11. Air Quality

11.1. Chapter Overview

11.1.1. Introduction

This section discusses potential air quality impacts associated with the Northern Branch Corridor project. Implementing the proposed passenger rail service may affect local and regional air quality in the following ways:

- Increased vehicular traffic at congested roadway intersections;
- Increased idling vehicles at new rail station parking areas; and,
- Net changes to regional emissions due to decreases in vehicle miles traveled (VMT).

11.1.2. Summary of Findings

The Northern Branch Corridor project is located in Hudson and Bergen Counties, which are in attainment for nitrogen dioxide (NO_2), lead (Pb), sulfur dioxide (SO_2), and inhalable particle matter smaller than 10 micrometers (PM_{10}). This means that the counties have met the national air pollution standards for these pollutants. The counties are in non-attainment for inhalable particle matter smaller than 2.5 micrometers ($PM_{2.5}$) and 8-hour ozone (O_3) and in maintenance for carbon monoxide (CO), which means that the ambient air in the county has exceeded the maximum levels of these pollutants and no additional polluting activity is permitted. While the operation of the light rail vehicles will not introduce new pollutants to the region, the Build Alternatives carry the potential to result in some air quality impacts associated with changes in local traffic patterns, as follows:

- Both Build Alternatives are anticipated to cause an increase in localized traffic near proposed stations; however, air quality modeling indicates that even with the increase in localized traffic, the CO levels would be below the one-hour (35 ppm) and eight-hour (9 ppm) National Ambient Air Quality Standards (NAAQS).
- Light Rail to Tenafly (Preferred Alternative) and Light Rail to Englewood Route 4 would reduce regional emissions of CO, $PM_{2.5}$ and PM_{10}, hydrocarbons (HC), and nitrogen oxides (NO_x).

The Northern Branch Rail Corridor project is listed within the FY2010-2019 Statewide Transportation Improvement Program (DB #T300) under Transit Rail Initiatives and in the 2009 Regional Transportation Plan subtitled "Plan 2035" (#TN08002). In addition, the regional analysis shows a reduction in $PM_{2.5}$ and PM_{10}. Therefore, it is anticipated that this project will comply with the conformity requirements established by the Clean Air Act Amendments of 1990.

11.2. Methodology

11.2.1. National Ambient Air Quality Standards

The Clean Air Act (CAA) is the primary basis for regulating national air pollutant emissions. The amendments to the CAA were passed in 1970 and mandated that the U.S. Environmental Protection Agency (USEPA) establish ceilings for certain pollutants based upon the identifiable effects each pollutant may have on public health and welfare. Subsequently, the USEPA promulgated the revised regulations which set National Ambient Air Quality Standards (NAAQS) for carbon monoxide CO, O_3, NO_2, Pb, SO_2 and PM_{10}, and in 1997, a new particulate standard for $PM_{2.5}$. These pollutants are collectively referred to as "criteria pollutants" and shown in Table 11-1.

New Jersey and National Ambient Air Quality Standards (NAAQS) are divided into two types of criteria. Primary standards define air quality levels intended to protect the public health with an adequate margin of safety. Secondary standards define levels of air quality intended to protect the public welfare from any known or anticipated adverse effect of a pollutant (e.g. soiling, vegetation damage, material corrosion).

Table 11-1: National and New Jersey Ambient Air Quality Standards

Pollutant	Averaging Period	New Jersey Primary	New Jersey Secondary	National Primary	National Secondary
Carbon Monoxide	1 hour	35 ppm	35 ppm	35 ppm	-
	8 hour	9 ppm	9 ppm	9 ppm	-
Ozone	1 hour	0.12 ppm	0.08 ppm	0.12 ppm	0.12 ppm
	8 hour	-	-	0.075 ppm	0.075 ppm
Nitrogen Dioxide	1 year	0.05 ppm	0.05 ppm	0.053 ppm	0.053 ppm
Lead	3 months	1.5 ug/m^3	1.5 ug/m^3	1.5 ug/m^3	1.5 ug/m^3
	3 hour	-	0.50 ppm	-	0.5 ppm
Sulfur Dioxide	24 hour	0.14 ppm	0.10 ppm	0.14 ppm	-
	1 year	0.03 ppm	0.02 ppm	0.03 ppm	-
Inhalable Particulates(PM_{10})	24 hour	-	-	150 ug/m^3	150 ug/m^3
	1 year	-	-	-	-
Fine Particulates($PM_{2.5}$)	24 hour	-	-	35 ug/m^3	35 ug/m^3
	1 year	-	-	15 ug/m^3	15 ug/m^3

Source: United States and New Jersey Departments of Environmental Protection, 2009; http://epa.gov/air/criteria.html, http://www.state.nj.us/dep/aqm/2713915.htm#Ambient

Section 107 of the 1970 Clean Air Act Amendments (CAAA) requires the USEPA and states throughout the country to identify those areas not meeting the NAAQS. An area which does not meet a standard is referred to as being in non-attainment. If an area fails to attain the NAAQS for any criteria pollutants, the CAA requires each state to develop and maintain a state implementation plan (SIP) that demonstrates the state's air pollution control strategy for meeting the NAAQS. Any federal action that occurs within an area that has not attained the NAAQS must show conformance with the SIP. Areas which previously were in violation of the NAAQS, but now achieve the standards are classified as maintenance areas. Maintenance areas must implement a plan to maintain ambient concentrations below the standards.

11.2.2. Pollutants of Concern

The Northern Branch Corridor project is located in Hudson County and Bergen County, which are both in attainment for NO_2, Pb, SO_2 and PM_{10}. Hudson and Bergen Counties are in non-attainment for $PM_{2.5}$ and 8-hour O_3 and in maintenance for CO. While the operation of the light rail vehicles will not introduce new pollutants to the region, as the project would result in an overall reduction in regional traffic, the Build Alternatives would cause an increase in localized traffic near proposed stations. Air quality modeling focused on understanding both localized and regional level impacts for the three criteria pollutants that were classified as either non-attainment or maintenance for Bergen and Hudson Counties.

Particulate Matter

Particle matter includes very small liquid and solid particles suspended within the lower atmosphere. The USEPA is concerned with inhalable particulate matter which is not filtered by the nose and throat like larger particulates and can reach deep in the lungs. Inhalable course particulates (PM_{10}) are larger than 2.5 micrometers but smaller than 10 micrometers in diameter and are caused by agriculture, grinding or crushing operations and become wind-blown dust that can also affect visibility. Hudson and Bergen Counties are in attainment for PM_{10}, however the counties are considered as non-attainment for $PM_{2.5}$ Fine particulate matter ($PM_{2.5}$) smaller than 2.5 micrometers in diameter is created from chemical

reactions in the atmosphere and through fuel combustion by sources such as motor vehicles and power generation. The $PM_{2.5}$ annual standard of 15 ug/m^3 has been set. The NAAQS was revised on December 17, 2006 to reflect a more stringent 24-hour $PM_{2.5}$ standard (35 ug/m^3). Regional $PM_{2.5}$ levels were estimated for the two Build Alternatives to quantify net changes due to the reduction in motor vehicle VMT.

Ozone

The entire state of New Jersey is in non-attainment for O_3. Naturally occurring ozone, in the upper atmosphere, protects the population from harmful ultraviolet rays. Ground-level ozone is created when nitrogen oxides (NO_x) and volatile organic compounds (VOC) react in the presence of sunlight and heat. The incomplete combustion of fossil fuel, power plants and other sources of combustion emit the primary source of NO_x. In recent years documented O_3 levels had been decreasing. In 2004, the USEPA created a new, more stringent O_3 standard and therefore precursors (NO_x and VOCs) are tracked very carefully. In the absence of USEPA project-level O_3 modeling guidance, O_3 precursors such as NO_x and VOCs were predicted on a regional basis for each alternative.

Carbon Monoxide

Hudson County and Bergen County are classified as maintenance areas for CO. After previously violating the NAAQS for CO, the northern New Jersey counties (including Hudson and Bergen Counties) were re-designated to attainment status in 2004. New Jersey and its controlling Metropolitan Planning Organizations (MPO) must continue with a Maintenance Plan which includes control measures, a transportation conformity budget and Contingency Plan to support the re-designation. Carbon monoxide is a colorless and odorless gas generated primarily by the incomplete combustion of fossil fuel. Substandard operating intersections produce significant delays and congestion, and result in excessive idle emissions. In addition, parking areas introduce additional idle emissions. CO levels were predicted both locally, as a result of increased traffic near proposed stations for each alternative, and regionally, to quantify net changes in CO due to the reduction in motor vehicle VMT.

11.2.3. Criteria For Determining Impacts

As stated within the Clean Air Act Amendments of 1990, proposed projects must adhere to and ensure conformity of the governing State Implementation Plan (SIP). The USEPA promulgated the Transportation Conformity Rule (TCR) under the CAAA, effective December 27, 1993 with recent revisions. The TCR provides criteria and procedures for determining conformity to SIPs of transportation plans, programs and projects funded or approved under Title 23 U.S.C. or the Federal Transit Act. The conformity requirements are as follows:

- The project must originate from a conforming transportation plan and program.
- In non-attainment areas, the project must eliminate or reduce the severity and number of violations of the NAAQS.

Hudson and Bergen Counties are in $PM_{2.5}$ non-attainment. The *Transportation Conformity Guidance for Qualitative Hot-spot Analysis in $PM_{2.5}$ and PM_{10} Non-Attainment and Maintenance Areas* (EPA 420-B-06-902) document has been released to assist with determining projects of air quality concern. Under 40 CFR 93.123(b)(iii), the Northern Branch Corridor would not be considered a project of $PM_{2.5}$ concern since the proposed light rail alternatives would not cause a significant number of diesel vehicles to congregate at a single location. Therefore, a hot-spot analysis for $PM_{2.5}$ is not required.

Localized CO levels were estimated based on the proposed project improvements, and compared to the federal/state CO primary standards of 35 ppm for a one-hour period, and 9 ppm for a continuous eight-hour period. If they met the standard and did not cause an exceedance, the project would conform to the SIP.

11.2.4. Analysis of Carbon Monoxide (CO) Emissions at Intersections

Intersections within the study corridor anticipated to experience the greatest project-related impact were selected for hot-spot CO modeling. The four intersections listed below were selected based on a combination of factors: highest traffic volumes, worst levels of service in the study area, and proximity to pedestrian activity. Both morning (AM) and evening (PM) peak weekday period traffic conditions were considered (refer to the traffic analysis in Chapter 9: Traffic for details).

- Leonia Station Area:
  - Fort Lee Road and Overpeck Park Entrance
  - Fort Lee Road and Willow Tree Drive/Station Parkway
- Tenafly Town Center Station Area:
  - West Clinton Avenue and West Railroad Ave
  - East Clinton Avenue and Piermont Road/County Road

To analyze CO concentrations as a result of roadways within the study area, NJDEP requires a specific methodology at intersections which is outlined in the *"Air Quality Analysis for Intersections"* document released by the Bureau of Air Quality Evaluation, dated May 2004. Two USEPA-approved models were utilized: MOBILE6.2 (EPA420-R-02-010) to calculate emission factors for input to the air dispersion model and CAL3QHC Version 2.0 (EPA-404/12-92-006).

The transport and concentration of pollutants from vehicular sources are influenced by three principal meteorological factors: wind speed, wind direction, and stability. Following NJDEP and USEPA guidelines, a wind speed of one meter per second and neutral atmospheric conditions were used.

Different emission rates occur when vehicles are stopped (idling), accelerating, decelerating, and traveling at different speeds. CAL3QHC simplifies these different emission rates into the following two components:

- Emissions when vehicles are stopped (idling) during the red phase of a signalized intersection; and,
- Emissions when vehicles are in motion during the green phase of a signalized intersection.

In addition, CAL3QHC estimates the average number of vehicles that would queue during the red phase of an intersection based on the characteristics of intersection and traffic conditions.

Since CO levels are highest adjacent to areas of localized congestion, NJDEP requires air quality receptors modeled at "reasonable" locations at modeled intersections. Sidewalks are present at some of the modeled intersection approach legs. Therefore, receptors were placed along the right-of-way lines or sidewalks at each approach leg, whichever was closest to the roadway. CO concentrations are expected to decrease with distance at residential receptors, which are located back from the sidewalks and right-of-way lines.

CAL3QHC was used to estimate 1-hour CO concentrations. Ambient background levels are then added to each one-hour concentration to yield the total CO concentration at each receptor site. A one-hour background CO level of 2.8 ppm (see Table 3.9-4) was utilized. Resultant one-hour CO concentrations are then compared to the standard of 35 ppm.

To evaluate an eight-hour air quality impact, each one-hour computer modeled concentration was multiplied by a 0.7 persistence factor. This value represents the role traffic and meteorological conditions may have on an overall eight-hour period. The eight-hour background CO level of 2.0 ppm (see Table 3.9-4) was utilized. Resultant eight-hour concentrations were then compared to the standard of 9 ppm.

Hot spot microscale CO analyses were performed for future conditions with and without the proposed action (i.e. future No Build and future Build Alternative conditions) for 2014 and 2030. It was assumed that if the Build Alternatives did not cause an increase in air quality pollutants at these intersections, then the remaining intersections, with less congestion, would also not experience a similar increase.

11.2.5. Analysis of Carbon Monoxide (CO) Emissions at Parking Lots

Parking areas associated with the proposed stations contribute to new sources of CO emissions within the project study area. CO emissions were predicted at the Englewood Route 4 parking deck since it is the largest proposed parking facility. Utilizing SCREEN3, a USEPA-recommended area source screening tool, CO concentrations adjacent to the parking deck were predicted.

Receptor locations were selected at sidewalks directly adjacent to the parking deck on all four sides. It was assumed that if this parking deck did not cause an increase in air quality pollutants, then the remaining parking areas, with less volume, would also not cause a similar increase.

11.2.6. Mesoscale Analysis of Regional Emissions

A mesoscale, or regional, analysis was conducted to assess the net effects of the proposed rail service on the emissions of pollutants. This analysis assessed the change in regional air quality based on the reduction in vehicle-related emissions, as compared to the increase in locomotive-related emissions. Relative differences in vehicle-related emissions were a function of the net change in VMT, average vehicle travel speed, and the corresponding pollutant emission rates. The emission rates for vehicles were determined for the project's opening year of 2014 and build year of 2030 using EPA's model MOBILE6.2. These calculations included the effect of the inspection/maintenance and anti-tampering programs. Five pollutants were assessed within the mesoscale analysis: carbon monoxide (CO), inhalable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), nitrogen oxides (NO_x) and hydrocarbons (HC) which belong to the group of chemicals known as volatile organic compounds (VOC). Hydrocarbons and nitrogen oxides are included because of their role as precursors for ozone (O3). By calculating the change in the emissions for hydrocarbons and nitrogen oxides, the effect on ozone would be assessed indirectly.

11.3. Environmental Review

Air Quality is monitored on a regional, not municipal, level. The environmental analysis therefore approaches air quality from the corridor level perspective, which is the appropriate level of detail consistent with available NAAQS data and modeling protocols.

11.3.1. Existing Conditions

Each criteria pollutant is monitored on a continuous basis throughout the State of New Jersey by NJDEP. Major objectives of monitoring air quality are to provide an early warning system for pollutant concentrations, assess air quality in light of public health and welfare standards, and also track trends or changes in these pollutant levels. The most recent monitored data is shown in Table 11-2.

Table 11-2: Pollutant Monitoring Data

Pollutant	Averaging Period	Maximum Averaging Period Concentrations	
		2008 Maximum Values	National and New Jersey Ambient Air Quality Standards
Fine Particulates ($PM_{2.5}$)	24 hrs. (1)	35.0 µg/m^3 (5)	35 µg/m^3
	1 yr. (2)	12.6 µg/m^3 (5)	15 µg/m^3
Ozone (O_3)	8 hr. (3)	0.086 ppm (6)	0.075 ppm
Carbon Monoxide (CO)	1 hr. (4)	2.8 ppm (7)	35 ppm
	8 hr. (4)	2.0 ppm (7)	9 ppm

Notes:
ppm = parts per million; µg/m^3= micrograms per cubic meter
(1) 98th percentile concentration – 3-year average; (2) 3-year average; (3) 3-year average of 4th highest daily 8-hour maximum; (4) highest second highest maximum concentration over the past five years; (5) Fort Lee Library, Center Street, Fort Lee; (6) Veterans Park, Bayonne; (7) George Washington Bridge Overpass, Fort Lee.

Source: http://www.epa.gov/air/data/monvals.html?st~NJ~New%20Jersey

Hudson and Bergen Counties have been designated as a part of a regional non-attainment area for $PM_{2.5}$ and 8-hour O_3, which is supported by the monitoring data in Table 11-2. The 3-year average 24-hour $PM_{2.5}$ concentration is 35 ug/m^3, which equals the standard (35 ug/m^3) and the 3-year average annual mean $PM_{2.5}$ concentration is 12.6 ug/m^3, which does not exceed the standard (15 ug/m^3). The average 8-hour O_3 concentration over the previous three (3) years exceeds the 8-hour standard of 0.075 ppm. The 1-hour and 8-hour CO concentrations are well below the standards, supporting the CO maintenance status of Hudson and Bergen Counties.

11.3.2. Potential Impacts and Mitigation

No Build Alternative

The modeling procedures described within Section 11.2: Methodology, were utilized to estimate vehicular CO emissions at intersections near proposed stations under future years 2014 and 2030 without the project. The results are presented in Table 11-3. The predicted concentrations, which include CO background values, do not exceed the NAAQS.

Table 11-3: No Build Alternative - Predicted CO Concentrations at Intersections

Area	Location	NAAQS	2014	2030
Predicted 1-hour CO Concentrations (ppm)				
Leonia	Fort Lee & Overpeck Park	35	3.9	3.8
	Fort Lee & Willowtree	35	4.0	4.0
Tenafly	W. Clinton & W. Railroad	35	3.6	3.6
	E. Clinton & Piermont	35	3.7	3.6
Englewood Route 4	Parking Deck	35	2.8	2.8
Predicted 8-hour CO Concentrations (ppm)				
Leonia	Fort Lee & Overpeck Park	9	2.8	2.7
	Fort Lee & Willowtree	9	2.8	2.8
Tenafly	W. Clinton & W. Railroad	9	2.6	2.6
	E. Clinton & Piermont	9	2.6	2.6
Englewood Route 4	Parking Deck	9	2.0	2.0
Note: Background concentrations were included: 2.8 ppm for 1-hour and 2.0 ppm for 8-hour				

Source: Jacobs, 2009

Light Rail to Tenafly (Preferred Alternative)

Impacts - The modeling procedures described within Section 11.2 were utilized to estimate vehicular CO emissions at intersections near proposed stations and at the largest parking deck under future years 2014 and 2030 with the Light Rail to Tenafly (Preferred Alternative) (Refer to Table 11-4). The predicted 2014 and 2030 CO concentrations, which include background values, do not exceed the NAAQS. Therefore, no significant CO impact is predicted at intersections adjacent to proposed station areas or at the parking areas.

Table 11-4: Light Rail to Tenafly (Preferred Alternative) - Predicted CO Concentrations at Intersections and Parking Deck

Area	Location	NAAQS	2014	2030
Predicted 1-hour CO Concentrations (ppm)				
Leonia	Fort Lee & Overpeck Park	35	3.9	3.9
	Fort Lee & Willowtree	35	4.2	4.2
Tenafly	W. Clinton & W. Railroad	35	3.7	3.6
	E. Clinton & Piermont	35	4.0	3.9
Englewood Route 4	Parking Deck	35	4.6	4.3
Predicted 8-hour CO Concentrations (ppm)				
Leonia	Fort Lee & Overpeck Park	9	2.8	2.8
	Fort Lee & Willowtree	9	3.0	3.0
Tenafly	W. Clinton & W. Railroad	9	2.6	2.6
	E. Clinton & Piermont	9	2.8	2.8
Englewood Route 4	Parking Deck	9	3.3	3.1
Note: Background concentrations were included: 2.8 ppm for 1-hour and 2.0 ppm for 8-hour				

Source: Jacobs, 2009

Since a significant number of commuters are projected to switch modes of travel from passenger vehicles to rail, the proposed project would reduce the regional vehicle-miles traveled (VMT), and consequently, the quantities of vehicular-related pollutants. In 2014, the assumed reduction in VMT is 59,730, and in 2030, the reduction would be 108,600. The effects of automobiles idling when waiting to enter or exit parking areas are also added to the analysis, assumed to be 1,271 in 2014, and 2,310 in 2030. As shown in Table 11-5, Light Rail to Tenafly (Preferred Alternative) would reduce emissions of CO, PM_{10}, $PM_{2.5}$ HC, and NO_x, thereby improving the air quality within the region.

Table 11-5: Light Rail to Tenafly (Preferred Alternative) - Net Effects on Regional Emissions (tons/year)

Pollutant	2014	2030
Carbon Monoxide (CO)	-3.66	-6.69
PM_{10}	-0.02	-0.04
$PM_{2.5}$	-0.01	-0.02
Hydrocarbons (HC)	-0.42	-0.76
Nitrogen Oxides (NO_x)	-0.42	-0.76

Source: A Comparison of Emissions From Light Rail Transit, Electric Commuter Rail, and Diesel Multiple Units by the Colorado Railcar Manufacturing, LLC, March 28, 2006.

Mitigation - Light Rail to Tenafly (Preferred Alternative) would not cause a significant impact to local or regional air quality; therefore, mitigation is not required.

Light Rail to Englewood Route 4

Impacts - Vehicular CO emissions were estimated at intersections near proposed stations and at the largest parking deck under future years 2014 and 2030 with the Light Rail to Englewood Route 4 (Refer to Table 11-6). As the Light Rail to Englewood Route 4 would cause minimal impact to the Tenafly Town Center intersections, the No Build traffic data was used for the analysis of the Tenafly area intersections. The predicted 2014 and 2030 CO concentrations, which include background values, are all below the CO NAAQS. Therefore, no significant CO impact is predicted at intersections adjacent to proposed station areas or at the parking areas.

Table 11-6: Light Rail to Englewood Route 4 - Predicted CO Concentrations at Intersections and Parking Deck

Area	Location	NAAQS	2014	2030
Predicted 1-hour CO Concentrations (ppm)				
Leonia	Fort Lee & Overpeck Park	35	3.9	3.9
	Fort Lee & Willowtree	35	4.2	4.2
Tenafly	W. Clinton & W. Railroad	35	3.6	3.6
	E. Clinton & Piermont	35	3.7	3.6
Englewood Route 4	Parking Deck	35	4.6	4.3
Predicted 8-hour CO Concentrations (ppm)				
Leonia	Fort Lee & Overpeck Park	9	2.8	2.8
	Fort Lee & Willowtree	9	3.0	3.0
Tenafly	W. Clinton & W. Railroad	9	2.6	2.6
	E. Clinton & Piermont	9	2.6	2.6
Englewood Route 4	Parking Deck	9	3.3	3.1
Note: Background concentrations were included: 2.8 ppm for 1-hour and 2.0 ppm for 8-hour				

Source: Jacobs, 2009

Since a significant number of commuters are projected to switch modes of travel from passenger vehicles to rail, the proposed project would reduce the regional VMT, and consequently, the quantities of vehicular-related pollutants. In 2014, the assumed reduction in VMT is 44,055, and in 2030, the reduction would be 80,100. The effects of automobiles idling while waiting to enter or exit parking areas are also added to the analysis, assumed to be 1,172 in 2014, and 2,130 in 2030. As shown in Table 11-7, Light Rail to Englewood Route 4 would reduce emissions of CO, PM_{10}, $PM_{2.5}$ HC, and NO_x, thereby improving the air quality within the region.

Table 11-7: Light Rail to Englewood Route 4 - Net Effects on Regional Emissions (tons/year)

Pollutant	2014	2030
Carbon Monoxide (CO)	-2.71	-4.93
PM_{10}	-0.02	-0.03
$PM_{2.5}$	-0.01	-0.01
Hydrocarbons (HC)	-0.31	-0.56
Nitrogen Oxides (NO_x)	-0.31	-0.56

Source: Jacobs, 2009 and A Comparison of Emissions From Light Rail Transit, Electric Commuter Rail, and Diesel Multiple Units by the Colorado Railcar Manufacturing, LLC, March 28, 2006.

Mitigation - The project would not cause a significant impact to local or regional air quality; therefore, mitigation is not required.

11.4. Summary of Potential Environmental Effects

Table 11-8 compares the predicted CO concentrations of the Build Alternatives to the No Build Alternative. The Build Alternatives exhibit a slight increase over the No Build Alternative at the intersections, and a larger increase at the parking deck, as the No Build Alternative would have no new parking areas. All of the predicted concentrations are well below the 1-hour and 8-hour standards.

Table 11-8: Predicted No Build and Build CO Concentrations (ppm)

Area	Intersection	NAAQS	2014			2030		
			No Build Alter-native	Light Rail to Tenafly (Preferred Alternative	Light Rail to Englewood Route 4	No Build Alter-native	Light Rail to Tenafly (Preferred Alternative	Light Rail to Englewood Route 4
Predicted 1-hour CO Concentrations								
Leonia	Fort Lee & Overpeck Park	35	3.9	3.9	3.9	3.8	3.9	3.9
	Fort Lee & Willowtree	35	4.0	4.2	4.2	4.0	4.2	4.2
Tenafly	W. Clinton & W. Railroad	35	3.6	3.7	3.6	3.6	3.6	3.6
	E. Clinton & Piermont	35	3.7	4.0	3.7	3.6	3.9	3.6
Englewood Route 4	Parking Deck	35	2.8	4.6	4.6	2.8	4.3	4.3
Predicted 8-hour CO Concentrations								
Leonia	Fort Lee & Overpeck Park	9	2.8	2.8	2.8	2.7	2.8	2.8
	Fort Lee & Willowtree	9	2.8	3.0	3.0	2.8	3.0	3.0
Tenafly	W. Clinton & W. Railroad	9	2.6	2.6	2.6	2.6	2.6	2.6
	E. Clinton & Piermont	9	2.6	2.8	2.6	2.6	2.8	2.6
Englewood Route 4	Parking Deck	9	2.0	3.3	3.3	2.0	3.1	3.1
Note: Background concentrations were included: 2.8 ppm for 1-hour and 2.0 ppm for 8-hour								

Source: Jacobs, 2009

A comparison of regional emissions for Light Rail to Tenafly (Preferred Alternative) and Light Rail to Englewood Route 4 is provided below in Table 11-9. Both Build Alternatives would reduce emissions; however, Light Rail to Tenafly (Preferred Alternative) exhibits a greater reduction in emissions due to the larger reduction in auto VMT.

Table 11-9: Comparison of Emissions by Alternative (tons/year)

Pollutant	No Build Alternative	Light Rail to Tenafly (Preferred Alternative	Light Rail to Englewood Route 4
Year 2014			
Carbon Monoxide (CO)	0	-3.66	-2.71
PM_{10}	0	-0.02	-0.02
$PM_{2.5}$	0	-0.01	-0.01
Hydrocarbons (HC)	0	-0.42	-0.31
Nitrogen Oxides (NO_x)	0	-0.42	-0.31
Year 2030			
Carbon Monoxide (CO)	0	-6.69	-4.93
PM_{10}	0	-0.04	-0.03
$PM_{2.5}$	0	-0.02	-0.01
Hydrocarbons (HC)	0	-0.76	-0.56
Nitrogen Oxides (NO_x)	0	-0.76	-0.56

Source: Jacobs, 2009 and A Comparison of Emissions From Light Rail Transit, Electric Commuter Rail, and Diesel Multiple Units by the Colorado Railcar Manufacturing, LLC, March 28, 2006.

Compliance with Project-Level Conformity Criteria

According to USEPA's Transportation Conformity Rule, transportation projects must originate from a conforming transportation plan and program, and in non-attainment areas, projects must eliminate or reduce the severity and number of violations of the NAAQS. The Northern Branch Rail Corridor project is listed within the FY2010-2019 Statewide Transportation Improvement Program (DB #T300) under Transit Rail Initiatives and in the 2009 Regional Transportation Plan subtitled "Plan 2035" (#TN08002). The results of the CO analysis documents CO levels will fall below the one-hour (35 ppm) and eight-hour (9 ppm) NAAQS. In addition, the regional analysis shows a reduction in $PM_{2.5}$ and PM_{10}. Therefore, it is anticipated that this project will comply with the conformity requirements established by the Clean Air Act Amendments of 1990.