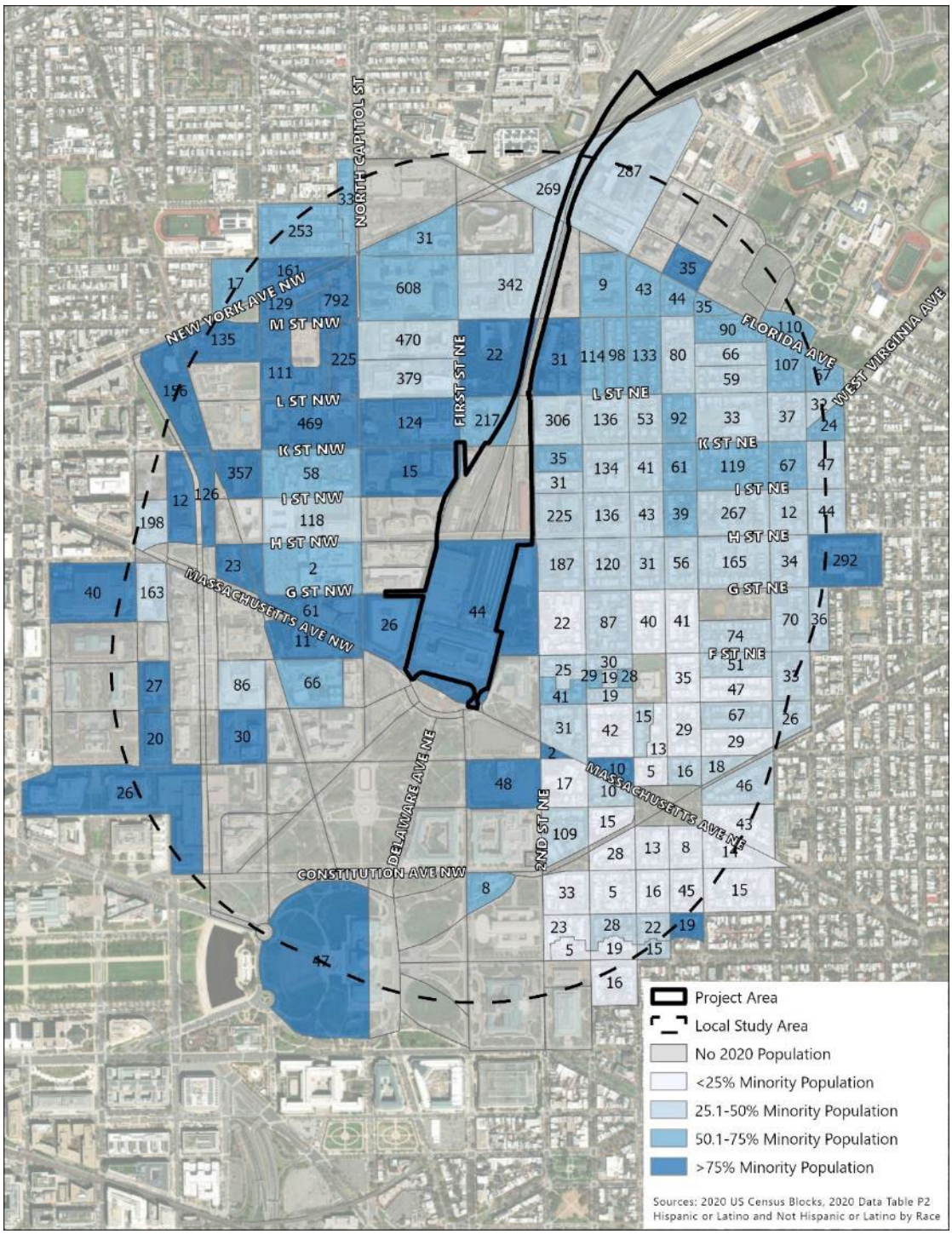
1. Total population other than not-Hispanic or Latino, White-alone population. Source: U.S. Census Bureau.

[247] District of Columbia. *Office of Racial Equity*. Accessed from https://ore.dc.gov/. Accessed on January 25, 2023.

[248] DC Law 23-521.

[249] District of Columbia. *Draft Racial Equity Action Plan*. Accessed from https://ore.dc.gov/sites/default/files/dc/sites/ore/page_content/attachments/ORE_REAP_ENGLISH_DRAFT.pdf. Accessed on January 25, 2023.

Figure 17-1. Distribution of Minority Population[250]



[250] Numbers are the number of minority persons in each block per the 2020 Census.

Table 17-2. Minority Population by Race or Ethnicity

Race or Ethnicity	Local Study Area	% of Total Study Area Population	District	% of Total District Population
Black or African American	7,062	25.7%	285,810	41.4%
American Indian and Alaska Native Alone	61	0.2%	3,193	0.5%
Asian	1,639	6.7%	33,545	4.8%
Native Hawaiian and Other Pacific Islander Alone	23	0.1%	432	0.1%
Some Other Race Alone	643	2.3%	37,294	5.4%
Two or More Races	2,664	8.4%	56,077	8.1%
Hispanic or Latino	2,331	8.5%	77,652	11.3%

Source: U.S. Census Bureau

The most recent American Community Survey (ACS) data (2016-2021) was used to identify low-income populations, based on U.S. Department of Health and Human Services (HHS) poverty guidelines. Due to high median income in the District, households below 150 percent of the HHS poverty guidelines were considered low-income (under $35,000, assuming a household size of three persons, consistent with average household size in the District). **Figure 17-2** shows the distribution of low-income households across the Local Study Area along with the location of affordable housing developments. **Table 17-3** shows the total number of low-income households in the Local Study Area and in the District, compared to the total number of households.

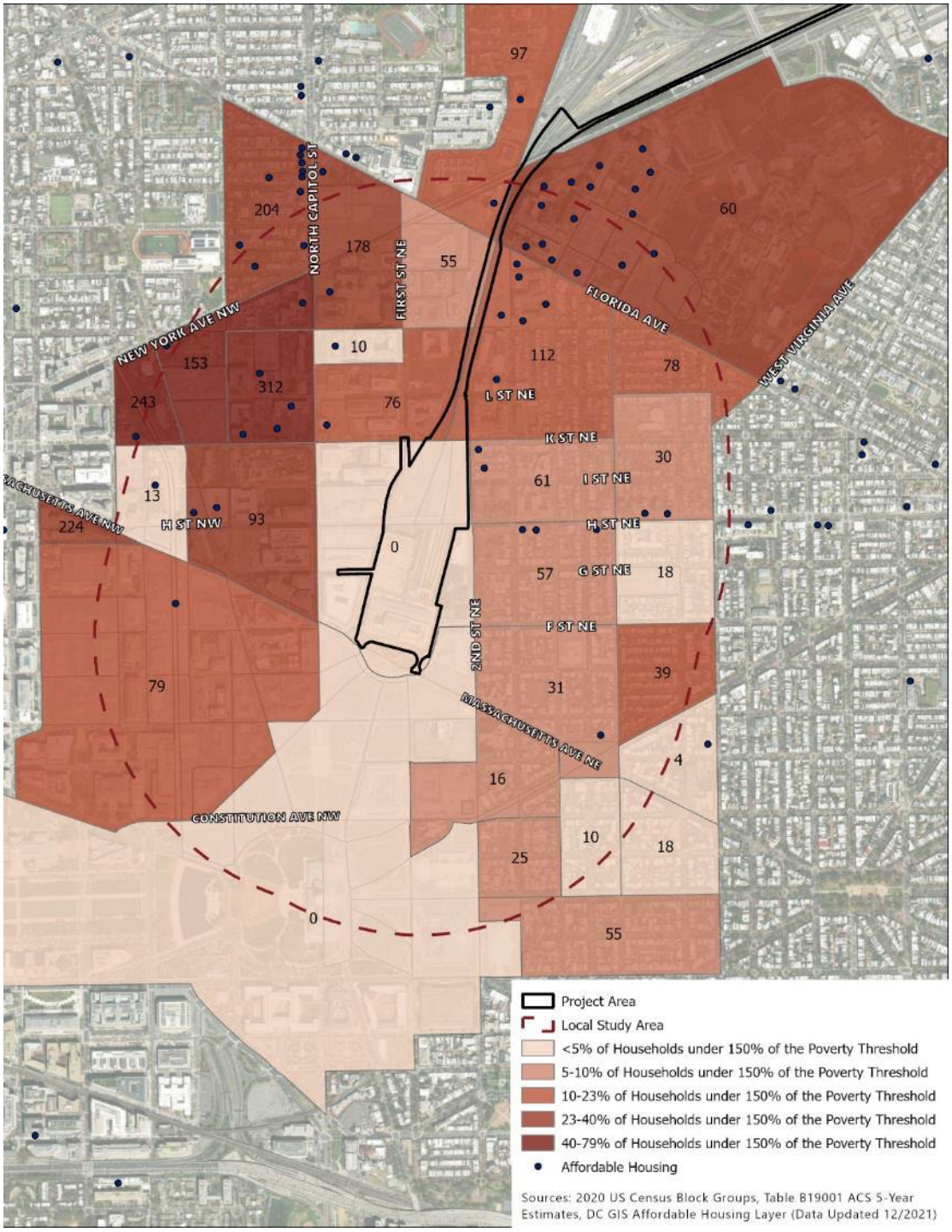
Table 17-3. Low-Income Households

Area	Total Households	Total Low-Income Households
Study Area	13,207	2,351 (18%)
District	319,565	74,139 (23%)

Figures 17-1 and 17-2 indicate an uneven distribution of EJ populations in the Local Study Area, with a noticeable difference between the areas to the east of Second Street NE and those to the west. Minorities make up 40 percent of the residents east of WUS and 58 percent of the residents west of WUS. Low-income households make up 9 percent of all households east of WUS and 27 percent of all households west of WUS.

Figures 17-1 and 17-2 also indicate a concentration of EJ populations along the North Capitol Street corridor north of H Street. A comparison with the 2010 data provided in the 2020 DEIS shows that several blocks just east of North Capitol Street that were empty of residents in 2010 have since been developed and have become home to a substantial proportion of minority residents.

Figure 17-2. Distribution of Low-Income Households[251]



[251] Numbers are the number of low-income households in each block group per 2016-2021 ACS data.

Overall, data from 2010 showed a more balanced distribution of minority population east and west of WUS. Low-income residents were and continue to be mostly concentrated immediately west of North Capitol Street. There is a significant amount of public and low-income housing in the Sursum Corda area to the northwest of North Capitol and K Streets, including the Sibley Plaza complex and the Sursum Corda Banner Lane redevelopment, where residents of the former public housing complex can exercise a right of return.

It can also be noted that several blocks in the Local Study Area with a reported 2020 Census population are empty of any residential uses. Such blocks include WUS itself, the area just west of the Capitol building, and the block occupied by the City Post Office (Postal Museum). This apparent discrepancy between population and land use likely reflects the presence of persons experiencing homelessness in these areas when the Census was taken.

17.4 Methodology

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 17.4, *Methodology*.

17.5 Impact Analysis

This section considers whether the adverse impacts of the Preferred Alternative would disproportionately affect EJ communities and whether their beneficial impacts would be denied to such communities. Determinations (bolded) are made based on existing demographic and economic conditions only, as it is not possible to predict the demographic and economic make-up of the Local Study Area in 2040.

Because the focus is on the distribution of impacts, the organization of this section is different from that of the other sections of this report. All resource categories considered in the report were reviewed as shown in **Table 17-4**. For each resource category, the table summarizes the intensity of the Preferred Alternative's impacts (middle two columns) then assesses whether there is potential for disproportionately high and adverse impacts on EJ communities for this category (right column). By definition, if the Preferred Alternative would have no impacts or negligible impacts, it has no potential for disproportionately high and adverse impacts. Resource categories that would experience more than negligible impacts were screened to determine their potential for disproportionately high and adverse impacts on EJ communities. Based on the findings of this screening, the following resource categories were determined to have at least some potential to result in disproportionately high and adverse impacts and therefore require further analysis: Transportation (Intercity Buses, City and Commuter Buses, and Vehicular Traffic); Noise and Vibration; and Social and Economic Conditions (Community Disruption). These categories are discussed in the following sections.

Table 17-4. EJ Screening of Preferred Alternative

Resource Category	Summary of Key Operational Impacts	Summary of Key Construction Impacts	Potential for Disproportionately High and Adverse Effects on EJ Communities?
Natural Ecological Systems	None.	Minor adverse from the loss of a few street trees during construction.	**No**. The few trees that would be removed would be replaced in accordance with District requirements. Impacts would not be disproportionately borne by EJ communities or appreciably more severe or greater in magnitude for EJ communities than for non-EJ communities.
Water Resources and Water Quality			
Surface Waters	Negligible indirect adverse.	None	**No**. Impacts would be on infrastructure and system capacity. They would not bear directly or affect EJ communities in an appreciably different manner than non-EJ communities. Impacts would not be disproportionately borne by EJ communities or appreciably more severe or greater in magnitude for EJ communities than for non-EJ communities. Beneficial impacts would benefit all District residents and EJ communities would not be excluded.
Groundwater	Moderate adverse from long-term withdrawal.	Moderate adverse from short-term withdrawal.	
Stormwater	Moderate beneficial from compliance with current regulations.	Minor adverse on runoff from erosion and sedimentation.	
Wastewater	Minor adverse from increased generation.	Minor adverse from increased generation.	
Drinking Water	Minor adverse from increased demand.	Negligible adverse.	
Solid Waste Disposal and Hazardous Materials and Waste			
Municipal Solid Waste	Minor direct beneficial from reduction and minor indirect adverse from increase in municipal solid waste needing disposal.	Minor adverse from construction spoil and debris needing disposal.	**No**. Impacts would be on the waste collection and disposal system and would not directly affect individuals, including members of EJ communities. Impacts would not be disproportionately borne by EJ communities or appreciably more severe or greater in magnitude for EJ communities than for non-EJ communities. Beneficial impacts would benefit all District residents and EJ communities would not be excluded.

Resource Category	Summary of Key Operational Impacts	Summary of Key Construction Impacts	Potential for Disproportionately High and Adverse Effects on EJ Communities?
Hazardous Materials and Waste	Negligible adverse from greater use and storage.	Minor adverse from use and storage. Minor beneficial from removal of potential soil contamination.	**No**. Adverse impacts would be negligible or minor and concentrated within the Project Area. Impacts would not be disproportionately borne by EJ communities or appreciably more severe or greater in magnitude for EJ communities than for non-EJ communities. Beneficial impacts would benefit all District residents and EJ communities would not be excluded.
Transportation			
Commuter and Intercity Rail	Major beneficial from increased rail service.	Moderate adverse from limited train delays and cancelations.	**No**. Adverse impacts would be borne by all rail passengers across lines and destination. Available data do not indicate that train riders at WUS are disproportionately minority or low-income.[252] Similarly, beneficial impacts would benefit all rail and bus passengers and would not exclude EJ communities. Impacts would not be disproportionately borne by EJ communities or appreciably more severe or greater in magnitude for them than for non-EJ communities.

[252] Fifty-two percent of respondents to a 2022 VRE customer survey identified as White or Caucasian; 92 percent of respondents reported an annual household income of more than $50,000. Maryland Transit Administration studies (covering 2015-2019) found that 54.42 percent of MARC riders were White or Caucasian, and 82.18 percent had an annual household income of more than $50,000. For comparison, Census data for the Washington Metropolitan Area indicate that 42 percent of residents are White or Caucasian and 79.5 percent have an annual household income of more than $50,000.
Sources: VRE. *Annual Customer Survey. 2022 Customer Opinion Survey Results*. Accessed from https://www.vre.org/sites/vre/assets/File/2022%20Passenger%20Survey%20Report.pdf. Accessed on January 25, 2023. Maryland Transit Authority. *2020-2023 Title VI Program*. Marc passengers: 54.42 percent Caucasian. Accessed from: https://s3.amazonaws.com/mta-website-staging/mta-website-staging/files/Title%20VI/MTA_TitleVIProgram_2020-2023_05.15.2020.pdf. Accessed on January 25, 2023. U.S Census Bureau. 2020 Decennial Census. Table P2. 2021 ACS Survey, Table B19001.

Resource Category	Summary of Key Operational Impacts	Summary of Key Construction Impacts	Potential for Disproportionately High and Adverse Effects on EJ Communities?
WMATA Metrorail	Minor adverse from capacity exceedances and platform congestion.	Moderate adverse from intermittent stoppages or single tracking.	**No.** Adverse impacts would be borne by all passengers. Available data do not indicate that Metrorail riders are disproportionately minority or low-income.[253] Impacts would not be disproportionately borne by EJ communities or appreciably more severe or greater in magnitude for them than for non-EJ communities.
DC Streetcar	Minor beneficial from increased ridership.	Moderate adverse from temporary disruption of direct access from WUS.	**No**. Adverse impacts would be borne by all Streetcar station users equally. There is no available data on the proportion of minority or low-income persons among streetcar users. Any disruptions to WUS access by streetcar during construction of the Project would be temporary and minimized. As a result, it is not anticipated that impacts would be appreciably more severe or greater in magnitude for EJ communities than for non-EJ communities.
Intercity, Tour/Charter, and Sightseeing Buses	Moderate beneficial on intercity and charter buses; moderate adverse on hop-on/hop-off buses due to lack of accommodation.	Minor adverse impacts from the use of interim facilities with reduced amenities during Phase 4, and possibly Phase 3, of construction.	**Yes**, based on the racial and socio-economic make-up of riders. Further analysis required.
Loading	None.	Major adverse from unavailability of West Dock.	**No**. Use of WUS loading docks is not an EJ concern as it relates only to the internal operation of WUS.

[253] In fiscal year 2019, minorities made up 45 percent of Metrorail's ridership (compared to 81 percent for Metrobus) and low-income Metrorail ridership was 13 percent (against 46 percent for Metrobus). WMATA. 2020. *2020 Title VI Update*. Accessed from https://www.wmata.com/about/board/meetings/board-pdfs/upload/20200910-EXEC-3B-Title-VI-Update-2020.pdf. Accessed on November 11, 2022.

Resource Category	Summary of Key Operational Impacts	Summary of Key Construction Impacts	Potential for Disproportionately High and Adverse Effects on EJ Communities?
Pedestrians	Major beneficial from enhanced space (in WUS). Minor adverse from greater congestion (outside WUS).	Moderate adverse from disruptions due to construction activities.	**No**. Adverse impacts would be borne by all pedestrians walking in, to, or from WUS equally and no available data suggest that minority or low-income communities are disproportionately represented among these pedestrians. Impacts would not be disproportionately borne by EJ communities or appreciably more severe or greater in magnitude for them than for non-EJ communities. Nor would EJ communities be excluded from the benefits of the Project.
Bicycle Activities	Major beneficial from improved access and storage.	Moderate adverse from disruptions due to construction activities.	**No**. Adverse impacts would be borne by all bicyclists riding to, from, or near WUS and no available data suggest that minority or low-income communities are disproportionately represented among these bicyclists. Impacts would not be disproportionately borne by EJ communities or appreciably more severe or greater in magnitude for these communities than for non-EJ communities. Nor would EJ communities be excluded from the benefits of the Project.
City and Commuter Buses	minor adverse from congestion on transit buses.	Negligible adverse from traffic disruptions.	**Yes**, based on the racial and socio-economic make-up of WUS city bus riders. Further analysis required (operational impacts only).
Vehicular Parking	Moderate adverse from loss of parking capacity.	Major adverse from unavailability of parking in construction Phase 4.	**No**. Adverse impacts would be borne by all drivers. There are no available data suggesting that minority or low-income communities are disproportionately represented among WUS parking users. Impacts would not be disproportionately borne by EJ communities or appreciably more severe or greater in magnitude for them than for non-EJ communities.

Resource Category	Summary of Key Operational Impacts	Summary of Key Construction Impacts	Potential for Disproportionately High and Adverse Effects on EJ Communities?
For-Hire Vehicles	Moderate beneficial from improved facilities.	Major adverse from disruptions during construction.	**No**. Adverse impacts would be borne by all for-hire vehicles and their passengers. There are no available data suggesting that minority or low-income communities are disproportionately represented among persons using for-hire vehicles to or from WUS. Impacts would not be disproportionately borne by EJ communities or appreciably more severe or greater in magnitude for them than for non-EJ communities. Nor would EJ communities be excluded from the benefits of the Project.
Private pick-up and Drop-off	Moderate beneficial improved facilities.	Major adverse from disruptions during construction.	**No**. Adverse impacts would be borne by all WUS users being picked-up or dropped off at WUS by a private vehicle. There are no available data suggesting that minority or low-income communities are disproportionately represented among such WUS users. Impacts would not be disproportionately borne by EJ communities or appreciably more severe or greater in magnitude for them than for non-EJ communities. Nor would EJ communities be excluded from the benefits of the Project.
Vehicular Traffic	Major adverse from increases delays and queuing at multiple intersections.	Major adverse from construction traffic.	**Yes**, based on the location of the affected intersections relative to the locations of EJ communities. Further analysis required.

Resource Category	Summary of Key Operational Impacts	Summary of Key Construction Impacts	Potential for Disproportionately High and Adverse Effects on EJ Communities?
Air Quality	Negligible to minor adverse from increased pollutant emissions.	Minor adverse from increased pollutant emissions.	**No**. Mesoscale (regional) analysis shows that anticipated emissions would be below the applicable *de minimis* levels. These standards are designed to protect human health with an adequate margin of safety, including sensitive communities. No adverse impacts would be predominantly suffered by local EJ communities or appreciably more severe or greater in magnitude than the impacts that would be experienced by local non-EJ communities.
Greenhouse Gas Emissions and Resilience			
Greenhouse Gas Emissions	Major adverse from increased emissions.	Major adverse from increased emissions.	**No**. Impacts from greenhouse gas emissions are long-term and at the planet level. While the effects of climate change may especially affect global non-white and low-income communities, this cannot be addressed at the local, project-level. Locally, no adverse impacts would be predominantly suffered by EJ communities or appreciably more severe or greater in magnitude than the impacts that would be suffered by local non-EJ communities.
Resilience	Beneficial from opportunities to increase resilience.	None.	**No**. EJ communities would not be excluded from the benefits of the Project.
Energy Resources	Minor adverse from increased energy consumption.	Minor adverse from increased energy consumption.	**No**. Impacts would be on regional energy consumption and production and would not directly affect individuals or communities, including EJ communities. Impacts would not be predominantly suffered by EJ communities or appreciably more severe or greater in magnitude than the impacts that would be experienced by non-EJ communities.

Resource Category	Summary of Key Operational Impacts	Summary of Key Construction Impacts	Potential for Disproportionately High and Adverse Effects on EJ Communities?
Land Use, Planning, and Property			
Land Use and Development	Major beneficial from enhanced multimodal use at WUS.	Moderate adverse from construction activities.	**No.** EJ communities would not be excluded from the benefits of the Project. Adverse impacts would not be predominantly suffered by EJ communities or appreciably more severe or greater in magnitude than the impacts that would be experienced by non-EJ communities.
Property	Minor adverse from use of private air rights.	None.	**No**. The use of private air rights for the Project raises no EJ concern.
Local and Regional Plan	Major beneficial.	None.	**No**. EJ communities would not be excluded from the benefits of the Project.
Noise and Vibration	Major or moderate adverse at multiple locations.	Major or moderate adverse at multiple locations.	**Yes**, based on the location of the impacts relative to the locations of EJ communities. Further analysis required.
Aesthetics and Visual Quality	Negligible to moderate adverse from changes in multiple views.	Negligible to minor adverse from changes in multiple views.	**No**. The affected views are not disproportionately within areas of EJ concern or have special significance for EJ communities. Impacts would not be predominantly suffered by EJ communities or appreciably more severe or greater in magnitude than the impacts that would be experienced by non-EJ communities.
Cultural Resources	Major adverse impacts on three cultural resources (WUS, REA Building, WUS Historic Site). Negligible to moderate adverse impacts on multiple other cultural resources.	Major adverse impacts on four cultural resources (WUS, REA Building, WUS Historic Site, and City Post Office [Postal Museum]). Negligible to moderate adverse impacts on multiple other cultural resources.	**No**. The affected resources are not disproportionately within areas of EJ concern or of special significance to EJ communities. Impacts would not be predominantly suffered by EJ communities or appreciably more severe or greater in magnitude than the effect that would be experienced by non-EJ communities.

Resource Category	Summary of Key Operational Impacts	Summary of Key Construction Impacts	Potential for Disproportionately High and Adverse Effects on EJ Communities?
Parks and Recreation Areas	Minor beneficial on Columbus Plaza. Minor adverse impacts from increased wear and tear from visitors.	Moderate adverse on Columbus Plaza and Metropolitan Branch Trail.	**No**. There is no available data suggesting that the affected parks are of special significance to EJ communities or predominately used by them. Impacts would not be predominantly suffered by EJ communities or appreciably more severe or greater in magnitude than the impacts that would be experienced by the non-EJ population.
Social and Economic Conditions			
Demographics	Minor impact.	None.	No potential for disproportionately high and adverse impacts.
Community Disruption and Other Social Benefits	Major beneficial from enhanced connectivity.	Moderate adverse from construction disruption.	**Yes**, based on the location of the adverse impacts and who they would affect. Further analysis required.
Employment	Minor beneficial and adverse from changes in employment in Project Area.	Minor beneficial from construction jobs.	**No**. There is no available data suggesting that the employment of EJ communities would predominately suffer from the Project or that EJ population would be denied access to jobs generated by the Project or excluded from the benefits of the Project.
WUS Revenue	Major adverse from lost revenue and minor indirect beneficial from development of Federal air rights.	Major adverse from lost revenue.	**No**. WUS revenue is not an EJ concern, as it relates only to the internal operations of WUS.
Other Economic Impacts	Minor beneficial on local and regional economy	Moderate beneficial on regional economy	**No**. EJ communities would not be excluded from the benefits of the Project.

Resource Category	Summary of Key Operational Impacts	Summary of Key Construction Impacts	Potential for Disproportionately High and Adverse Effects on EJ Communities?
Public Safety and Security			
Security	Major beneficial from security enhancements at WUS.	Major adverse from risks associated with construction operations.	**No**. Adverse impacts would be localized and would not extend past the Project Area and immediate vicinity. Impacts would not be predominantly suffered by EJ communities or appreciably more severe or greater in magnitude than the impacts that would be experienced in the non-EJ population. EJ communities would not be excluded from the beneficial impacts.
Safety	Moderate adverse from increased demand on emergency services.	Moderate adverse from risks associated with construction operations.	**No**. Operational adverse impacts would be system-wide and be addressed through planning. Construction impacts would be localized (Project Area) and within areas not accessible to the public. Impacts would not be predominantly suffered by EJ communities or appreciably more severe or greater in magnitude than the impacts that would be experienced by non-EJ communities.
Public Health, Elderly and Persons with Disabilities			
Public Health	Negligible.	Minor adverse from construction risks.	**No**. Adverse impacts would be localized (Project Area and immediate surroundings) and would be borne by all WUS users and visitors. Impacts would not be predominantly suffered by EJ communities or appreciably more severe or greater in magnitude than the impacts that would be experienced by the non-EJ population. EJ communities would not be excluded from the benefits of the Project.
Transportation and Mobility of Elderly and Persons with Disabilities	Major beneficial from multimodal enhancements at WUS.	Major adverse from disruptions associated with construction.	

17.5.1 Operational Impacts

The Preferred Alternative is not anticipated to have disproportionately high and adverse impacts on EJ communities after mitigation of traffic impacts and completion of the ongoing focused outreach effort.

This section addresses only the impact areas identified as requiring further analysis in **Table 17-4.**

17.5.1.1 Transportation

Intercity Buses

The Preferred Alternative would have a moderate beneficial impact on intercity bus operations, as explained in **Section 5.5.1.4**, *Intercity, Tour/Charter, and Sightseeing Buses*. Available data indicate that minority and low-income passengers make up a substantial portion of intercity bus passengers.[254] Data also suggest that minorities and low-income populations rely on the bus for intercity travel much more than other demographics.[255] Minority and low-income passengers would directly benefit from the improved bus facility at WUS.

Minority and low-income passengers would directly benefit from the improved bus facility at WUS. As explained in **Section 5.5.1.4**, *Intercity, Tour/Charter, and Sightseeing Buses*, this new, purpose-built facility would be integrated into the overbuild deck. It would open directly onto the train hall's lower mezzanine, where waiting areas, information displays, and other bus passenger amenities would be located. Through the train hall, bus passengers would have direct access to the multimodal connections available at WUS, including rail, Metrorail, and the pick-up and drop-off facility. This would be a substantial improvement in passenger experience relative to the No-Action Alternative.

All intercity and tour/charter buses that serve WUS would use the facility. Based on FRA's analysis, the 38-39 slip facility would be able to accommodate all regular demand and all peak intercity demand during holidays or other times of high bus activity. During such periods, however, tour/charter bus

[254] Based on a *Northeast Corridor Intercity Travel Study* published in 2015, 55 percent of intercity bus passengers in the Northeast Corridor were white; passenger median household income was in the $50,000-$75,000 range: *Northeast Corridor Intercity Travel Study*. Accessed from https://nec-commission.com/app/uploads/2018/04/2015-09-14_NEC-Intercity-Travel-Summary-Report_Website.pdf. Accessed on November 11, 2022. A 2015 study of curbside bus operations in the northeast found that, depending on the bus company, the percentage of white passengers ranged from 60 percent (for what the study defines as "corporate curbside buses," which include Boltbus and Megabus) to 37 percent (for what the study defined as "Chinatown buses."). Forty percent of Corporate curbside bus passengers reported an annual household income of less than $40,000, with a similar proportion for Chinatown buses: Nicolas J. Klein. 2015. "Get on the (Curbside) Bus: The New Intercity Bus" in *The Journal of Transport and Land Use*, Vol. 8, No.1, pp, 155-169. Accessed from https://www.researchgate.net/publication/276474451_Get_on_the_Curbside_bus_The_new_intercity_bus. Accessed on November 11, 2022.

[255] The 2015 *Northeast Corridor Intercity Travel Study* finds that while racial minorities make up only 4 percent of intercity travelers by car, they make up 45 percent of bus passengers, indicating an appreciably greater reliance on bus travel by EJ than non-EJ populations. Similarly, people with household incomes less than $25,000 represent 2 percent of drivers but 22 percent of bus passengers.

activity may cause the facility's capacity to be exceeded. In these circumstances, buses could make use of the pick-up and drop-off area on the H Street deck level, next to the train hall. Approximately 15 buses could be accommodated in this area. **Appendix S1**, *Multimodal Refinement Report*, of the Supplemental Draft Environmental Statement (SDEIS) provides further information on how FRA and the Project Proponents sized the bus facility to meet anticipated demand.

The Preferred Alternative would have a moderate adverse impact on hop-off/hop-on operations, which have no designated on/off boarding area in the Preferred Alternative. Hop-on/hop-off buses are marketed to, and priced for, tourists, whom they transport from landmark to landmark across the District. [256] There are no available data suggesting that EJ populations account for a disproportionate number of hop-off/hop-on bus passengers. The moderate adverse operational impact on hop-on/hop-off bus operations identified in **Section 5.5.1.4**, *Intercity, Tour/Charter, and Sightseeing Buses* is not anticipated to disproportionately affect EJ communities.

City and Commuter Buses

As explained in **Section 5.5.1.8**, *City and Commuter Buses,* the Preferred Alternative would have a minor adverse direct operational impact on city and commuter buses, as increases in WUS-generated ridership would incrementally contribute to the peak-time overcrowding of some city buses. Also, increases in traffic congestion would incrementally contribute to delays experienced by all city and commuter buses. This would not amount to a disproportionately high and adverse impact on EJ communities. The impact would affect members of EJ populations, who make up a large proportion of bus passengers (81 percent minorities and 46 percent low-income in fiscal year 2019)[257]. However, the increase in congestion and delay attributable to the Project in the Preferred Alternative would be small relative to No-Action Alternative conditions, the same bus lines would be affected, and all passengers would be equally affected. Congestion would also affect all road users, not only bus riders. While there would be an impact on EJ communities, it would not be disproportionately high and adverse.

Vehicular Traffic

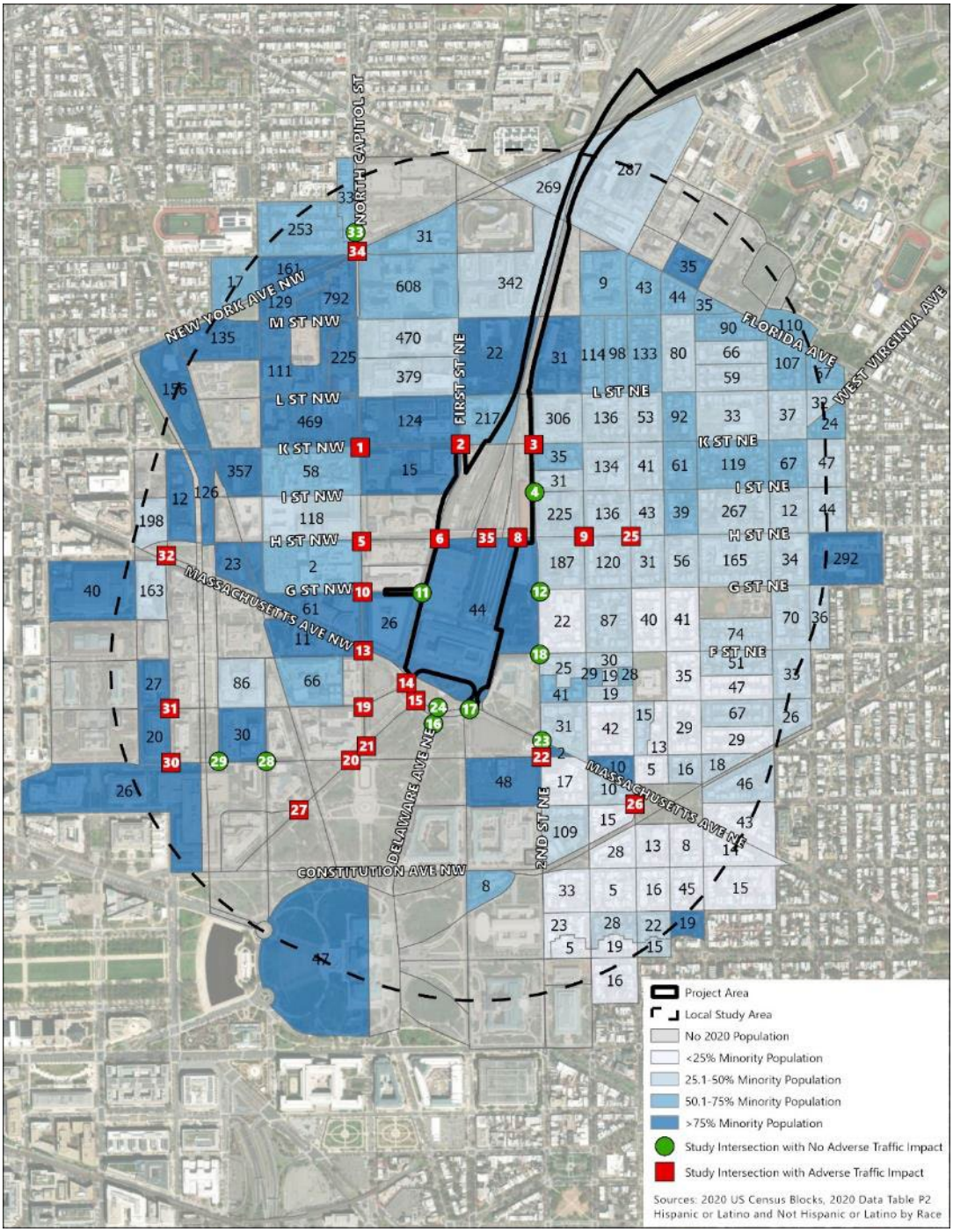
In the Preferred Alternative, roadway traffic around WUS would increase because of increased activity at WUS as well as general development and population growth. As shown by the results of the traffic impact analysis (**Section 5.5.1.12**, *Vehicular Traffic*), this would cause a degradation of operational conditions at several intersections relative to the No-Action Alternative. **Figure 17-3** shows the location of the study intersections and traffic impacts relative to the minority population in the Local Study Area.[258]

[256] As of March 2023, a one-day pass for the Old Town Trolley, which stops at WUS, cost $46.95 per person (*Washington DC Sightseeing Tours*. Accessed from https://www.trolleytours.com/washington-dc/tickets. Accessed on March 1, 2023.)

[257] WMATA. 2020. *2020 Title VI Update*. Accessed from https://www.wmata.com/about/board/meetings/board-pdfs/upload/20200910-EXEC-3B-Title-VI-Update-2020.pdf. Accessed on November 11, 2022.

[258] Because of the larger Census geography used for income data, analysis of impacts on minorities also covers impacts on low-income populations.

Figure 17-3. Distribution of Traffic Impacts[259]



[259] Numbers are the number of minority persons in each block per the 2020 Census.

The following paragraphs discuss whether these impacts have the potential to be a disproportionately high and adverse effect on EJ population by (1) assessing the proportion of intersections of EJ concern that would experience a major impact relative to all such intersections; and (2) assessing the proportion of minority residents living near an adversely affected intersection relative to the entire population of the Local Study Area.[260]

Ten (29 percent) out of the 35 studied intersections evaluated in the traffic analysis are intersections of EJ concern.[261] These 10 intersections are listed in **Table 17-5**.[262] **Table 17-5** also shows which of the 10 intersections would experience a major impact under one of three indicators used to assess traffic impacts. As shown in the table, 7 (70 percent) of the 10 intersections would experience a major impact. These intersections are largely concentrated along North Capitol Street between New York Avenue and Massachusetts Avenue, and K Street between Second Street NE and North Capitol Street.

Table 17-5. Traffic Impacts of EJ Concern in the Preferred Alternative[1]

Int. No.	Intersection Adjacent to EJ Population	Degradation to Level of Service (LOS) F	Queue Increase Greater than 150 Feet	Delay Increase >5 seconds
1	**North Capitol Street / K Street**	X	X	X
2	**First Street / K Street NE**	X	X	X
3	**Second Street / K Street NE**	X	X	X
5	**North Capitol Street / H Street**		X	X
10	**North Capitol Street / G Street**	X	X	X
28	**First Street / D Street NW**			
29	**Second Street / D Street NW**			
31	**3rd Street / E Street NW**		X	X
33	**North Capitol Street (SB Ramp) / New York Avenue**			
34	**North Capitol Street (NB Ramp) / New York Avenue**			X

1. "X" under any of the three indicators indicates a major impact in the Preferred Alternative.

As explained in **Section 5.5.1.12**, *Vehicular Traffic*, in the Preferred Alternative, 6 (17 percent) of the 35 study intersections would degrade to Level of Service (LOS) F from a better LOS during at least one peak period; 18 (51 percent) would experience an increase in queue length of more than 150 feet; and 18 (51 percent) would experience an increase in average delay of more than 5 seconds.

The 7 intersections of EJ concern that would experience a major adverse impact include 4 of the 6 intersections that would degrade to LOS F (67 percent); 6 out of the 18 intersections where there would

[260] This second step only considers minority residents for the same reason as stated in the preceding footnote.

[261] Intersections of EJ concern are intersections in or adjacent to Census blocks with 50 percent minority residents or more, or Census block groups with 23% low-income household or more.

[262] Intersections adjacent to blocks without residential uses are not included.

be an increase in queue length of more than 150 feet (33 percent); and 7 out of the 18 intersections where delays would increase by more than 5 seconds (39 percent).

Table 17-6 shows the number of minority persons (non-Hispanic or Latino White or Caucasian) within the Census blocks adjacent to intersections that would experience a major adverse impact. As shown in the table, in the Preferred Alternative, minorities represent almost 54 percent of the persons living near an adversely affected intersection while being 45 percent of the population of the Local Study Area.

Table 17-6. EJ Population near Adversely Affected Intersections in the Preferred Alternative

Int. No.	Impacted Intersection	Impact[1]			Affected Population		
		LOS	Queuing	Delay	Minority Pop.	Total Pop.	% Minority
1	North Capitol Street / K Street	X	X	X	666	713	93%
2	First Street / K Street NE	X	X	X	356	547	65%
3	Second Street / K Street NE	X	X	X	341	863	40%
5	North Capitol Street / H Street		X	X	120	301	40%
6	WUS West Intersection / H Street NE	X	X	X	44	48	92%
8	WUS East Intersection / H Street NE		X	X	44	48	92%
9	3rd Street / H Street NE		X	X	668	2,049	33%
10	North Capitol Street / G Street	X	X	X	89	100	89%
13	North Capitol Street / Massachusetts Avenue	X	X	X	98	109	90%
22	Second Street / D Street NE			X	67	162	41%
25	4th Street / H Street NE		X		330	901	37%
26	Massachusetts Avenue / C Street / 4th Street NE			X	25	152	16%
30	3rd Street / I-395 On-ramp / D Street NW		X		46	55	84%
31	3rd Street / E Street NW		X	X	47	59	80%
32	3rd Street / Massachusetts Avenue/ H Street NW			X	163	581	28%
34	North Capitol Street (NB Ramp) / New York Avenue			X	2,007	2,807	71%
	TOTAL				**5,111**	**9,495**	**53.7%**
	Total Local Study Area				**12,774**	**27,465**	**45%**

1. "X" under any of the three indicators indicates a major impact in the Preferred Alternative.

Several considerations are relevant to help determine whether these findings mean that there would be disproportionately high and adverse impacts to EJ populations from traffic.

The affected intersections are along major thoroughfares, such as North Capitol Street and K Street, which already carry large amounts of commuter traffic. Drivers transiting this area during peak times would represent a large proportion of the persons experiencing these impacts. Local residents likely make use of these roadways to travel and would be affected as well.

Local residents may experience secondary effects from traffic, such as noise and general disturbance, including increased pedestrian/car conflicts. Outside the immediate frontage of North Capitol Street and K Street, such impacts are most likely to occur if increased congestion leads drivers to divert through

residential streets in search of short-cuts. It is reasonably likely that such traffic diversion, if it occurs, would be primarily between North Capitol Street and the downtown area, potentially affecting neighborhoods immediately to the west of North Capitol Street. WUS-bound drivers would have no incentives to cut through residential streets.

In general, downtown traffic seeking to avoid North Capitol Street is more likely to use New York Avenue rather than divert through residential streets to the west of North Capitol Street because opportunities to do so are very limited. Moving south from New York Avenue:

- M Street NW is one-way westbound and terminates at New York Avenue.
- L Street NW terminates at New Jersey Avenue NW, after which westbound traffic could only continue on to New York Avenue NW.
- K Street NW is restricted for northbound left turns during the PM peak hour.
- I (Eye) Street NW is closed.
- H Street NW is restricted for northbound left turns during the PM peak hour.
- G Street NW terminates at Massachusetts Avenue one block away.

Thus, any opportunities to cut through neighborhoods to the west are restricted to such thoroughfares as K Street NW/NE and H Street NW/NE, within the limits imposed by current turning prohibitions. Any impacts are likely to be felt only along those streets. The potentially affected areas are mostly on North Capitol Street between K and M Streets NW/NE (north of M Street, North Capitol Street is grade-separated) and on K Street NW/NE between Second Street NE and New Jersey Avenue NW.

The noise analysis for the Preferred Alternative indicates that noise from traffic would not increase in a perceptible manner in the Local Study Area (see also **Section 17.5.1.2**, *Noise and Vibration*, below). Increased traffic would result in increased air pollutant emissions, which would be concentrated at the most congested intersections before dissipating. As explained in **Section 6.2**, *Regulatory Context*, of this report, microscale analysis for carbon monoxide and particulate matter emissions is no longer required in the District and was not conducted for the SDEIS. However, such analysis was conducted for the alternatives evaluated in the 2020 DEIS. That analysis found that, at the most congested intersections, emissions levels would remain within the then applicable *de minimis* threshold, suggesting that the same would be the case for the Preferred Alternative. Any disturbance and safety issues associated with greater traffic would also be limited to the vicinity of the affected intersections. The lack of opportunities or incentives for diversion through side streets would limit the extent of such risks.

Additionally, the traffic impacts as presented in this SDEIS do not incorporate the effect of the mitigation measures FRA is proposing to implement, which are listed in **Section 17.7**, *Avoidance, Minimization, and Mitigation Evaluation*. The Final EIS will finalize the list of mitigation measures and present an updated evaluation of traffic impacts after mitigation. FRA anticipates that the intensity of these impacts will be reduced across the Local Study Area, including along North Capitol Street and K Street.

Further, FRA initiated a complementary, focused outreach effort to meaningfully engage the EJ communities potentially affected by traffic impacts; gain a better understanding of how these

communities would be affected; and obtain their input in developing proportionate mitigation measures that would adequately address their concerns with respect to traffic impacts. This effort, which focuses on neighborhoods and communities west of WUS along the North Capitol Street corridor, is ongoing and includes the steps and activities shown in **Table 17-7**. The table shows activities through the publication of the SDEIS. Outreach will continue after that date, as appropriate. Steps completed to date are described in **Section 17.5.1.4**, *Community Outreach to Date*, below.

Table 17-7. Summary of Focused Outreach Activities

Step/Activity	Timeframe (all 2023)
• Identify stakeholders to engage • Identify current community leaders and interested parties of potentially affected neighborhoods to participate in focused Community Communications Committee • Identify pop-up/event opportunities within the community of focus to share project information with public	Late January/Early February
• Hold first meeting of focused Community Communications Committee • Interview stakeholders and community leaders	Late February
• Attend/participate in pop-up/event opportunities to share information and solicit input • Conduct check in meeting with stakeholders/focused Community Communications Committee for responses to concerns and emerging concerns • Hold second meeting of focused Community Communications Committee	March
• Attend/participate in pop-up/event opportunities to continue sharing information and solicit input • Conduct check-in meetings with stakeholders/focused Community Communications Committee for responses to concerns and emerging concerns	April
• Hold third meeting of focused Community Communications Committee (as needed) • Attend/participate in pop-up/event opportunities to share information and solicit input (as needed)	May

FRA will reevaluate the effects from traffic increases on EJ populations in the Final EIS based on impacts after mitigation and the outcomes of the focused engagement process. Based on the above considerations, at this time, FRA does not anticipate that traffic will have a disproportionately high and adverse effect on EJ communities.

17.5.1.2 Noise and Vibration

Adverse noise and vibration impacts would not be predominantly borne by EJ populations or be appreciably more severe for these populations than for non-EJ communities. Increased train and car traffic in the Preferred Alternative would cause increases in operational noise throughout the Local Study Area. As explained in **Section 10.5.1.1**, *Operational Noise*, increases in noise levels would not cause any exceedance of the applicable Federal Transit Administration (FTA) threshold for a severe noise impact. There would be a moderate impact at 14 locations. Increases in volumes would be less than 3 A-weighted decibels (dBA), which is barely perceptible, except at one location. At a model receptor near 1255 Union Street NE, there would be a noticeable increase in noise levels of about 9 dBA due to rail operations. This single impact would not constitute a disproportionately high and adverse impact on EJ communities. The operational noise analysis showed that operational vibration impacts would be negligible to minor everywhere and for everyone.

17.5.1.3 Social and Economic Conditions

Relative to the No-Action Alternative, the Preferred Alternative would have a major beneficial impact on local communities by improving community cohesion and providing new pedestrian connections between WUS and the surrounding neighborhoods. The Preferred Alternative would result in more and improved bus and train service at WUS. It would provide enhanced connections between the neighborhoods to the east and west of WUS as well as make the station more accessible to pedestrians, bicycles, and persons with reduced mobility.

The Preferred Alternative would establish more direct and safer pedestrian and bicycle east-west connections across the rail terminal south of K Street NE, via the new H Street Concourse. In addition to better access to land uses to the east of WUS, including retail on H Street NE and community uses (such as the Kaiser Permanente Medical Center), the concourse would also provide better access to the new retail and various multimodal transportation connections at WUS for people coming from northwest of the station.

While there would be increases in peak hour vehicular traffic along several thoroughfares around WUS, including North Capitol Street, K Street NE, First Street NE, and Second Street NE (see the analysis of traffic impacts in **Section 5.5.1.12**, *Vehicular Traffic*, of this report), continued implementation of the District Vision Zero strategy would help maintain safe pedestrian and bicycle travel through the area.[263] Increased congestion along major thoroughfares would not offset the benefits from new and improved connections.

The Preferred Alternative also would have positive economic impacts through the addition of new retail space at WUS and the intensification of train operations (see **Section 14.5.2.2**, *Community Disruption and Other Social Benefits or Impacts*), adding up to approximately 1,421 new jobs at WUS. Minority and low-income persons would enjoy these benefits as much as the general population. There is no reason to think that minority or low-income populations would experience disproportionately high and adverse

[263] District of Columbia. *Vision Zero DC*. Accessed from https://visionzero.dc.gov/. Accessed on January 23, 2023.

impacts from the reduction in the size of the private air rights development that would occur in the Preferred Alternative.

17.5.1.4 Community Outreach to Date

Focused Community Communications Committee

On February 17, 2023, FRA sent a letter inviting the persons listed in **Table 17-8** to participate in Community Communications Committee (CCC) sessions focused on environmental justice issues and geographically centered on neighborhoods west of WUS. The role of the focused CCC members would be to help share information on the Project with their respective constituencies and obtain meaningful feedback from the community. All invitees accepted.

Table 17-8. Members of the EJ-Focused CCC

Name	Title/Role	Organization
Kevin Rogers	Commissioner	Advisory Neighborhood Commission (ANC) 6E03
Denise Blackson	Commissioner	ANC6E04
Dylan Forest	Commissioner	ANC6E06
Ritanch Hans	Commissioner	ANC6E09
Marcus Manning	Community Outreach and Relations Specialist Ward 6	Executive Office of the Mayor
Drew Hubbard	Interim Director	District of Columbia Department of Housing and Community Development (DHCD)
Talib Shakir	Director of Operations	Mayor's Office of Community Relations and Services (MOCRS)
Jake Stolzenberg	Community Outreach and Relations Specialist Ward 6	MOCRS
Anthony Brown	Church Liaison	Bible Way Church
Rev. Kimberly Jamieson	Chief of Operations	Mount Carmel Baptist Church
Tawanda Johnson	Library Manager	Northwest One Library
Mary Van Bavel	Commuter Programs Manager	Gallaudet University

Interviews

In February 2023, members of the Project Team conducted initial interviews with the following CCC members: Commissioners Blackson (ANC6E04) and Hans (ANC6E09); Drew Hubbard (DHCD); Talib Shakir (MOCRS); Jake Stolzenberg (MOCRS); Tawanda Johnson (Northwest One Library); and Mary Van Bavel (Gallaudet University). The following themes emerges from these interviews:

- There is a large senior population in this area who will need more face-to-face interaction to reach them.

- There are populations that may be skeptical about the project and if their concerns will actually be taken into consideration.
- Everyone that we have spoken to has seemed enthusiastic about participating and helping to share project information.

February 28, 2023, CCC Meeting

The February 17, 2023, letter invited EJ-focused CCC members to attend a meeting on February 28, 2023, at Union Station Redevelopment Corporation (USRC) offices, 750 First Street NE. The purpose of this meeting was to update the CCC members on the Project and the SDEIS process, and to provide more information on the EJ outreach plan and the CCC's role. The meeting consisted of a presentation that summarized the history of the Project; described the Preferred Alternative; and identified traffic impacts as the impacts of EJ concern. Questions and answers followed the presentation.

The following CCC members attended: Ritanch Hans (ANC6E09); Drew Hubbard (DHCD); and Jake Stolzenberg (MOCRS). Additionally, Leandro Zucchi represented USRC. [264] Topics raised during the post-presentation discussion included bicycle and pedestrian safety; noise pollution; and visual impacts. Participants were invited to identify opportunities to reach their respective constituents.

March 28, 2023, CCC Meeting

On March 28, 2023, a meeting of the EJ-focused CCC was held online. The following CCC members attended: Denise Blackson (ANC6E04); Anthony Brown (Bible Way Church); Ritanch Hans (ANC6E09); Drew Hubbard (DHCD); Tawanda Johnson (Northwest One Library); Marcus Manning (Executive Office of the Mayor); Kevin Rogers (ANC6E03); Talib Shakir (MOCRS); and Jake Stolzenberg (MOCRS).

The meeting started with a presentation that provided an overview of the methodology and initial findings of the EJ analysis conducted for the SDEIS. The presentation was followed by a discussion during which the following topics were raised: impacts from construction dust; impacts on traffic congestion of roads with reduced capacity because of bicycle lanes and road diets; and need for regularly providing the community with information on the Project.

March 14, 2023, ANC6E Meeting

Members of the Project Team presented an abridged version of the February 28 presentation at the regular meeting of ANC6E on March 14, 2023. The abridged presentation focused on the history of the Project to date; the Preferred Alternative; potential EJ impacts; and next steps in the outreach effort. Questions and answers followed the presentation. The questions included whether the Project has a residential component; how much parking, if any, would be provided; whether bicycle parking would be provided; and whether provisions were being made to have sufficient seating areas in the new train hall.

[264] The limited attendance is attributable to several CCC members being sick, combined with last-minute competing events in the District. To mitigate this risk, in consultation with CCC members, the next meeting will be in virtual format.

Pop-up Events

The pop-up events conducted through early April 2023 are summarized in **Table 17-9**. The pop-up events consist of a table and graphic displays staffed by Project Team members. Their purpose is to provide information on the Project and receive feedback on community concerns or questions about the Project and how it could impact the daily lives and commutes of local residents. Pop-up events are scheduled to continue through May 2023 at a minimum.

Table 17-9. Summary of Pop-up Events

Date	Location	Key Topics Raised
February 25, 2023	Northwest One Library	Conversations held with 11 people. Topics raised included: • What would happen to the parking garage and rental cars • The benefits of redevelopment • Adding more retail at WUS • Creating more jobs in the area • Concerns about effect of traffic on commutes • Cost of transit
March 18, 2023	Ward 6 Community Clean up Event	Conversations held with 15 people. Topics raised included: • Awareness of the Project • Interest in learning more about the Project • Concerns about road closures and impacts to pedestrian routes
March 23, 2023	Northwest One Library	Conversations held with 14 people. Topics raised included: • Concern about need to reroute traffic • Job opportunities • Use of solar panels in the new parts of the station • Energy friendliness of the expanded station • Elevators and accessibility • Avoiding construction during rush hour • Minimizing construction duration • Sharing information with the community
March 25, 2023	Union Station in Bloom Event at WUS	Conversations held with 43 people. Topics raised included: • Impacts of the Project on WUS visitors • Project duration and cost • Impacts to bicycle and pedestrian circulation, and disruption of train service during construction • Construction noise and dust • Need for public seating at WUS • Cost of parking • Preservation of the historic building

Date	Location	Key Topics Raised
		• Need for new access to WUS at H Street and improved access at the front of the station • Importance of sharing information • Traffic congestion around WUS
March 31, 2023	2M Apartments (2M Street NE)	Conversations held with 43 people. Topics raised included: • Car circulation, especially in front of WUS • Retail and entertainment at the expanded station • Construction traffic and vehicular access during construction • Need to advertise any detours during construction • Loss of street parking • Bicycle safety • Increased rents • Impacts on cultural resources
April 2, 2023	NoMA in Bloom Event (Alethia Tanner Park)	Conversations held with 47 people. Topics raised included: • Safety aspects of the Project • Impacts on transit bus routes • Timely notification of changing schedules, Metrorail delays, and road closures • Desire for indoor secure bicycle parking in WUS • Impact on Metrorail • Concern about street closures • Question on type of retail and green space activities and community programming that will be available • Need for information on neighborhood benefits, including additional housing • Question on what will happen to bicycle lanes and pedestrian walkways during and after construction • Impact on the Metropolitan Branch Trail • Need to share route changes information to nearby housing areas and apartments • Need to create protected walk and bicycle alternative routes during construction • Need to avoid impacts on transit bus routes and Metrorail • Need to reduce speed through the construction area • Creating better traffic patterns around New York Avenue and Florida Avenue intersection

Date	Location	Key Topics Raised
		• Making sure detour wayfinding is easy • Concern that parking access is decreasing • Need for more retail stores in WUS • Maintaining Americans with Disabilities (ADA) accessibility during construction • Concern about long wait times during peak hours while trains or Metrorail service are impacted • Minimizing internal space for private car parking and maximizing public access • Wish for more seating in and around WUS • Need to maintain access to Kaiser Permanente Medical Building
April 12, 2023	Hayes Senior Wellness Center	Conversations held with 45 people. Topics raised included: • Long-term benefits • Access to Streetcar during construction • Length and phasing of construction • Access to nearby transportation and services such as Metrorail and the Post Office • Impacts to transit buses

17.5.2 Construction Impacts

Construction of the Preferred Alternative would not have disproportionately high and adverse impacts on EJ communities.

The section below addresses the impact areas identified as requiring further analysis in **Table 17-1**.

17.5.2.1 Transportation

Intercity Buses

As explained in **Section 5.5.3.4**, *Intercity, Tour/Charter, and Sightseeing Buses*, impacts on intercity bus operations would be concentrated in Phases 3 and 4 of construction. During Phase 3, which would last for approximately 2 years and 8.5 months, the relocation of the facility within the existing parking structure would create some disruptions although operations would generally be able to continue. At the beginning of Phase 4, the entire existing bus facility and parking garage would be demolished. There would be no permanent bus facility at WUS until the completion of the new facility at the end of Phase 4. Phase 4 would last for approximately 4 years and 3 months.

As explained in Section S.11.7.2, *Bus*, of **Appendix S2**, *Description of Alternative F*, during Phase 3 if needed and during Phase 4, a temporary bus facility or temporary bus loading zones would be established on the completed portion of the structural deck, including the private air rights deck. FRA confirmed with the private air rights developer that this approach is feasible.

Such interim bus facilities would be sufficient to maintain adequate intercity and charter bus service at WUS until the new facility is operational. They would not provide the same amenities as the new facility and, depending on their location, may increase the distance to the front of the station. This would be a moderate adverse impact, as service would continue and intermodal connections would remain available throughout. USRC would work with the private air rights developer and the bus carriers to ensure that the temporary facilities are sited and designed in a manner that provides users with the highest reasonably achievable level of comfort.

As explained in **Section 17.5.1.1**, *Transportation, Intercity Buses* above, available data suggest that EJ populations rely on the bus for intercity travel appreciably more than non-EJ populations. The temporary facilities would adequately accommodate intercity bus travel during Phase 4. Therefore, there would not be any reduced opportunities for members of EJ communities to travel by bus between the demolition of the existing bus facility and the completion of the new one. All bus facility users would experience temporary moderate adverse impacts due to limited user amenities while waiting for or unboarding from a bus. Such experiences would be short and occasional for most riders regardless of their EJ status. Therefore, construction of the Preferred Alternative would not result in disproportionately high and adverse impacts on EJ communities with respect to intercity buses.

Vehicular Traffic

As explained in **Section 5.5.3.12**, *Vehicular Traffic,* construction activities at WUS would generate traffic to and from the Project Area throughout the day during the entire construction period, although the volume and nature of this traffic would vary depending on the construction phase and type of activities being conducted. It would be greatest during excavation activities, when up to 120 trucks per 20-hour day could be traveling to and from the site. This is a maximum, conservative estimate that assumes that no work trains would be used to haul spoils away.

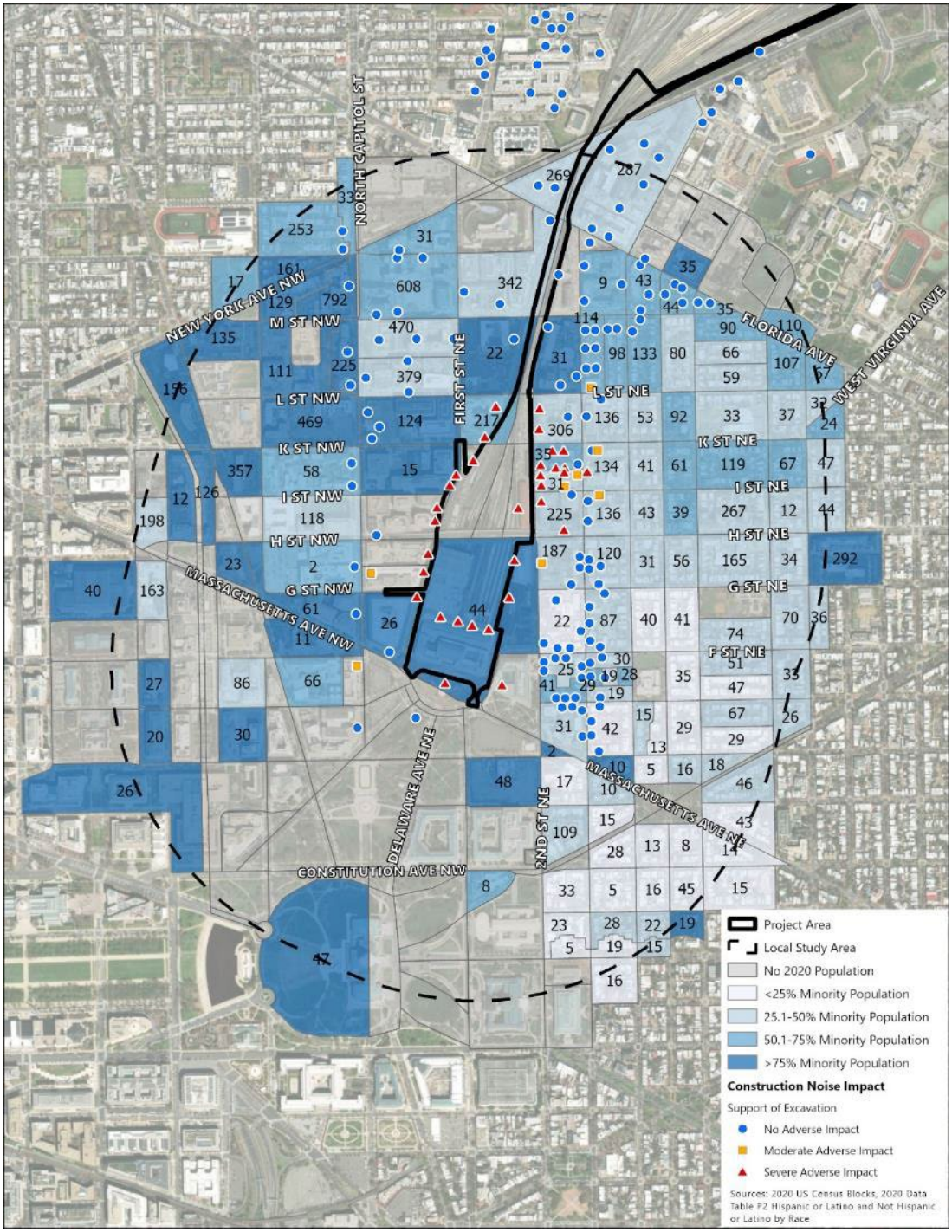
As part of the Construction Transportation Management Plan that USRC would prepare for the Project, construction trucks would be required to avoid residential neighborhoods and travel only along designated truck routes, with the exception of short stretches of First and Second Streets NE to reach the nearest designated route. Therefore, trucks would not travel through neighborhoods in a manner that could result in disproportionately high and adverse impacts on EJ communities.

17.5.2.2 Noise and Vibration

Construction of the Preferred Alternative would cause noise and vibration. The construction noise impact analysis (**Section 10.5.3**, *Construction Impacts*) for the Preferred Alternative shows that there would be major construction noise impacts at up to 43 receptor locations, including residential and institutional uses, where noise levels would exceed the FTA criteria for moderate or severe impacts during support of excavation (SOE) construction, which would be the noisiest activity.

Figure 17-4 shows the location of severe and moderate noise impacts from SOE construction.

Figure 17-4. Distribution of Construction Noise Impacts (SOE Construction)[265]



[265] Numbers are the number of minority persons in each block per the 2020 Census.

Most of the affected receptors are located very close to the edge of the rail terminal, within which the work would take place, along First and Second Streets NE south of L Street and west of 3rd Street NE. While some minority or low-income persons would experience severe or moderate noise impacts, with a cluster of impacted receptors between K and I Streets NE, just east of the rail terminal, these impacts, because of their narrow geographical range, would not be predominantly borne by EJ communities or be appreciably more severe for these communities than for non-EJ communities. Measures being proposed to avoid, minimize, or mitigate noise impacts (see **Section 10.7**, *Avoidance, Minimization, and Mitigation Evaluation*) would reduce impacts on EJ as well as non-EJ populations.

Construction would also generate vibration. Modeling indicated that the greatest levels of stationary-source vibrations would be along the eastern side of the Project Area (affecting the Railway Express Agency [REA] Building and the Kaiser Permanente Medical Center) as well as near the City Post Office (Postal Museum), on the west side. Vibration from truck traffic is expected to generate annoyance at 14 locations close to New York Avenue, North Capitol Street, G Street NE, and Second Street NE. These locations are not concentrated in areas with large minority or low-income populations. While minority or low-income people may experience annoyance-generating vibration levels, vibration impacts would not be predominantly borne by EJ communities or be appreciably more severe for these communities than for non-EJ communities.

17.5.2.3 Social and Economic Conditions

There is a substantial population of people experiencing homelessness near WUS. If such a population is still present when construction of the Preferred Alternative begins, they would likely be displaced. Because of the transient, mobile, and changing character of the homeless population, as well as evolving economic conditions and District policies, no data are available to adequately determine how many people this would affect and whether it would amount to a disproportionately high and adverse impact on EJ communities. Some homeless persons may relocate to nearby areas while others may travel farther. Nearby homelessness assistance resources would remain available to those who need them. The steps described in **Section 17.7**, *Avoidance, Minimization, and Mitigation Evaluation*, would minimize impacts on this population.

17.6 Summary of Impacts

After implementation of the focused outreach plan and mitigation of the traffic impacts, no disproportionately high and adverse impacts on EJ communities are anticipated. The Preferred Alternative would likely require the displacement of any homeless persons using the area around WUS when construction begins.

17.7 Avoidance, Minimization, and Mitigation Evaluation

FRA is proposing to adopt the following measures, which are anticipated to avoid disproportionately high and adverse impacts on EJ communities.

17.7.1 Traffic

When implementing the following traffic impact mitigation measure (proposed in **Section 5.7**, *Avoidance, Minimization, and Mitigation Evaluation*, of this report), USRC would incorporate EJ considerations informed by the ongoing focused community outreach effort:

- USRC would work with the District Department of Transportation (DDOT) to identify traffic mitigation approaches, including, but not limited to, regular monitoring activities, turn restrictions, alternative intersection phasing, lane reassignment, parking restrictions, and circulation changes, to address congestion at the most severely impacted intersections in the Study Area. USRC would be responsible for design, permitting, and installation of those improvements in coordination with DDOT. Specific solutions identified to date include:
  - Developing mode shift and trip reduction goals for the station to be achieved through mitigation efforts.
  - Monitoring multimodal traffic performance in the first ten years of operation to confirm mode shift and trip reduction goals; this monitoring to be conducted consistent with DDOT Comprehensive Transportation Review (CTR) guidelines for Performance Monitoring Plans, to determine refinements to the measures presented below and to operations and circulation in the Project Area.
  - As needed to address congestion identified by traffic monitoring, making spot intersection modifications at First and K Streets NE, North Capitol and G Streets, Second and K Streets NE, and other intersections in the Study Area. USRC would be responsible for design, permitting, and installation subject to DDOT approvals.
  - Coordinating with the U.S. Government Publishing Office (GPO) to open up currently closed sections of First Street and G Street NW to public access and to fund costs associated with this opening to meet GPO requirements and requirements for public access.
  - Performing a signal and mobility study of the southern portion of the Study Area, around the intersection of Louisiana Avenue and North Capitol Street, to identify how changes to signalization could address degraded traffic conditions. USRC, in coordination with DDOT, to install study-identified improvements and support DDOT signalization changes.
  - Further coordinating with the private air rights developer on strategies for traffic distribution to address degraded traffic conditions, as possible, on H Street. USRC, in coordination with the private air rights developer, would design and install wayfinding and other measures to improve traffic distribution on H Street.
  - Participating in DDOT's mobility study for the North Capitol Street corridor to understand how Project and DDOT policies and strategies could reduce congestion along the North Capitol Street corridor. USRC would provide technical support and information on future WUS operations to inform the study's recommendations.

- Advancing facility design that implements internal wayfinding prioritizing transit access and balancing pick-up and drop-off demand across different locations based on congestion. This wayfinding would be provided through static and variable signage.
- In coordination with DDOT, developing external wayfinding to reduce turn pressures on congested intersections, including, as appropriate, static and variable signage on the Center Leg Freeway to direct traffic to appropriate locations. USRC would design, permit, and install this wayfinding.
- Allocating sufficient resources to implement the identified mitigations.

17.7.2 Persons Experiencing Homelessness

USRC would require that, if and when the construction contractor encounters homeless persons when staging construction activities and need to relocate these persons, the contractor should contact and coordinate with the appropriate authorities and organizations to ensure the displaced persons are given access to available public and private assistance services, including opportunities for shelter and health and mental health care; are not deprived of their belongings or otherwise mistreated; and neither they nor the workers interacting with them are put at risk of harm.

17.8 Permits and Regulatory Compliance

There are no formal permits required to demonstrate regulatory compliance with regard to EJ. Compliance with local noise and construction ordinances would occur through the construction permitting process, which would minimize noise impacts. Per DOT Order 5610.2(a), it must be determined whether transportation activities would have an adverse effect on minority and low-income populations and whether that adverse effect would be disproportionately high.

Activities that have a disproportionately high and adverse impact on minority and low-income populations may only be implemented if further mitigation measures or alternatives to avoid or reduce these impacts are not practicable. Effective, meaningful involvement of low-income and minority populations must be undertaken in project planning and development and EJ populations must have fair and equal access to information.

18 Cumulative Impacts

18.1 Overview

This section describes the cumulative impacts of the Preferred Alternative. The Preferred Alternative would result in direct and indirect adverse or beneficial impacts on a range of resources, as described in prior impact sections. Under the National Environmental Policy Act of 1969 (NEPA), a cumulative impact is 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 actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." [266]

18.2 Regulatory Context

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 18.2, *Regulatory Context*.

18.3 Study Area

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 18.3, *Study Area*.

18.4 Methodology

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 18.4, *Methodology*. The list of reasonably foreseeable private projects (Section 18.4.2.3, *Private Developments Projects*, of Appendix C3) was reviewed based on available

[266] 40 CFR 40 CFR § 1508.7. The Supplemental Draft Environmental Impact Statement is being prepared in accordance with Council on Environmental Quality (CEQ)'s regulations implementing NEPA (40 CFR Parts 1500-1508) from 1978, as amended in 1986 and 2005. CEQ comprehensively updated its NEPA implementing regulations effective September 14, 2020; the revised regulations apply to any NEPA process begun after that date. For NEPA reviews initiated prior to September 14, 2020, the lead Federal agency may continue to apply the prior regulations. CEQ is reviewing the 2020 regulations and finalized a phase 1 rulemaking in April 2022 that maintained this approach. FRA initiated the NEPA process for the Project on November 4, 2015 and is applying the CEQ regulations that were in effect at that time.

information.[267] Altogether, after this review, planned or under construction private projects in the Study Area amount to approximately 13,060 residential units, 685,700 square feet of retail, 8,056,000 million square feet of office space, and 2,940 hotel rooms. Where applicable, updated quantitative estimates of the impacts of the private cumulative projects are provided. The level of foreseeable development and associated impacts are broadly similar to what was used for the analysis in Section 18 of Appendix C3.[268]

18.5 Impacts Analysis

18.5.1 Introduction

This section presents the cumulative long-term, operational impacts of the Preferred Alternative when added to those of past, present, future actions. For each resource, the cumulative impacts of the Preferred Alternative are summarized in bold lettering, followed by a more detailed analysis.

18.5.2 Natural Ecological Systems

The Project would have no cumulative impacts on natural ecological systems.

While the District contains large undeveloped areas, such as Rock Creek Park, none are located near WUS. As explained in **Section 2.5,** *Impacts of the Preferred Alternative*, of this report, the Preferred Alternative would not have any long-term impacts on natural ecological systems due to the lack of natural resources in or near the Project Area. The Preferred Alternative would generate no cumulative impacts to natural ecological systems.

[267] Sources for the review included NoMA Business Improvement District (BID) Development Map (accessed from https://nomabid.org/wp-content/uploads/2023/03/NoMa-BID-Development-Map-March-2023_8.5-x-11in-version-1.pdf); Mount Vernon Triangle BID Development Map (accessed from https://www.mountvernontriangle.org/development-map/); Capitol Crossing Mixed-Used Development (accessed from https://capitolcrossingdc.com/project/); Nena Perry-Brown, October 14, 2021, "The Next Phase of Capitol Crossing Looks to Get Key Approval," *Urban Turf* (accessed from https://dc.urbanturf.com/articles/blog/the-next-phase-of-capitol-crossing-looks-to-get-key-approval/18821); Nena Perry-Brown, March 21, 2022, "715 Units Proposed For Second Phase of Development for DC's Sursum Corda Site," *Urban Turf* (accessed from https://dc.urbanturf.com/articles/blog/pud-application-seeks-to-add-another-715-units-to-sursum-corda-site/19413); "Highline Union Market," *Urban Turf* (accessed from https://dc.urbanturf.com/pipeline/403/Highline_Union_Market); Urban Turf Staff, July 25, 2022, "JBG/Gallaudet Pitch 650-Unit Development Behind Union Market," *Urban Turf* (accessed from https://dc.urbanturf.com/articles/blog/jbggallaudet-pitch-650-unit-behind-union-market/19909); Nena Perry-Brown, November 20, 2020, "First Phase of 740-Unit Development Breaks Ground at Northwest One," *Urban Turf* (https://dc.urbanturf.com/articles/blog/first-phase-of-740-unit-development-breaks-ground-at-northwest-one/17567). All websites last accessed on April 5, 2023.

[268] The scale and type of planned private developments often change in keeping with evolving market and regulatory conditions. Therefore, these numbers should be considered order-of-magnitude estimates.

18.5.3 Water Resources and Water Quality

18.5.3.1 Impacts of Past, Present, and Foreseeable Actions (without the Project)

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 18.5.3.1, *Impacts of Past, Present, and Foreseeable actions (without the Project)*. The updated reasonably foreseeable private development projects in the Study Area are anticipated to generate approximately 3.3 million gallons of wastewater per day and demand for approximately 3.63 million gallons of drinking water per day.[269]

18.5.3.2 Cumulative Impacts of the Preferred Alternative

Surface Waters

In the Preferred Alternative, when considered with past, present, and reasonably foreseeable actions, the Project would have a negligible adverse cumulative impact on surface waters.

The Preferred Alternative would generate wastewater that would be conveyed through DC Water's combined sewer system to either Blue Plains or, during larger storms, combined sewer overflow (CSO) outfalls in the Anacostia River. This could result in a slightly greater risk of untreated wastewater being released into the Anacostia River relative to what past, present, and reasonably foreseeable actions would cause without the Project. The contribution of the Project to wastewater generation in the District would be very small (see *Wastewater* below), and the risk would be substantially reduced by the completion of the Clean Rivers Project.[270] The adverse cumulative adverse impact on surface waters would be negligible.

Groundwater

In the Preferred Alternative, when considered with past, present, and reasonably foreseeable actions, the Project would have a moderate adverse cumulative impact on groundwater.

The Preferred Alternative would add to the local adverse impacts of past, present, and reasonably foreseeable projects on groundwater because of construction-related and operational dewatering. As shown in **Section 3.6**, *Summary of Impacts*, **Table 3-5**, the rate of dewatering in the Preferred Alternative would be an estimated 220 to 280 gallons per minute (gpm) during construction and an estimated 20 to 30 gpm in the long term (operational phase). This has the potential to aggravate the risk of ground settlement in the area near WUS once these impacts are added to those of past, future, and reasonably foreseeable actions. Based on preliminary analysis, the features at greatest risk for

[269] See **Section 3.5.1.4**, *Wastewater*, and **Section 3.5.1.5**, *Drinking Water*, of this report for information on how wastewater and drinking water demands are estimated based on land use.

[270] Clean Rivers involves the construction of large underground tunnels to collect and retain combined sewage during high flow conditions. The Clean Rivers Project is to be completed by 2030. See DC Department of Energy and Environment. *Water Quality Assessment 2020 Integrated Report to EPA*, Sections 305(b) and 303(d) Clean Water Act. Accessed from 2020 IR 06-25-2020.pdf (dc.gov). Accessed on November 11, 2022.

drawdown induced settlement would be shallow utility infrastructure such as sewer lines, gas lines, and water lines in the Project Area and along adjoining public roadways; the Washington Metropolitan Area Transit Authority (WMATA) Red Line station; and the adjoining neighborhoods or buildings that are supported by shallow foundation systems. The larger adjacent buildings around WUS likely stand on deep foundations and are unlikely to experience settlement from drawdown, although this may warrant further study.[271]

While data indicate declines in hydraulic pressure at several wells in the Patuxent Aquifer, these declines are most likely due to several large DC Water Long Term Control Plan (Clean Rivers) dewatering projects along the Anacostia River, with dewatering rates exceeding one million gallons per day at some locations.[272] Additional groundwater withdrawal from the Project is not likely to have a measurable effect. The District Department of Energy and Environment considers that long-term dewatering associated with basements and parking garages has no potential to significantly deplete groundwater.[273]

Stormwater

In the Preferred Alternative, when considered with past, present, and reasonably foreseeable actions, the Project would have a moderate beneficial cumulative impact on stormwater infrastructure and flow.

The Preferred Alternative would upgrade stormwater management systems within the footprint of the station elements and the potential Federal air rights development to meet current District and Federal regulations. When added to similar upgrades from past, present, and reasonably foreseeable actions (which must comply with current District regulations at a minimum), this would be a beneficial impact. This beneficial impact would be moderate, as the upgraded areas represent a relatively small part of the District.

Wastewater

In the Preferred Alternative, when considered with past, present, and reasonably foreseeable actions, the Project would have a minor adverse cumulative impact on wastewater generation.

The Preferred Alternative would generate wastewater because of greater passenger and visitor activity at WUS and the potential development of the Federal air rights above the rail terminal. This wastewater would be conveyed through DC Water's sewer infrastructure. Though the Project would add to the total wastewater generated by past, present, and reasonably foreseeable actions, this contribution would be very small. As shown in **Section 3.6**, *Summary of Impacts*, **Table 3-5**, it would amount approximately to

[271] Wood. February 2019. *Preliminary Report of Aquifer Pumping Test and Seepage Analysis, Union Station Washington, D.C.*

[272] District Department of Energy and Environment. *Water Quality Assessment 2020 Integrated Report to EPA*, Sections 305(b) and 303(d) Clean Water Act. Accessed from 2020 IR 06-25-2020.pdf (dc.gov). Accessed on November 11, 2022.

[273] District Department of Energy and Environment. September 18, 2009. *Protection of the District's Groundwater and the EISF Review Process*. Accessed from https://doee.dc.gov/publication/policy-protection-districts-groundwater. Accessed on November 11, 2022.

an additional 184,740 gallons per day (gpd).[274] This represents approximately 0.06 percent of the 300 million gpd that Blue Plains currently processes on average, 0.05 percent of its 384 million gpd capacity, and about 0.2 percent of its average unused daily capacity.[275] This increase has no potential to create a capacity shortage. Adding the demand generated by the Preferred Alternative to the demand anticipated to result from foreseeable projects in the Study Area (approximately 3.3 million gpd) would result in a cumulative demand representing around 4 percent of Blue Plain's unused capacity. The adverse cumulative impacts would be minor.

Drinking Water

In the Preferred Alternative, when considered with past, present, and reasonably foreseeable actions, the Project would have a minor adverse cumulative impact on drinking water demand.

The Preferred Alternative would generate demand for drinking water from greater passenger and visitor activity at WUS and from the potential development of the Federal air rights above the rail terminal. As shown in **Section 3.6**, *Summary of Impacts*, **Table 3-5**, projected water demand from the Preferred Alternative would be approximately 155,694 gpd.[276] This would be a small addition to the demand past, present, and reasonably foreseeable actions would generate. It would represent approximately 0.1 percent of the 135 million gpd the Washington Aqueduct produces on average. [277] This increase has no potential to create a capacity shortage. Adding the demand generated by the Preferred Alternative to the demand anticipated to result from foreseeable projects in the Study Area (approximately 3.63 million gpd) would result in a cumulative demand representing approximately 3 percent of the 135 million gpd the Washington Aqueduct produces on average. The adverse cumulative impact would be minor.

18.5.4 Solid Waste Disposal and Hazardous Materials

18.5.4.1 Impacts of Past, Present, and Foreseeable Actions (without the Project)

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 18.5.4.1, *Impacts of Past, Present, and Foreseeable actions (without the Project)*. The updated foreseeable private development projects in the Study Area are anticipated to generate approximately 69,370 tons of municipal waste per year.[278]

[274] Including 89,730 gpd from WUS; 51,810 gpd from the potential Federal air rights development; and up to 43,200 gpd from long-term dewatering.

[275] DC Water. *DC Water at a Glance*. Accessed from DC Water At A Glance | DCWater.com. Accessed on November 11, 2022.

[276] Including 98,703 gpd from WUS and 56,991 gpd from the potential Federal air rights development.

[277] U.S. Army Corps of Engineers. *Washington Aqueduct*. Accessed from https://www.nab.usace.army.mil/Missions/Washington-Aqueduct/. Accessed on October 14, 2022.

[278] See **Section 4.5.1.1**, *Municipal Solid Waste,* of this report for information on how waste generation is estimated based on land use.

18.5.4.2 Cumulative Impacts of the Project

Municipal Solid Waste

In the Preferred Alternative, when considered along with past, present, and reasonably foreseeable actions, the Project would have a minor adverse cumulative impact on municipal solid waste generation.

As shown in **Section 4.6**, *Summary of Impacts,* **Table 4-4,** the Preferred Alternative would generate municipal solid waste from increased numbers of passengers and visitors at WUS (approximately 2,662 tons per year [tpy]) as well as from the potential development of the Federal air rights above the rail terminal (approximately 1,865 tpy), for a total of approximately 4,527 tpy. This would be a small addition to the waste produced in the District by past, present, and reasonably foreseeable projects, as it would represent approximately 0.4 percent of the 1,139,846 tons of waste produced in the District in 2018[279] and 0.002 percent of the 248.3 million tons of landfilling capacity in Virginia alone in late 2020.[280] The increase from the Preferred Alternative is not likely to cause capacity problems at disposal facilities. Adding the demand generated by the Preferred Alternative to the demand anticipated to result from foreseeable projects in the Study Area (approximately 69,370 tpy) would result in a cumulative demand representing approximately 0.03 percent of landfilling capacity in Virginia alone in late 2020. The adverse cumulative impact would be minor.

Hazardous Materials and Waste

In the Preferred Alternative, when considered along with past, present, and reasonably foreseeable actions, the Project would have a minor adverse and beneficial cumulative impact on hazardous materials and waste.

The Preferred Alternative would involve excavating the rail terminal and disposing of soil that is likely to be contaminated. Approximately 1.5 million cubic yards of soil would be removed. The removal and disposal of potentially contaminated soils in accordance with applicable regulations would positively contribute to the cumulative removal or cleaning up of legacy hazardous material issues in the District. This beneficial cumulative impact would be minor because of the likely limited level of contamination that would be encountered and removed.

The Preferred Alternative would increase the amount of hazardous material stored and used at WUS, in addition to what would be stored and used in past, present, and reasonably foreseeable developments and projects. While this increase would be an adverse cumulative impact, the storage, utilization, and disposal of hazardous materials would continue to be performed in compliance with applicable laws, regulations, and policies. The adverse cumulative impact would be minor.

[279] District Department of Public Works. *Washington DC Solid Waste Diversion Annual Report. Calendar Year 2018*. Accessed from: https://dpw.dc.gov/wastediversionreport. Accessed on October 17, 2022.

[280] Commonwealth of Virginia Department of Environmental Quality. 2021 Annual Solid Waste Report for CY 2020. Accessed from: https://www.deq.virginia.gov/home/showpublisheddocument/9500. Accessed on October 17, 2022.

18.5.5 Transportation

18.5.5.1 Impacts of Past, Present, and Foreseeable Actions (without the Project)

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 18.5.5.1, *Impacts of Past, Present, and Foreseeable actions (without the Project)*.

18.5.5.2 Cumulative Impacts of the Project

Commuter and Intercity Railroads

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would result in a major beneficial cumulative impact on commuter and intercity railroads.

The Preferred Alternative would allow Amtrak, MARC, and VRE to increase service and accommodate planned growth in ridership through 2040 and beyond, as described in **Section 5.5.1.1**, *Commuter and Intercity Railroad*. This would address the demand generated by past, present, and foreseeable actions in the District. Therefore, when added to the impacts of those actions, the Project would result in a major beneficial cumulative impact.

WMATA Metrorail

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would result in a minor adverse cumulative impact on Metrorail.

The impact analysis presented in **Section 5.5.1.2**, *WMATA Metrorail* shows that the Preferred Alternative would have a minor adverse impact on Metrorail ridership at WUS relative to the No-Action Alternative. The No-Action Alternative incorporates growth anticipated to result from past, present, and foreseeable actions. Therefore, the impacts analyzed in the referenced section are cumulative impacts of the Project.

DC Streetcar

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would have a minor beneficial cumulative impact on the DC Streetcar.

The impact analysis presented in **Section 5.5.1.3**, *DC Streetcar,* shows that the Preferred Alternative would have a minor beneficial impact on DC Streetcar operations relative to the No-Action Alternative. The No-Action Alternative incorporates growth anticipated to result from past, present, and foreseeable actions. Therefore, the impacts analyzed in the referenced section are cumulative impacts of the Project.

Intercity, Tour/Charter, and Sightseeing Buses

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would have a moderate beneficial cumulative impact on intercity, tour/charter, and sightseeing bus operations.

The Preferred Alternative would allow intercity bus operators to accommodate the demand generated by past, present, and foreseeable actions in a manner that would improve user experience relative to the No-Action Alternative, as described in **Section 5.5.1.4**, *Intercity, Tour/Charter, and Sightseeing Buses*. Therefore, when added to the impacts of past, present, and reasonably foreseeable actions, the Project would result in a moderate beneficial cumulative impact.

Loading

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would result in no cumulative impact on loading.

As explained in **Section 5.5.1.5**, *Loading*, the Preferred Alternative would have no impact on loading. Therefore, there would be no cumulative impacts on loading at WUS.

Pedestrians

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would have a major beneficial cumulative impact on pedestrian circulation within WUS, and a minor adverse cumulative impact on pedestrian circulation outside of WUS.

As explained in **Section 5.5.1.6**, *Pedestrians*, the Preferred Alternative would generate additional pedestrian trips relative to the No-Action Alternative both inside and outside WUS. The Preferred Alternative include circulation improvements that would result in a major beneficial impact inside WUS relative to the No-Action Alternative; outside of WUS, greater circulation would cause minor adverse impacts relative to the No-Action Alternative. Because the analysis of the No-Action Alternative impact incorporates growth anticipated to result from past, present, and foreseeable actions, these impacts are also cumulative impacts.

Bicycle Activity

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would have a major beneficial cumulative impact on bicycle circulation.

As explained in **Section 5.5.1.7**, *Bicycle Activity*, the Preferred Alternative would provide new storage and facilities for bicycles, as well as better connectivity to and through the station. This would allow WUS to meet future demand for bicycle access, including the trips generated by the Project, resulting in a major beneficial impact. Because the No-Action Alternative incorporates growth anticipated to result from past, present, and foreseeable actions, the impacts analyzed in the referenced section are cumulative impacts.

City and Commuter Buses

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would cause a minor adverse cumulative impact on city and commuter buses.

The Preferred Alternative would generate additional bus rides. As explained in **Section 5.5.1.8**, *City and Commuter Buses*, in the aggregate, city buses serving WUS would continue to operate below capacity. While sixteen Metrobus routes would operate over capacity, this would also be the case in the No-Action Alternative. The No-Action Alternative incorporates growth in city and commuter bus ridership anticipated to result from past, present, and foreseeable actions. Therefore, the impacts analyzed in the referenced section are cumulative impacts.

Vehicular Parking and Rental Cars

In the Preferred alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would cause a moderate adverse cumulative impact on vehicular parking at WUS. It would have a minor adverse cumulative impact on rental car operations.

The Preferred Alternative would result in fewer parking spaces at WUS while the number of WUS passengers and visitors would increase. Parking and rental car services at WUS predominantly serves WUS users, and demand for them is not substantially driven by past, present, and foreseeable actions. Therefore, the Preferred Alternative adverse impact on parking and rental cars at WUS are also cumulative impacts on these resources.

For-hire Vehicles

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would cause a moderate beneficial cumulative impact on for-hire vehicles at WUS because of the provision of new locations for pick-ups and drop-offs.

The impact analysis presented in **Section 5.5.1.10**, *For-Hire Vehicles* shows that the Preferred Alternative would generate additional for-hire vehicle trips from increased activity at WUS. These would contribute to adverse cumulative impacts on traffic operations and, as such, were incorporated in the vehicular traffic impact analysis. The Preferred Alternative would provide for new pick-up and drop-off locations at and near WUS, a moderate beneficial impact. To the extent that past, present, and foreseeable actions generate demand for for-hire vehicle trips to or from WUS, this would also be a moderate beneficial cumulative impact.

Private Pick-up and Drop-off

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would cause a moderate beneficial cumulative impact on private pick-up and drop-off operations at WUS.

The impact analysis presented in **Section 5.5.1.11**, *Private Pick-up and Drop-off*, shows that the Preferred Alternative would generate additional private pick-up and drop-off activity at WUS and

additional vehicular trips. These trips would contribute to adverse cumulative impacts on traffic operations and, as such, were incorporated in the Vehicular Traffic impact analysis. The Preferred Alternative would provide for new pick-up and drop-off locations at and near WUS, a moderate beneficial impact. To the extent that past, present, and foreseeable actions generate demand for private pick-up and drop-off vehicle trips to or from WUS, this would also be a moderate beneficial cumulative impact.

Vehicular Traffic

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would result in major adverse cumulative impacts on traffic operations.

The Preferred Alternative would generate additional vehicular trips and impacts on the operation of the street and roadway system relative to the No-Action Alternative. The operational intersection analyses performed for the Preferred Alternative and presented in **Section 5.5.2.12**, *Vehicular Traffic* incorporate the impacts of past, present, and foreseeable actions as background. Therefore, the impacts presented in the referenced section are cumulative impacts.

18.5.6 Air Quality

18.5.6.1 Impacts of Past, Present, and Foreseeable Actions (without the Project)

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 18.5.6.1, *Impacts of Past, Present, and Foreseeable actions (without the Project)*.

18.5.6.2 Cumulative Impacts of the Project

In the Preferred Alternative, considered with other past, present, and reasonably foreseeable actions, the Project would cause a minor adverse cumulative impact on regional air quality.

As explained in the air quality impact analysis presented in **Section 6.5.** *Impacts of the Preferred Alternative,* the Preferred Alternative would generate additional emissions of criteria pollutants from mobile sources relative to the No-Action Alternative. The No-Action Alternative air quality analysis incorporated emissions from mobile sources associated with past, present, and reasonably foreseeable actions through the inclusion of background traffic in the traffic analysis. Therefore, total emissions under the Preferred Alternative (**Section 6.5.2.1**, *Mesoscale Analysis*, **Table 6-1**) represent the cumulative impacts of the Project on air quality. The cumulative adverse impact would be minor, as it would not exceed the applicable *de minimis* thresholds.

18.5.7 Greenhouse Gas Emissions and Resilience

18.5.7.1 Impacts of Past, Present, and Foreseeable Actions (without the Project)

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 18.5.7.1, *Impacts of Past, Present, and Foreseeable actions (without the Project)*.

18.5.7.2 Cumulative Impacts of the Project

Greenhouse Gas Emissions

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would result in a major adverse cumulative impact on GHG emissions.

As explained in the GHG impact analysis presented in **Section 7.5**, *Impacts of the Preferred Alternative,* the Preferred Alternative would potentially generate additional annual emissions of GHG from mobile and stationary sources relative to the No-Action Alternative, including approximately 9,791 metric tons from stationary sources; approximately 3,661 metric tons from the potential Federal air rights development; and approximately 9,247 metric tons from mobile sources. Therefore, the amount of potential stationary source emissions contributed by the Preferred Alternative in addition to those of past, present, and foreseeable actions would be approximately 22,699 metric tons. This would represent approximately 0.3 percent of the District's 2019 carbon monoxide equivalent (CO_2e) emissions (7,170,450 metric tons) and 0.5 percent of the District's emission target for 2032 (4,614,141 metric tons). While a small increment, any net increase in GHG emissions would be a major adverse impact in the context of the District's goal to achieve carbon neutrality by 2045.

Resilience

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would result in a beneficial cumulative impact on resilience.

The Preferred Alternative, when added to past, present, and foreseeable actions, would increase District-wide resilience, resulting in a beneficial cumulative impact. Specifically, it would contribute to fulfilling one of *Resilient DC*'s initiatives, which is to "call on regional transit providers (WMATA, MARC, VRE, Circulator) to improve regional integration (such as coordinated schedule, *increased Union Station capacity and frequency*, fare integration, free transfers) and expand night and weekend service for key residential and employment zones."[281] The Project would incorporate features that enhance its resilience (see **Section 7.5.2.6**, *Resilience*) ability to withstand climate change-related events. As such, it would cumulatively contribute to improving local resiliency.

[281] *Resilient DC. A Strategy to Thrive in the Face of Change*, page 73 (emphasis added). Accessed from https://resilient.dc.gov/. Accessed on November 11, 2022.

18.5.8 Energy Resources

18.5.8.1 Impacts of Past, Present, and Foreseeable Actions (without the Project)

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 18.5.8.1, *Impacts of Past, Present, and Foreseeable actions (without the Project)*. *)*. The updated reasonably foreseeable private development projects in the Study Area are anticipated to generate an energy demand of approximately 1.358 billion kilo British thermal units (kBTUs) per year.[282]

18.5.8.2 Cumulative Impacts of the Project

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would cause a minor adverse cumulative impact on energy resources.

The Preferred Alternative would cause an increase in energy use at WUS to light, heat, cool, and ventilate the expanded station. As shown in **Section 8.6**, *Summary of Impacts*, **Table 8-7**, the additional amount of energy used by the Project annually would be approximately 100,504,000 kBTUs per year, including approximately 72,904,000 kBTUs for WUS and approximately 27,600,000 kBTUs for the potential Federal air rights development. This would be a small increment over consumption from past, present, and reasonably foreseeable actions, representing approximately 0.07 percent of the District's 2020 energy consumption of 144 billion kBTUs. [283] This increase is not likely to cause energy shortages or other issues. Adding the demand generated by the Preferred Alternative to the demand anticipated to result from foreseeable projects in the Study Area (approximately 1.358 billion kBTUs) would result in a cumulative demand representing approximately 1 percent of the District's 2020 energy consumption. The adverse cumulative impact would be minor.

18.5.9 Land Use, Land Planning, and Property

18.5.9.1 Impacts of Past, Present, and Foreseeable Actions (without the Project)

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 18.5.9.1, *Impacts of Past, Present, and Foreseeable actions (without the Project)*.

[282] See **Section 8.5.1.1**, *Buildings,* of this report for information on how energy demand is estimated based on land use.

[283] U.S. Energy Information Administration. *District of Columbia Energy Profile*. Accessed from https://www.eia.gov/state/print.php?sid=DC. Accessed on October 25, 2022.

18.5.9.2 Cumulative Impacts of the Project

Zoning, Land Use, and Development

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would have a major beneficial cumulative impact on land use.

The expansion of WUS in the Preferred Alternative would enhance WUS's functionality as a multimodal facility and improve connectivity among the neighborhoods on either side of the rail terminal. The expanded station would accommodate increased intercity and commuter train service, which in turn would support nearby existing and future residential and commercial developments by making the area more accessible. The Preferred Alternative would also make available for potential mixed-use development the Federally owned air rights currently occupied by the WUS parking garage. The Preferred Alternative would render the neighborhoods around WUS more accessible and better connected which each other and the rest of the District. Together with past, present, and reasonably foreseeable actions, it would contribute to the continuing development of the areas around WUS, a major beneficial cumulative impact.

Property Ownership, Land Acquisitions, and Displacements

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would result in a minor adverse cumulative impact on private property.

The Preferred Alternative would use approximately 2.9 acres of the privately owned air rights above the WUS rail terminal. No past, present, and reasonably foreseeable actions have had or would have impacts on these air rights. The Project's cumulative impacts on property are the impacts of the Project alone. As explained in **Section 9.5.1.2,** P*roperty Ownership, Land Acquisition, or Displacement*, these impacts would be minor.

Consistency with Local and Regional Plans

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would have a major beneficial cumulative impact on community planning through its consistency with local and regional plans.

As explained in **Section 9.5.1.3,** *Consistency with Local and Regional Plans*, the Preferred Alternative would be consistent with and support many of the relevant plans' goals and objectives, especially those pertaining to transportation and connectivity. These impacts, when added to those of past, present, and reasonably foreseeable actions, would result in major beneficial cumulative impacts.

18.5.10 Noise and Vibration

18.5.10.1 Impacts of Past, Present, and Foreseeable Actions (without the Project)

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 18.5.10.1, *Impacts of Past, Present, and Foreseeable Actions (without the Project)*.

18.5.10.2 Cumulative Impacts of the Project

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would cause negligible adverse impacts on noise and vibrations, except at 14 modeled locations, where it would result in moderate adverse cumulative impacts on noise levels.

The Preferred Alternative would generate additional noise and vibration because of the associated increase in train and motor vehicle traffic. The noise analysis presented in **Section 10.5**, *Impacts of the Preferred Alternative* is cumulative in that it incorporates noise from present and reasonably foreseeable traffic, along with that associated with the Project. The analysis shows that noise levels would generally be within 1 to 3 A-weighted decibels (dBA) of No-Action Alternative levels, which is an imperceptible difference; noise levels would continue to range from 60 to 75 dBA, typical of an urban environment. Similarly, vibration levels from trains would not perceptibly change. Therefore, the cumulative adverse impacts of the Project would be negligible except at the 14 modeled locations where increases would bring noise levels above the thresholds for a moderate impact (these locations are identified in **Section 10.5.1**, *Direct Operational Impacts*, **Figure 10-3** and **Table 10-1**).

18.5.11 Aesthetics and Visual Quality

18.5.11.1 Impacts of Past, Present, and Foreseeable Actions (without the Project)

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 18.5.11.1, *Impacts of Past, Present, and Foreseeable Actions (without the Project)*.

18.5.11.2 Cumulative Impacts of the Project

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would have potential negligible to moderate cumulative adverse and beneficial impacts on aesthetics and visual quality, depending on the location.

In general, the Preferred Alternative, when added to past, present, and reasonably foreseeable actions, would introduce new visual elements in the Project Area that would be visible from areas near WUS. However, the private air rights development would surround, obscure, encompass, or balance these elements, reducing their visibility. The visual impact analysis presented in **Section 11.5,** *Impacts of the Preferred Alternative,* is cumulative in that it considers the private air rights development when assessing anticipated changes in views. This development is the only other project through which the

Project would generate noticeable cumulative impacts. The visual impact analysis, whose findings are summarized in **Section 11.6**, *Summary of Impacts,* **Table 11-4**, shows that the Project may adversely affect 9 of the 28 views and vistas considered in the analysis, with impacts ranging from moderate to negligible. The Project may also have beneficial impacts on two views.

Most of the Project's visual impacts are conservatively described as adverse because the assessment is based only on massing and visibility. For this reason, these impacts are mostly potential. At this stage of design, there is not enough information on materials and specific architectural features to allow for a more refined evaluation. However, Union Station Redevelopment Corporation (USRC), as Project Sponsor, is committed to a Project design that is compatible with the design of the historic station building and makes the expanded WUS a grand gateway into the Nation's capital. Additionally, the Project would be subject to review and approval by the Commission of Fine Arts (CFA) and the National Capital Planning Commission (NCPC), which would help ensure that it is consistent with its visual and cultural environment.

18.5.12 Cultural Resources

18.5.12.1 Impacts of Past, Present, and Foreseeable actions (without the Project)

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 18.5.12.1, *Impacts of Past, Present, and Foreseeable actions (without the Project)*.

18.5.12.2 Cumulative Impacts of the Project

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would have potential major cumulative adverse impacts on WUS and the WUS Historic Site.

The Preferred Alternative, when added to past, present, and reasonably foreseeable actions, would result in major cumulative direct adverse impacts on WUS, the WUS Historic Site, the Railway Express Agency (REA) Building, and the City Post Office (Postal Museum), for the reasons explained in **Section 12.5.1**, *Direct Operational Impacts*. Because of the reconstruction of the rail terminal and column removal work, the Project would also increase the risk of major potential adverse impacts on archaeological resources if any are present. As much as possible, these impacts would be avoided, minimized, or mitigated through the Section 106 process.

18.5.13 Parks and Recreation Areas

18.5.13.1 Impacts of Past, Present, and Foreseeable Actions (without the Project)

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 18.5.13.1, *Impacts of Past, Present, and Foreseeable Actions (without the Project)*.

18.5.13.2 Cumulative Impacts of the Project

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would have minor cumulative adverse impacts on parks and recreation areas.

The Preferred Alternative would generate more activity at WUS, bringing more people to the area. Some of these people may use local parks and recreation areas, leading to accelerated wear and tear and increased maintenance costs. The increase in visits and foot traffic attributable to the Preferred Alternative would likely be small, however, and cumulative adverse impacts would be minor.

18.5.14 Social and Economic Conditions

18.5.14.1 Impacts of Past, Present, and Foreseeable Actions (without the Project)

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 18.5.14.1, *Impacts of Past, Present, and Foreseeable Actions (without the Project)*.

18.5.14.2 Cumulative Impacts of the Project

Demographics

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would result in a minor cumulative impact on demography.

As explained in **Section 14.5.2.1**, *Demographics*, would add residents to the Project Area through the potential development of the Federal air rights. It may also indirectly cause more people to move to areas near WUS by improving connectivity through, and increasing activity at, WUS, although this impact cannot be quantified. Some of the potentially induced growth may be accommodated by the residential component of the reasonably foreseeable projects, which include approximately 13,060 new residential units. In the context of the District as a whole, the impact would be minor. [284]

Community Disruption and Other Social Benefits or Impacts

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would result in a major beneficial cumulative impact with regard to community disruption and other social benefits.

The Preferred Alternative, when added to past, present, and reasonably foreseeable actions, would have a major beneficial impact by providing more and better intermodal connectivity that would benefit the Project Area, its surroundings, and the District as a whole. It would make the Study Area more accessible, providing residents and employees with improved commuting options. This would support

[284] The demographic impact is not characterized as adverse or beneficial because a small change in residential population does not in itself represent a favorable or unfavorable outcome.

ongoing and future development and help address the consequences of this development on the transportation system. The Project would also directly contribute additional economic activity through new retail at WUS, though it would be a small increase to the area's past, present, and planned retail. The Project would also potentially lead to the transfer and development of the remaining Federal air rights above the rail terminal, further contributing to the economic development of the Study Area and the District.

Employment

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would have a minor beneficial cumulative impact on employment.

As shown in **Section 14.6,** *Summary of Impacts,* **Table 14-5**, after rounding, the Preferred Alternative (including the potential Federal air rights development) would add approximately 2,710 jobs to the Project Area.[285] The foreseeable projects in the Study Area would potentially support approximately 35,000 new jobs.[286] While there would be a beneficial cumulative impact on employment, this impact would be minor compared to overall present and future employment in the District.

Washington Union Station Revenue

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would have a major adverse cumulative impact on WUS revenue.

The Preferred Alternative would reduce the number of parking spaces at WUS by approximately 75 percent, thereby reducing the station's revenue by more than half (**Section 14.5.1.4**, *Washington Union Station Revenue*). No other past, present, and reasonably foreseeable actions have had or would have any substantial impacts on WUS revenue. The Preferred Alternative's cumulative impact is the impact of the Project alone. This impact would be major.

Other Economic Impacts

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would have a minor beneficial cumulative impact on economic conditions.

The Preferred Alternative would have beneficial cumulative impacts on the economy through the economic activity it would support and promote at WUS and in the District, in addition to the activity supported by the past, present, and foreseeable actions in the area. The spending of Project-generated private and commercial income would in turn generate more economic activity both locally and regionally. This activity would generate revenue for the District through sales, property taxes, and income taxes. While these economic and fiscal benefits cannot be quantified, they likely would be proportionately minor in the context of the District's economy.

[285] Approximately 1,421 jobs for WUS and 1,290 jobs for the potential Federal air rights development.

[286] See **Section 14.5.1.3**, *Employment*, of this report, for the planning factors used for each land use.

18.5.15 Public Safety and Security

18.5.15.1 Impacts of Past, Present, and Foreseeable Actions (without the Project)

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 18.5.15.1, *Impacts of Past, Present, and Foreseeable Actions (without the Project)*.

18.5.15.2 Cumulative Impacts of the Project

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would have a major beneficial impact on security and a moderate adverse impact on public safety.

The Preferred Alternative would create new security risks at WUS but also provide the opportunity to enhance security measures there, as described in **Section 15.5.1**, *Direct Operational Impacts*. This would result in a major beneficial cumulative impact on security in the area, given WUS's central and highly visible presence, and its potential as a target of terrorist attacks.

The Preferred Alternative would also have an adverse cumulative impact on safety, as it would add further to the demand for emergency services that past, present, and foreseeable actions would generate. However, emergency services would have time to plan for increases in personnel and equipment need. The adverse impact would be moderate.

18.5.16 Public Health, Elderly, and Persons with Disabilities

18.5.16.1 Impacts of Past, Present, and Foreseeable Actions (without the Project)

Refer to Appendix C3, *Washington Union Station (WUS) Expansion Project Environmental Consequences Technical Report*, Section 18.5.16.1, *Impacts of Past, Present, and Foreseeable Actions (without the Project)*.

18.5.16.2 Cumulative Impacts of the Project

In the Preferred Alternative, when considered with other past, present, and reasonably foreseeable actions, the Project would have a negligible cumulative impact on public health and a major beneficial cumulative impact on the transportation and mobility of the elderly and persons with disabilities at WUS.

The Preferred Alternative would have negligible adverse impacts on health (see **Section 16.5.1**, *Direct Operational Impacts*) and would not create conditions that would directly threaten or diminish public health when considered with other past, present, and reasonably foreseeable actions. The Preferred Alternative would also have a major cumulative beneficial impact on the mobility of the elderly and persons with disabilities at WUS, as explained in **Section 16.5.1**, *Direct Operational Impacts*.

18.6 Avoidance, Minimization and Mitigation Evaluation

The previous sections of this report document the measures that FRA is proposing in order to avoid, minimize, and mitigate the impacts of the Preferred Alternative. These measures would also serve to avoid, minimize, and mitigate cumulative impacts.