10.0 Air Quality and Greenhouse Gases

10.1. Introduction

This chapter defines the air quality and greenhouse gas (GHG) resources pertinent to the Long Bridge Project (the Project), and provides the regulatory context, methodology, and Affected Environment. For each Action Alternative and the No Action Alternative, this chapter assesses the potential short-term and long-term impacts on air quality and GHG emissions. This chapter also discusses proposed avoidance, minimization, and mitigation measures to reduce adverse impacts of the Project.

The term **air pollution** refers to one or more substances determined to degrade the quality of the atmosphere. The United States Environmental Protection Agency (EPA) identified the following six main air pollutants, collectively referred to as criteria pollutants, as being of nationwide concern, based on their potential effect on human health:

- Carbon monoxide (CO);
- Sulfur oxides (SOx), including sulfur dioxide (SO2);
- Nitrogen oxides (NOx), including nitrogen dioxide (NO2);
- Ozone (O3);
- Particulate matter sized 10 micrometers or less (PM10) and sized 2.5 micrometers or less (PM2.5); and
- Lead (Pb).

GHGs are gases that trap heat in the atmosphere and affect climate change. The precise sources of these pollutants, their effects on human health and general welfare, and their final disposition in the atmosphere vary considerably. Some major GHGs include carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), and fluorinated gases (hydrofluorocarbons, perfluorocarbons, etc.).

10.2. Regulatory Context and Methodology

This section describes the most pertinent regulatory context for evaluating impacts to air quality and GHG resources and summarizes the methodology for evaluating current conditions and the probable consequences of the alternatives. This section also includes a description of the Study Area. **Appendix D1, Methodology Report**, provides the complete list of laws, regulations, and other guidance considered, and a full description of the analysis methodology**.**

10.2.1. Regulatory Context

The Clean Air Act of 1970, as amended (CAA) and the Conformity Rule are the primary Federal legislations regulating air quality. These regulations play a role in setting the nation's air quality standards for pollutants and adopting emission control programs.[1,2] The CAA authorizes the EPA to "protect public health by regulating emissions of harmful pollutants." The National Environmental Policy Act of 1969 (NEPA) also requires the analysis of potential impacts in terms of the project's context,

[1] 42 USC 7401
[2] 40 CFR parts 51 and 93

intensity, and duration. The Federal Railroad Administration (FRA) *Procedures for Considering Environmental Impacts* states that an environmental document should consider possible impacts on air quality.[3]

Under authority of the CAA, EPA has established National Ambient Air Quality Standards (NAAQS) for criteria pollutants to protect public health and welfare.[4] The analysis evaluates ambient air quality against the NAAQS to determine whether pollutant concentration levels are harmful. The EPA classifies an area as nonattainment for a pollutant if that pollutant exceeds the NAAQS. EPA promulgated regulations to ensure that Federal agencies do not adopt, accept, approve, or fund activities that are not consistent with the CAA. FRA follows General Conformity regulations.[5] The EPA established *de minimis* (minimum) thresholds to help determine if a project requires a General Conformity determination. If the Project exceeds *de minimis* thresholds, a General Conformity determination would establish the Project's compliance with the State Implementation Plan.

The District Department of Energy and Environment (DOEE) establishes and enforces the District's air quality regulations. The regulations prevent or minimize emissions into the atmosphere to protect and enhance the District's air quality. These regulations apply to controlling emissions from both stationary sources and mobile sources, controlling fugitive dust from construction activities, and controlling on-road engine and non-road diesel engine idling. The Virginia Department of Environmental Quality (VDEQ) Air Division carries out the mandates of the Virginia Air Pollution Control Law, and ensures Virginia meets its Federal obligations under the CAA.[6] Arlington County does not have regulations or ordinances that govern air pollutant emissions.

No established thresholds exist for assessing the significance of a project's GHG emissions. State and local agencies have developed several local plans that provide guidance and direction on GHG emissions. The Commonwealth of Virginia has developed plans to reach GHG reduction goals and sustainability objectives in the *Virginia Energy Plan*.[7] The District has developed multiple plans to reach GHG reduction goals and sustainability objectives. These plans include the *Sustainable DC Plan* and the *Climate Ready DC Plan*.[8]

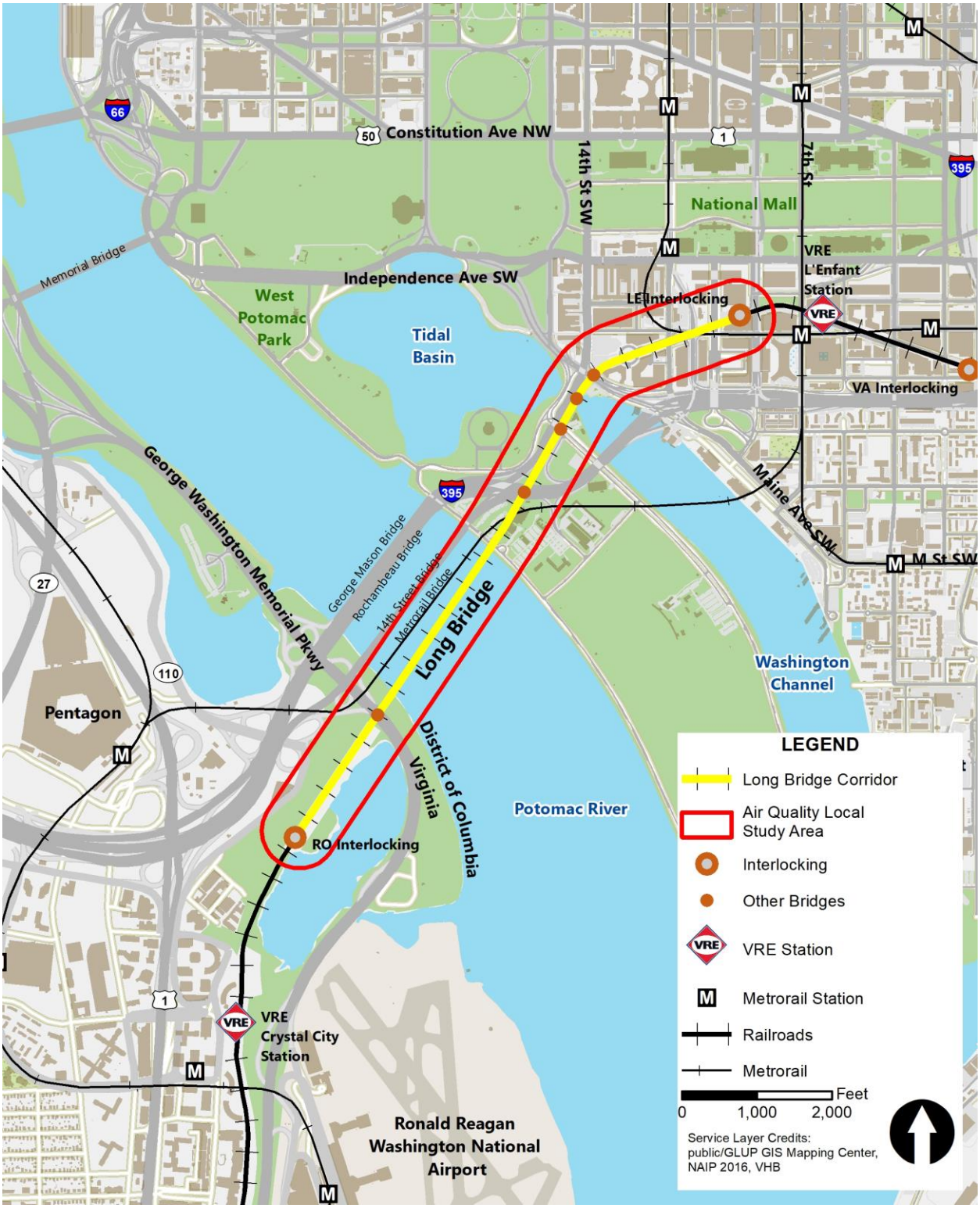
10.2.2. Methodology

10.2.2.1. Air Quality

This analysis examined the impact of criteria pollutants at both the local and regional levels. The Local Study Area (**Figure 10-1)**, included locations around the Project's emission sources where the public has access to ambient air.

[3] 64 FR 28545
[4] 40 CFR part 50
[5] United States Department of Transportation, Federal Highway Administration. Transportation and General Conformity FAQs. Accessed from https://www.fhwa.dot.gov/environment/air_quality/conformity/policy_and_guidance/faqs/genfaqsmemo.cfm. Accessed October 16, 2018.
[6] 9 VAC 5-160
[7] Virginia Department of Mines, Minerals, and Energy. October 1, 2014. *The Virginia Energy Plan*. Accessed from https://www.dmme.virginia.gov/DE/2014_VirginiaEnergyPlan2.shtml. Accessed May 16, 2018.
[8] *Climate Ready DC: The District of Columbia's Plan to Adapt to a Changing Climate*. Undated.

Figure 10-1 | Local Study Area for Air Quality



In addition, the Local Study Area included sensitive receptors around the Project, accessible by the public, where impact from increased train activity might occur. The Regional Study Area (the District and Arlington County, Virginia) included data collection sources such as the air quality monitoring station at the Aurora Hills Visitor Center in Arlington County and meteorological data from Ronald Reagan Washington National Airport in Arlington County. Affected Environment included ambient air quality conditions from DOEE, VDEQ, and EPA air quality monitoring data.

The Project's direct and indirect impacts on air quality considered post-construction operations mobile sources and construction emissions. The impacts analysis included local, regional, and mobile source air toxics (MSAT) assessments.

The local emissions assessment was qualitative and considered the potential relative concentrations of air pollutants of the No Action and Action Alternatives. The assessment was based on railroad operations, emission source location and heights, and receptor location and heights. The study documented the air quality emissions resulting from changes in the vehicle traffic conditions for each alternative (likely near the stations).

As part of the regional assessment, the evaluation calculated emissions inventories for VOC (volatile organic compounds),[9] NOx, CO, PM10/PM2.5[10] The study compared emissions in terms of trends over time for the Action Alternatives and No Action Alternative. The air quality assessment included inventories for existing conditions, the No Action, and the Action Alternatives in the Project's design year (2040). The study then presents a qualitative discussion of the Project's impacts on future O3 and PM Air Quality Index (AQI).

The qualitative MSAT assessment followed the Federal Highway Administration guidelines on air toxics, the *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*.[11] The assessment identified MSATs of concern and described trends of MSAT emissions for all alternatives. Screening-level analysis reviewed the proposed Project's conceptual engineering plans, profiles, and project description to identify new or modified air toxic emissions sources.

The quantitative construction air quality analysis included the evaluation of construction vehicles (worker cars and construction trucks), stationary construction equipment, and fugitive source activities. Emission factors for the emission sources used a combination of EPA's Non-Road, Motor Vehicle Emission Simulator 2014b (MOVES2014b) and the Compilation of Air Emissions Factors (AP-42) models. The evaluation calculated emission inventories for the entirety of the construction periods under each of the Action Alternatives. The analysis determined the peak year of construction, defined as the year in which the largest amount of pollutant emissions occurs. The study then compares the emissions inventory of the peak year of construction to the *de minimis* thresholds to evaluate whether a General Conformity determination is necessary.

[9] VOCs are organic chemical compounds with compositions that enable them to evaporate under normal indoor atmospheric conditions of temperature and pressure.

[10] These pollutants are evaluated in the regional analysis as the study area is designated nonattainment or maintenance areas for these pollutants, as described in Section 10.3.

[11] Biondi, Emily. *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA*. Federal Highway Administration. October 18, 2016.

10.2.2.2. Greenhouse Gas Emissions

The state of dispersion science and health effects of GHG emissions have not sufficiently advanced to accurately consider the microscale level of mobile sources. For this reason, the EIS did not determine a Local Study Area for GHG emissions for mobile sources and only considered them on a regional scale. The Regional Study Area encompasses the jurisdictions of the Metropolitan Washington Council of Governments (MWCOG), the local Metropolitan Planning Organization. These jurisdictions include the District; the Cities of Manassas, Manassas Park, Fairfax, Falls Church, and Alexandria, as well as Prince William, Loudoun, Fairfax, and Arlington Counties in Virginia; and Charles, Prince George's, Montgomery, and Frederick Counties in Maryland. The Affected Environment included documentation of mobile sources and annual regional emissions inventories for the emitted GHGs. The study uses the EPA guidance *Emission Factors for Locomotives* (EPA-420-F-09-025) to develop railroad emissions.

The impact analysis evaluated the GHG emissions for each Action Alternative compared to the No Action Alternative in the planning year (2040). The study conducted a mobile source analysis that compiled annual emissions inventories based on the emitted GHGs. This included emissions from diesel locomotives from operating conditions in the Transportation analysis. The analysis also evaluated GHG impact of fossil fuels burned to generate electricity used on the bridge.

The quantitative analysis of GHG construction impacts from the Action Alternatives considered the duration and intensity of anticipated construction activities. The analysis included best practice mitigation measures to minimize pollutant emissions during the construction period. The analysis considered variations in construction energy use and corresponding GHG emissions for each Action Alternative based on the proposed design and its associated construction requirements.

10.3. Affected Environment

This section summarizes the existing air quality and GHG emissions conditions within the Local and Regional Study Areas. For a complete description of the Affected Environment, see **Appendix D2, Affected Environment Report.**

10.3.1. Ambient Air Quality

Ambient air is the atmosphere, external to buildings, to which the general public has access. The CAA requires the EPA to set the NAAQS on pollutants considered potentially harmful to public health and the environment at ambient concentrations, including seven principal (criteria) pollutants: CO, NO2, O3, PM2.5, PM10, SO2, and Pb. Ambient air monitoring is the systematic, long-term assessment of pollutant levels by measuring the quantity and types of pollutants in the surrounding outdoor air.

Table 10-1 presents the background concentrations of pollutants for the Regional Study Area based on air quality monitoring from 2014 to 2016. The values describe the air quality status of a given location relative to the NAAQS. These values provide a way to designate and classify nonattainment areas and to assess progress towards meeting the NAAQS.

The representative regional background concentrations show that all pollutant concentrations at the Regional Study Area monitors are below their respective NAAQS criteria, except O3. The EPA designates the District and Arlington County as nonattainment areas for 8-hour O3 and maintenance areas for CO

and PM2.5; the values presented in **Table 10-1** confirm the higher levels of O3 and the progress towards attainment for CO and PM.

Table 10-1 | Regional Background Air Quality Concentrations

Pollutant	Averaging Period	Background Concentration	Monitoring Location	NAAQS
CO (ppm)	8-hour	1.7	Aurora Hills Visitor Center, VA	9
	1-hour	3.7	Aurora Hills Visitor Center, VA	35
NO2 (ppb)	1-hour	50	McMillan, DC	100
	Annual	11	Aurora Hills Visitor Center, VA	53
O3 (ppm)	8-hour	0.072	Aurora Hills Visitor Center, VA	0.070
PM2.5 (µg/m³)	Annual	8.5	Aurora Hills Visitor Center, VA	12
	24-hour	19	Aurora Hills Visitor Center, VA	35
PM10 (µg/m³)	24-hour	27	Fredericksburg, VA	150
SO2 (ppb)	1-hour	11	McMillan, DC	75
Pb (µg/m³)	3-month	0.01	McMillan, DC	0.15

Source: EPA, Air Quality Design Values (2017)[12]

Note: (ppm) – parts per million; (ppb) – parts per billion; (µg/m³) – micrograms per meter cubed

10.3.2. Air Quality Index

The AQI is a metric for metropolitan areas to report on the daily air quality and associated health effects that may results from air pollution. The EPA calculates the AQI based on five major air pollutants in the CAA: ground-level O3, particle pollution, CO, SO2, and NO2. The primary focus of the AQI is on O3 and PM, as these pose the greatest risk to human health.

The AQI has six categories to determine the level of health concern (**Table 10-2**). The EPA considers an AQI of less than 100 as generally satisfactory except for particularly sensitive groups. As levels increase, they become unhealthy for all groups.

10.3.3. Regional Greenhouse Gas Emissions

The DOEE regularly tracks the District's GHG emissions to determine the region's compliance with its reduction goals. The most recent GHG inventory estimates approximately 57 percent of the District's GHG emissions are from non-residential buildings, and 23 percent from the transportation sector. When DOEE conducted the inventory in 2013, the city-wide annual GHG emissions were 7.75 million metric tons of carbon dioxide equivalent (CO2e).[13] However, this represented an annual GHG emission reduction of 2.35 million metric tons of CO2e when compared to the base year emissions in 2006. Passenger vehicles produced the majority of transportation-related GHG emissions. Electricity used in transit accounted for six percent of transportation-related GHG emissions. The Washington

[12] EPA. 2017. Virginia Ambient Air Monitoring Data Report. Accessed from https://www.epa.gov/air-trends/air-quality-design-values. Accessed November 8, 2017.

[13] Carbon dioxide equivalent (CO2e) is a standard unit for measuring carbon footprints. The idea is to express the impact of each different greenhouse gas in terms of the amount of CO2 that would create the same amount of warming.

Metropolitan Region has met its 2012 goal to reduce GHG emissions to 2005 levels. The MWCOG continues to work with its regional partners to meet the 2020 goal of 20 percent below 2005 levels.[14]

Table 10-2 | Air Quality Index and Associated Health Effects

AQI	Level of Health Concern	Health Effects
0 to 50	Good	Air quality is satisfactory, and air pollution poses little or no risk.
51 to 100	Moderate	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
101 to 150	Unhealthy for Sensitive Groups	Members of sensitive groups may experience health effects; the general public is not likely to be affected.
151 to 200	Unhealthy	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
201 to 300	Very Unhealthy	Health alert; everyone may experience more serious health effects.
301 to 500	Hazardous	Health warnings of emergency conditions; the entire population is likely to be affected
Source: EPA, 2018[15]		

10.4. Permanent or Long-Term Effects

This section discusses the permanent or long-term effects following the construction of the No Action Alternative and Action Alternatives on air quality and GHG emissions within the Local and Regional Study Areas. For a complete description of the permanent or long-term effects, see **Appendix D3, Environmental Consequences Report**.

10.4.1. No Action Alternative

The section presents the environmental consequences associated with the No Action Alternative. The No Action Alternative includes planned and funded transportation projects likely to be implemented by 2040, and maintenance projects necessary to keep the existing bridge and Corridor in service. The analysis considered the air quality and GHG impacts associated with this alternative at a local and regional level.

10.4.1.1. Local Assessment

The No Action Alternative would have adverse impacts on direct local emissions based on the short durations of pollutant exposure associated with moving locomotives. The No Action Alternative would

[14] MWCOG. *Environment Climate and Energy*. Undated.
[15] EPA. May 2016. *Technical Assistance Document for the Report of Daily Air Quality – the Air Quality Index (AQI)*. Accessed from https://www3.epa.gov/airnow/aqi-technical-assistance-document-may2016.pdf. Accessed January 17, 2018.

see daily train operations increase from 76 trains per day to 112 trains per day. The No Action Alternative has the potential to increase local concentrations of air pollutants due to the increased number of trains and degraded operations resulting from the lack of capacity increase on the Corridor. However, the increases would not be substantial given the temporary nature of locomotive emissions. Localized receptors would only experience pollutant emissions from a locomotive for a short duration.

10.4.1.2. Regional Assessment

The No Action Alternative would have adverse impacts on direct regional emissions based on the increase in emissions related to the increased rail service projected under the No Action Alternative (**Table 10-3**). Locomotive emissions reflect the planned future operations for the No Action Alternative railroad services using diesel locomotives.

Table 10-3 | No Action Alternative Regional Emissions Inventory

Scenario	CO Tons/Year	NOx Tons/Year	VOC Tons/Year	PM10 Tons/Year	PM2.5 Tons/Year	GHG Metric Tons CO2/Year
Existing Condition	20	147	5.9	6.2	4.0	7,070
No Action Alternative	31	240	8.9	9.4	5.9	10,727
Increase	11	94	3.0	3.1	1.9	3,657

Source: VHB
VOC – Volatile Organic Compounds, NOx – Oxides of Nitrogen, CO- Carbon Monoxide, PM10 – Particulate Matter 10, PM2.5 – Particulate Matter 2.5

10.4.2. Action Alternative A (Preferred Alternative)

The section presents the impacts associated with Action Alternative A.

10.4.2.1. Local Assessment

Action Alternative A would have minor direct adverse impacts on local emissions based on the short durations of pollutant exposure associated with moving locomotives. Action Alternative A would have daily operations of 192 trains per day, due to additional capacity. In addition to the existing passenger railroad service and CSXT freight operations, Norfolk Southern would operate new freight trains and MARC would operate new passenger service.

Local sensitive receptors in proximity to the rail Corridor include Long Bridge Park, the Mount Vernon Trail, the Rock Creek Park Trail, the National Mall and Memorial Parks headquarters complex, the ballfields along Ohio Drive SW, and the Portals V residential development. Other areas like sidewalks and surface parking where the public may have access are also sensitive.

Action Alternative A may increase local concentrations of air pollutants over the No Action Alternative due to the increased operations on the Corridor and reduced distances between emissions sources and receptors. However, Action Alternative A would likely have a minor impact to local air quality due to the

short durations of pollutant exposure associated with moving locomotives. Localized receptors would only experience pollutant emissions from a locomotive for a short duration. For instance, a Virginia Railway Express (VRE) locomotive traveling at 30 miles per hour would pass a receptor location in 1.5 seconds.

10.4.2.2. Regional Assessment/General Conformity

Action Alternative A would have minor adverse impacts on direct regional emissions based on increased capacity and rail service. However, these emissions would remain well below the *de miminis* thresholds and would not require a General Conformity decision. Although not quantified, the additional railroad service would likely result in a modal shift, causing a reduction of regional motor vehicle activity. This reduction in regional motor vehicle activity would likely result in reduced pollutant emissions from vehicles on the roadways. **Table 10-4** provides Action Alternative A mesoscale inventories for the studied pollutants associated with railroad activity. When compared to the No Action Alternative, Alternative A would see increases of 9 tons per year of CO, 12 tons per year of NOx, 0.5 tons per year of VOC, 0.5 tons per year of PM10, 0.2 tons per year of PM2.5, and 3,242 metric tons per year of GHG. As both the No Action and Action Alternative emission inventories include the effects of other projects occurring independently of the Project, it is necessary to subtract the No Action Alternative from the Action Alternative to determine the emissions directly resulting from the Project.

Table 10-4 | Alternative A Regional Emissions Inventory

Scenario	CO Tons/Year	NOx Tons/Year	VOC Tons/Year	PM10 Tons/Year	PM2.5 Tons/Year	GHG Metric Tons CO2/Year
Existing Condition	20	147	5.9	6.2	4.0	7,070
No Action Alternative	31	240	8.9	9.4	5.9	10,727
Action Alternative A	40	252	9.4	9.9	6.1	13,969
Difference (Action Alternative A from No Action Alternative)	9	12	0.5	0.5	0.2	3,242
De Minimis	*100*	*100*	*50*	*100*	*100*	-

Source: VHB
VOC – Volatile Organic Compounds, NOx – Oxides of Nitrogen, CO – Carbon Monoxide, PM10 – Particulate Matter 10, PM2.5 – Particulate Matter 2.5

Stationary source emissions of GHG would occur during the operation of Action Alternative A due to the use of electricity by track switches and bridge lighting. **Chapter 11, Energy**, presents an estimate of energy consumption by these sources in the Existing Condition and Action Alternative A. The analysis developed an assessment of GHG emissions associated with the electricity consumption of the Project. **Table 10-5** presents these estimates. In both the existing conditions and No Action Alternative, the Project would consume 416,100 kWh of electricity, resulting in 150 metric tons of GHG per year. Action

Alternative A would consume 810,300 kWh of electricity, which results in the emissions of 292 metric tons per year of GHG. The resulting difference is 142 metric tons of GHG per year. Stationary sources of GHG emissions associated with the Project would be relatively small and would be a fraction of the anticipated increase in regional GHG emissions associated with the rail activity.

Table 10-5 | Alternative A Stationary Source GHG Emissions

Scenario	Annual Electricity Consumption kWh/Year	GHG Emissions Metric Tons CO2/Year
Existing Condition/ No Action Alternative	416,100	150
Action Alternative A	810,300	292
Project Increment	394,200	142

Source: VHB
kWh - Kilowatt Hours

10.4.2.3. MSAT Assessment

Action Alternative A would have minor adverse impacts on direct local emissions based on the short durations of pollutant exposure associated with moving locomotives. Action Alternative A will have minor adverse impacts on direct regional emissions based on increased rail service projected by the Project's enhancements. However, these emissions would still be well below the *de miminis* thresholds. For Action Alternative A, the amount of MSAT emitted would be proportional to the amount of railroad activity, if other variables are the same. More trains would run in Action Alternative A compared to the No Action Alternative because of the additional capacity associated with the new tracks. The increase in railroad activity associated with Action Alternative A would lead to higher diesel particulate matter emissions (a component of MSAT) in the Regional Study Area. The additional railroad activity of Action Alternative A would increase diesel emissions at nearby homes, parks, and businesses. Therefore, in Action Alternative A, localized areas may exist where ambient concentrations of MSAT would be higher than in the No Action Alternative.

Action Alternative A might cause higher levels of MSAT emissions in the Local Study Area, relative to the No Action Alternative. The Alternative will provide some benefit from improvements in railroad speeds and reductions in region-wide motor vehicle traffic. There also could be slightly higher differences in MSAT levels in Action Alternative A in a few localized areas where railroad activity occurs closer to homes, parks, and businesses. However, future MSAT emissions would likely be lower than present levels due to EPA's national control programs that project a reduction in annual MSAT emissions by over 90 percent from 2010 to 2050.[16]

10.4.3. Action Alternative B

The operation of Action Alternative B would cause the same air quality and GHG impacts as Action Alternative A. Action Alternative B would have minor adverse impacts on direct local emissions based on

[16] 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 June 6, 2018.

the short durations of pollutant exposure associated with moving locomotives. Action Alternative B would have minor adverse impacts on direct regional emissions based on the increased emissions, rail service, and capacity created by the Project. Action Alternative B would cause emissions well below the *de miminis* thresholds.

10.5. Temporary Effects

This section discusses the direct and indirect temporary impacts of the No Action Alternative and Action Alternatives during construction, based on the conceptual engineering design. For the complete technical analysis of the potential temporary impacts to air quality and GHG emissions, see **Appendix D3, Environmental Consequences Report**.

10.5.1. No Action Alternative

The No Action Alternative would result in emissions related to the construction of other projects such as the addition of a fourth track from AF to RO Interlockings in Virginia, the addition of a fourth track from L'Enfant (LE) to Virginia (VA) Interlockings in the District, the VRE L'Enfant Station Improvements, and the Virginia Avenue Tunnel project. The emissions related to the construction of these projects and any other large capital projects would be assessed and any required mitigation would be determined within the context of each project.

10.5.2. Action Alternative A (Preferred Alternative)

Action Alternative A would have minor temporary adverse direct impacts on local and regional emissions based on the short duration of pollutant exposure associated with the temporary nature of the Project's construction activities. The Project would result in temporary effects on air quality and GHG emissions due to the various emission sources associated with construction. Pollutant emissions during construction would occur from emissions from on-site diesel equipment, increased truck traffic to and from the construction site, and fugitive dust. Construction activities primarily include track construction throughout the Corridor, bridge construction at abutments, bridge construction over the Potomac River, and pier and decking construction at Maryland Avenue SW. Construction would last about 5 years.

The air quality review of the temporary effects included estimating emissions generated by the various construction sources. Using a preliminary estimate of the construction schedule, working days and equipment information, the analysis created an emissions inventory for the entire construction of Action Alternative A. As the *de minimis* criteria were based on emissions over 1 year, the peak construction emission year is Quarter 3 of 2022 to Quarter 2 of 2023. **Table 10-6** shows the emissions during this peak year by the construction activities occurring throughout the year. In that peak year, emissions would not exceed the *de minimis* thresholds, based on the preliminary construction schedule and equipment. As such, the construction of Action Alternative A would not cause major adverse impacts and would not require a General Conformity determination.

292 **Table 10-6** | Action Alternative A Peak Year Emissions Inventory

Construction Activity	CO Tons/yr	NOx Tons/yr	VOC Tons/yr	PM10 Tons/yr	PM2.5 Tons/yr	CO2 Metric Tons/yr
Trackwork	2.834	2.814	0.326	0.043	0.042	876
Demolition	0.042	0.085	0.011	0.003	0.003	28
Place Parapet	0.026	0.035	0.006	0.002	0.002	12
Place Deck	0.077	0.037	0.007	0.002	0.002	13
Install Steel Deck	0.243	0.467	0.070	0.007	0.007	209
Form Deck	0.143	0.060	0.024	0.001	0.001	67
Dry Run	0.006	0.002	0.001	0.000	0.000	3
Through Girders	0.315	0.606	0.091	0.009	0.009	271
Deck Girders	0.158	0.303	0.046	0.004	0.004	135
Deck Rebar	0.013	0.113	0.016	0.002	0.002	49
Waterproof	0.084	0.029	0.013	0.001	0.001	36
Parapet Rebar	0.003	0.024	0.003	0.000	0.000	10
Form Crew	1.525	0.532	0.234	0.012	0.012	658
Backfill	0.447	2.752	0.301	0.036	0.035	963
Excavation	0.228	0.466	0.061	0.018	0.018	155
Support of Excavation	0.161	0.561	0.118	0.014	0.014	352
Land Pile Drive	0.217	0.754	0.163	0.019	0.019	486
Retaining Wall	0.247	1.647	0.173	0.022	0.021	542
Traffic	0.370	2.470	0.259	0.033	0.032	813
Access	0.041	0.274	0.029	0.004	0.004	90
Cofferdam	1.203	3.525	0.745	0.070	0.068	2,496
Water Piles	0.688	2.005	0.430	0.040	0.039	1,442
Pier Formwork	3.183	3.051	0.827	0.047	0.045	2,818
Tremie Pours	0.561	0.826	0.138	0.033	0.032	328
Pier Excavation/Backfill	0.559	3.440	0.376	0.045	0.044	1,203
Peak Year Total Emissions	13.370	26.878	4.469	0.467	0.453	14,055
De Minimis Threshold	*100*	*100*	*50*	*100*	*100*	-

Source: VHB, 2018

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10.5.3. Action Alternative B

Action Alternative B would have minor adverse impacts on direct local and regional emissions from construction. This is based on the short duration of pollutant exposure associated with the temporary nature of construction activities. The estimated construction duration for Action Alternative B is 8 years and 3 months. While all other work is the same as Action Alternative A, the replacement of the existing bridge over the George Washington Memorial Parkway and the replacement of the existing Long Bridge would lengthen the construction schedule for Action Alternative B. Peak year emissions for Action Alternative B would be similar as Action Alternative A, occurring from Quarter 3 of 2022 to Quarter 2 of 2023. Although the peak year emissions between the Action Alternatives are similar, Action Alternative B construction would result in approximately 1.6 times the total pollutant emissions of Action Alternative A throughout the entire construction schedule. As peak year emissions for Action Alternative B would be similar to Action Alternative A, emissions would not exceed the *de minimis* thresholds. As such, the construction of Action Alternative B would not cause major adverse impacts and would not require a General Conformity determination.

10.6. Avoidance, Minimization, and Mitigation

This section describes proposed mitigation for the impacts to air quality. The Project would cause minor air quality impacts during operations. The Project will meet all applicable air quality laws and regulations.

Although neither Action Alternative would cause major adverse impacts during construction, compliance with all applicable laws and regulations would reduce pollutant emissions from construction activity. Measures include dust suppression measures, idling restrictions, and the use of Ultra Low Sulfur Diesel (ULSD). More specifically, this includes, but is not limited to, maintenance of all motor vehicles, machinery, and equipment associated with construction activities and proper fitting of equipment with mufflers or other regulatory-required emissions control devices. The Virginia Department of Rail and Public Transportation, the project sponsor for design and construction, would prohibit the excessive idling of construction equipment engines. Typical methods of reducing idling include driver training, periodic inspections by site supervisors, and posting signage.

DRPT would enforce District and Virginia anti-idling laws during all construction phases of the Project. The Project construction in the District would comply with the District's anti-idling regulation as in 20 DCMR 900, which limits non-road engine idling to 3 minutes. Construction components in Virginia would comply with 9 VAC 5-40-5670, limiting motor vehicle idling to 3 minutes unless providing auxiliary power for purposes other than heating or air conditioning. The contractor will place idling restriction signs on the premises to remind drivers and construction personnel of the idling regulations.

DRPT would require that contractors implement protective measures around the construction site and demolition work. These measures protect pedestrians and prevent dust and debris from leaving the site or entering the surrounding community in accordance with 20 DCMR 605. The surfaces affected (such as roadways or disturbed areas) would determine the appropriate methods of dust control. Measures would include, as necessary, the application of water, the use of stone in construction roads, and vegetative cover. DRPT would require that the contractor control dust generated from earthwork and other construction activities, such as stockpiled soils, by spraying with water to mitigate wind erosion on open soil areas. The contractor may implement other dust suppression methods, such as wheel washing,

to minimize the off-site transport of dust. Additionally, the contractor may require regular sweeping of the pavement of adjacent roadway surfaces during the construction period to minimize the potential for vehicular traffic to create airborne dust and particulate matter. Another way to reduce air quality impacts would be to recycle construction waste and demolition materials.DRPT would require that construction contractors use ULSD fuel for all off-road construction vehicles as an additional measure to reduce air emissions from construction activities. The Project Sponsor would require that any non-road diesel equipment rated 50 horsepower or greater meet EPA's Tier 4 emission limits or that the contractor retrofit the equipment with appropriate emission reduction measures. Emission reduction equipment could include EPA-verified or California Air Resources Board–verified diesel oxidation catalysts or diesel particulate filters.