Appendix J

Air Quality Impact Analysis

AIR QUALITY IMPACT ANALYSIS

INTERSTATE 526 & INTERSTATE 26 INTERCHANGE

NORTH CHARLESTON AND CHARLESTON, SOUTH CAROLINA

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1.0 Air Quality Overview

The I-526 Lowcountry Corridor (LCC) West project is in Charleston and North Charleston, South Carolina. At the time of this writing, the project area is in attainment for all criteria pollutants[1]. Although the LCC is located in an area that is currently in attainment for all criteria pollutants, the higher-than-typical fraction of heavy-duty diesel (HDD) traffic along the urban corridor has created concerns regarding the potential impacts on economically distressed populations in the areas surrounding the LCC West. These concerns are primarily due to the potential for human exposure to higher emissions of mobile source air toxic (MSAT) pollutants sourced from traffic along the corridor than would be experienced elsewhere in the Charleston/ North Charleston region.

Several economically disadvantaged communities and areas are located in the general vicinity of the LCC West, referred to as Environmental Justice Neighborhoods (EJN) for the remainder of this report. (Figure 1-1) These EJNs include:

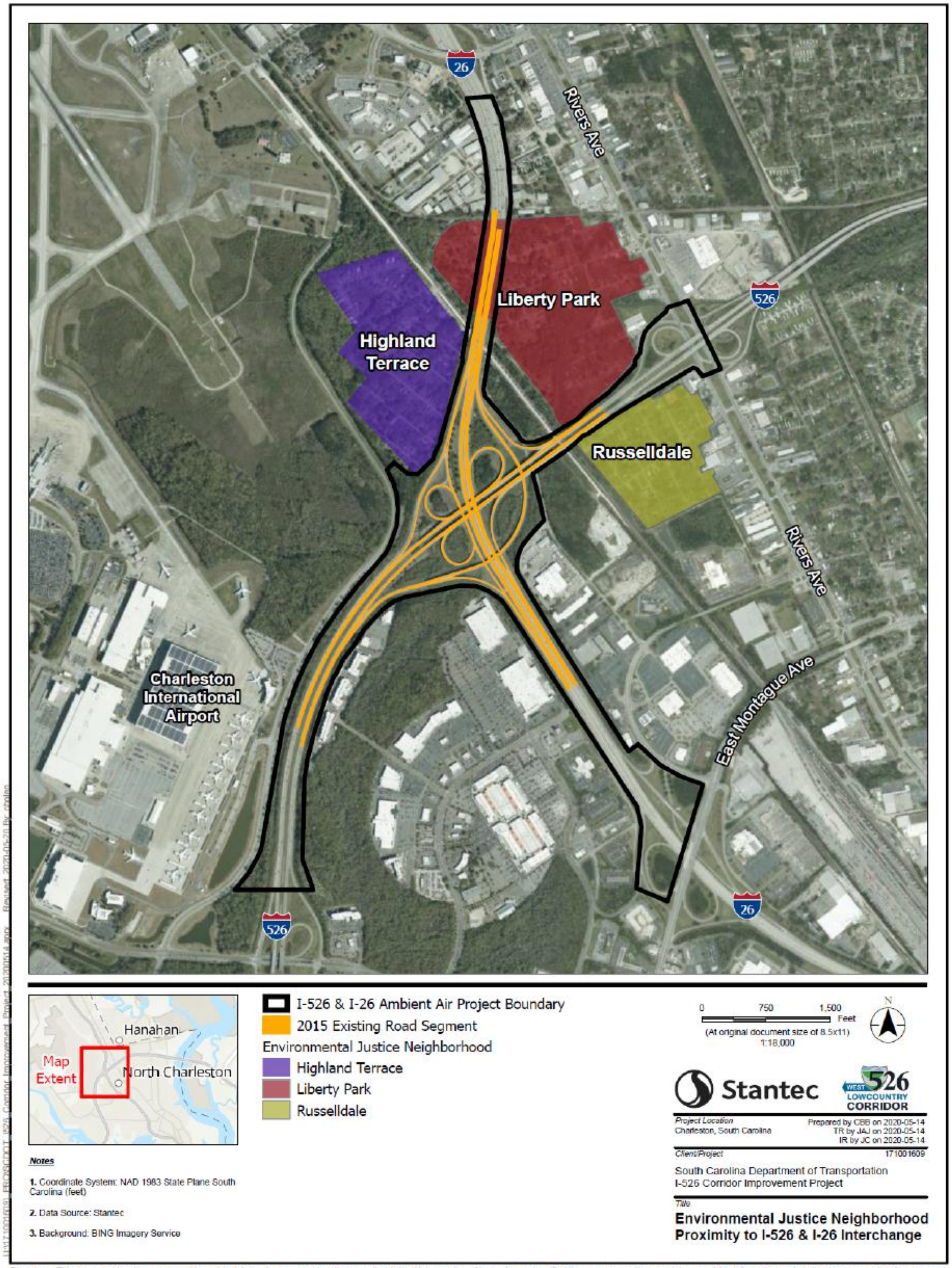
- Russelldale
- Liberty Park
- Highland Terrace

This air quality impact analysis focuses on MSAT emissions sourced from peak hour weekday morning traffic on the I-526 and I-26 interchange and the potential air quality impacts on EJNs in the immediate vicinity of the interchange. These EJNs, identified in Figure 1-1, are located immediately northwest, northeast and east-southeast of the interchange and are a particular focus of this analysis due to their close proximity to the interchange under consideration.

In the case of a freeway interchange, like the one being examined herein, it is reasonable to expect the highest pollutant concentrations to be at near-road sites where few, if any pedestrians may be located. Aside from these near-road concentrations that fall right along the project area boundary shown as a black outline in Figure 1-1, the highest modeled pollutant concentrations among the EJNs identified in the I-526 LCC West Community Impact Assessment are likely to be located in three EJNs. For this reason, the modeling domain used for this analysis includes placing model receptors at “sensitive receptor” locations within each EJN. For this analysis, model receptors were placed throughout each EJN to capture the areas believed to be the highest concentration within each EJN. Model results are discussed more thoroughly in Section 4.7 of this report.

[1] EPA Greenbook, accessed online in May 2020 - https://www.epa.gov/green-book.

Figure 1-1. Project Boundary and EJN Locations



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2.1 INTERCHANGE SELECTION

The I-526 and I-26 freeway interchange was selected for this quantitative air quality analysis due primarily to the following factors:

- Highest Peak Hour Traffic along the Project Corridor
- Highest Confirmed Fraction of HDD Traffic along the Project Corridor
- Proximity to EJNs Identified in Community Impact Assessment for the I-526 LCC West Project

South Carolina Department of Transportation (SCDOT) designated the I-526 and I-26 interchange for the purposes of this quantitative air quality impact analysis due to its very high peak hour vehicle miles traveled (VMT) which can exceed 140,000 annual average daily traffic (AADT) and lead to congested traffic conditions. During morning peak hour traffic, this interchange commonly hosts greater than average heavy-duty vehicles in the fleet. Heavy-duty vehicle fleet fractions greater than 8% are generally considered by the Federal Highway Administration (FHWA) to be a significant fraction of overall traffic and therefore subject to transportation hot spot conformity requirements for quantitative modeling analysis of particulate matter in nonattainment and maintenance areas for one or more particulate National Ambient Air Quality Standards (NAAQS). The LCC West project corridor is not located in a nonattainment or maintenance area for any criteria pollutant. However, SCDOT, in consultation with FHWA, determined that a quantitative analysis of MSAT impacts to nearby populations would be prudent to ensure the best possible outcomes for the transportation network and the citizens it serves.

Further, as the most highly traveled interchange (or intersection) along the project corridor, it can reasonably be assumed that the air quality impacts to nearby populations from MSAT emissions sourced from this interchange will be as high, or higher, than those of any other interchange or intersection along the project corridor for a reasonably conservative estimate of impacts.

2.2 MOBILE SOURCE AIR TOXICS (MSAT)

Upon passage of the Clean Air Act Amendments of 1990 (CAAA), the United States Environmental Protection Agency (EPA) was tasked with the regulation of 188 individual toxic air pollutants, officially referred to as "Hazardous Air Pollutants" (HAPs). Of these 188 HAPs, 93 were identified as being emitted from mobile sources with nine of these having been designated as "significant" with regard to contributions of emissions from mobile sources[2]. These FHWA priority species are:

- 1,3-Butadiene
- Acetaldehyde
- Acrolein
- Benzene
- Diesel Particulate (diesel PM)

[2] Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents, accessed online May 2020 - https://www.fhwa.dot.gov/environMent/air_quality/air_toxics/policy_and_guidance/msat/index.cfm.

- Ethylbenzene
- Formaldehyde
- Naphthalene
- Polycyclic Organic Matter (POM)

This analysis will focus on the above listed MSAT species and in addition will address five volatile organic compounds that are also HAPs[3]:

- Hexane
- Propionaldehyde
- Styrene
- Toluene
- Xylene

It should be noted that naphthalene and polycyclic organic matter are two of many species of pollutants that are included in diesel PM from tailpipe exhaust and are not included explicitly in this analysis for that reason. It can be reasonably assumed that reductions of diesel exhaust PM will be commensurate with reductions in naphthalene and POM.

2.2.1 Priority MSAT Pollutants

Among FHWA's priority MSAT pollutants, Diesel PM tailpipe emissions are of particular interest due to their increasingly well-established detrimental impacts to human health and the environment[4]. It is estimated that diesel PM makes up more than 50% of priority MSAT emissions. Based on MOVES modeling results for analysis years 2010 through 2050, EPA and FHWA project MSAT emissions to be reduced by at least 90% by 2050 with diesel PM representing the most precipitous drop during the initial 2010 through 2020 analysis years. These model projections assume that during the 40-year study period, VMT will increase by 45%, making the projected reductions even more remarkable[2]. Figure 2-1 presents the results of this MOVES modeling analysis conducted by EPA and FHWA.

While the data presented in Figure 2-1 provide a macroscale view of the anticipated air quality impacts from mobile sources over the next thirty years, the design of this air quality impact analysis is meant to provide a microscale analysis of the likely MSAT emission reductions resulting from completion of the build alternative selected and the implementation of tiered emissions standards for mobile sources of various classes by EPA and FHWA. The aggressive drop in diesel PM emissions shown in Figure 2-1 from 2010 – 2020 is closely tied to tiered heavy duty vehicle emissions requirements implemented by these regulatory agencies[2].

Discussion of modeled impacts of each pollutant at the project boundary and in nearby EJNs is included in Section 4.7.

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[3] EPA Initial List of Hazardous Air Pollutants with Modifications, Accessed Online May 2020, https://www.epa.gov/haps/initial-list-hazardous-air-pollutants-modifications.

[4] EPA Summary of Health and Environmental Effects of Particulate Matter, Accessed online May 2020, https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm

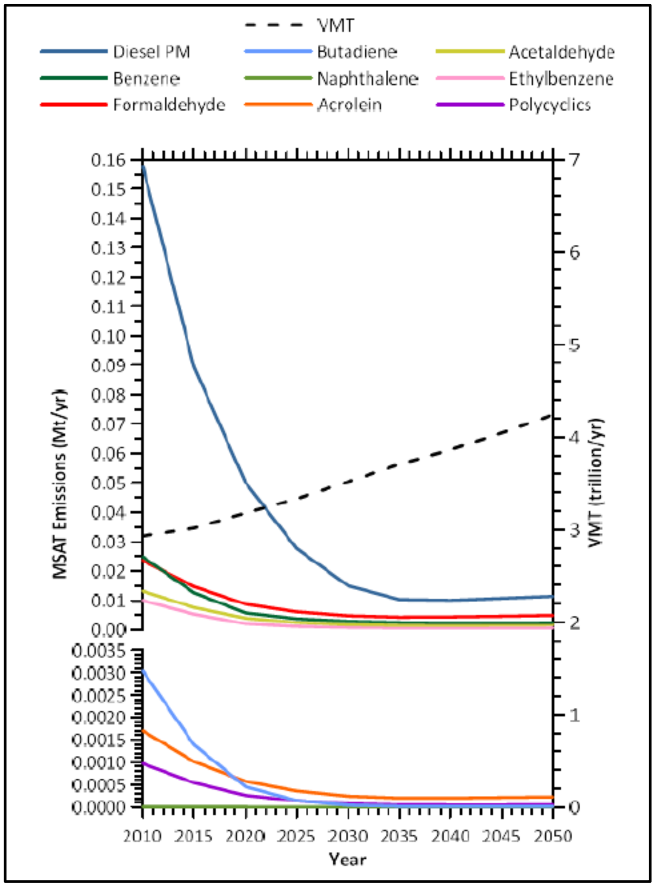

Figure 2-1. MOVES Model Projections of Annual MSAT Emissions Reductions Between 2010 and 2050 Assuming a 45% increase in VMT

Figure courtesy of FHWA Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents, October 18, 2016.

2.2.2 Additional Volatile Organic Compound Pollutants

The LCC West project is located within five kilometers of various stationary sources of VOC and HAP emissions including airports and petroleum product production and distribution facilities, both of which are known sources of HAP and VOC emissions[5,6]. Quantitative air quality impacts of the LCC West project were modeled for five VOCs not included in the FHWA MSAT priority list: hexane, propionaldehyde, styrene, toluene and xylene. While these pollutants are not currently included on FHWA's priority list for MSAT pollutants, they do contribute to the formation of secondary aerosols including fine particulate matter and ground-level ozone[7].

A full comparison of emissions contributions from the LCC West project and nearby stationary sources of air pollution is beyond the scope of this analysis, but due to the colocation of multiple stationary sources in the project vicinity, it was deemed prudent to include quantitative analysis of these additional VOC species.

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[5] "Interim Report of the Committee on Changes in New Source Review Programs for Stationary Sources of Air Pollutants," National Research Council of the National Academies of Science, Engineering and Medicine, ISBN 978-0-309-09578-5, 2005.

[6] "Aircraft engine exhaust emissions and other airport-related contributions to ambient air pollution: A review," Masiol, Mauro, Harrison, Roy M., Atmospheric Environment 95 (2014) 409-455.

[7] https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics, Accessed May 2020.

MOVES2014b, issued by EPA in December 2018, was used in inventory mode to generate link-level emission factors in units of grams per hour for each link in the I-526 and I-26 interchange for 12 species of MSAT and diesel PM. This section includes details regarding MOVES2014b inputs used for each modeled scenario. MOVES run specification files are included in Section 5.0 – Supporting Data.

3.1 METEOROLOGY

January morning peak hour meteorology was selected as a worst-case modeling scenario due to the cool, stable atmospheric conditions that are typical of wintertime morning rush hour conditions. National Weather Service historical (2000 – present) temperature and relative humidity data for the month of January for Charleston County, South Carolina were used for all MOVES modeling included in this analysis.

Table 3-1. MOVES2014b Meteorlogical Input

Month of MOVES2014b	Average Temperature °F 2000 – 2019 Historical Dataset from National Weather Service	Corresponding Relative Humidity (%)
January	49.1	42

A complete set of historical meteorological data is included in Section 5.1

3.2 TIME SPANS

As previously mentioned, January morning peak weekday hour was the chosen time span for each MOVES modeling scenario. The weekday morning rush hour, 7:00 am to 8:00 am, was selected because pre-project traffic count data collected by Stantec indicated that the fraction of the peak morning hour fleet comprised of HDD vehicles were marginally higher than the evening peak hour. Table 3-2 shows the results of traffic counts at the I-526 and I-26 interchange. It is reasonable to assume that a higher fraction of HDD vehicles will result in higher emission rates for all MSAT species and diesel PM, thereby ensuring a conservative analysis of air quality impacts near the project area.

Table 3-2. Peak Hour Fractions of Heavy Duty Vehicles at the I-526 and I-26 Interchange

Traffic Movement	Heavy Vehicle Percentage – Morning Peak	Heavy Vehicle Percentage – Evening Peak
I-526 EB to I-26 EB	9 %	9 %
I-526 EB to I-26 WB	17 %	10 %
I-526 WB to I-26 EB	9 %	9 %
I-526 WB to I-26 WB	17 %	10 %
I-26 EB to I-526 EB	9 %	6 %
I-26 EB to I-526 WB	5 %	7 %
I-26 WB to I-526 EB	9 %	6 %
I-26 WB to I-526 WB	5 %	7 %
I-526 EB to I-526 EB	7 %	5 %
I-526 WB to I-526 WB	13 %	11 %
I-26 EB to I-26 EB	5 %	7 %
I-26 WB to I-26 WB	9 %	8 %

3.3 Geographic Location

MOVES2014b was run in inventory mode at the project-scale for Charleston County, South Carolina where the I-526 LCC West project is located.

3.4 Road Type

MOVES2014b is capable of generating emission factors for several roadway types including:

- Off-Network (Parking Lots, Transportation Terminals, etc.)
- Rural Restricted Access (Freeway access by ramp only)
- Rural Unrestricted Access
- Urban Restricted Access (Freeway access by ramp only)
- Urban Unrestricted Access

The I-526 and I-26 interchange is a freeway located in the urban region of North Charleston and Charleston, therefore MOVES2014b was used to generate emission factors for Urban Restricted Access roadway links.

3.5 Inspection and Maintenance Program

No inspection and maintenance (I&M) program is currently in place for Charleston, South Carolina, therefore MOVES2014b was run with no I&M program active for all modeling scenarios.

3.6 Fleet Age Distribution

MOVES2014b default fleet age distributions for Charleston County, South Carolina were developed for 2015 and 2050 using EPA's Default Age Distributions for MOVES2014 converter tool[8].

[8] Default Age Distributions for MOVES2014.xls, accessed online May 2020 - https://www.epa.gov/moves/tools-develop-or-convert-moves-inputs.

3.7 Fuels

Default MOVES2014b inputs for fuel supply, fuel formulations, fuel usage fractions, and alternative vehicle and fuel technology were used for Charleston County, South Carolina for 2015 and 2050 modeling runs (build and no-build) for all pollutants except for diesel PM. For diesel PM emission factor generation, only diesel-fueled vehicles were selected in the MOVES2014b model setup. For all other MSATs, emission factors were generated for gas- and diesel-fueled vehicle types including:

- Passenger Cars
- Passenger Trucks
- Light Commercial Trucks
- School Buses
- Transit Buses
- Intercity Buses (Diesel Only)
- Motor Homes
- Motorcycles (Gas Only)
- Refuse Trucks
- Single Unit Short-Haul Trucks
- Single Unit Long-Haul Trucks
- Combo Short-Haul Trucks
- Combo Long-Haul Trucks (Diesel Only)

3.8 Link Detail

Unique emission factors were generated for every vehicle-link combination in each scenario. Aggregate emission factors for each link were created by summing the gram per hour emission factors for all vehicle types for the link. Vissim traffic modeling software was used to generate link-level traffic volumes and average speeds for all three scenarios modeled. Link-level Vissim data for each link is included in Section 5.2. The 2015 Existing conditions scenario and the 2050 No-build alternative include 30 links each as shown in Tables 3-3 and 3-4. The 2050 Build alternative includes 33 links as shown in Table 3-5.

Table 3-3. 2015 Existing Cconditions MOVES2014b Link Details

MOVES2014b Link ID	County	Link Description*	MOVES Road Type	Link Length (ft)	Link Traffic Volume (veh/hr)	Link Average Speed (mph)
1	Charleston	I526 EB1	Urban Restricted Access	1306	3218	56.7
2	Charleston	I526 EB2	Urban Restricted Access	1839	1113	57.6
3	Charleston	I526 EB3	Urban Restricted Access	816	2389	45.3
4	Charleston	I526 EB4	Urban Restricted Access	1421	2958	45.2
5	Charleston	I526 WB1	Urban Restricted Access	471	3855	45.8
6	Charleston	I526 WB2	Urban Restricted Access	1177	2453	52.4
7	Charleston	I526 WB3	Urban Restricted Access	542	2700	50.7
8	Charleston	I526 WB4	Urban Restricted Access	1289	1876	55.8
9	Charleston	I526 WB5	Urban Restricted Access	1990	3633	56.4
10	Charleston	I26 EB1	Urban Restricted Access	1609	7912	51.2
11	Charleston	I26 EB2	Urban Restricted Access	4515	4886	57.7
12	Charleston	I26 EB3	Urban Restricted Access	398	6171	58.7
13	Charleston	I26 EB4	Urban Restricted Access	1189	3052	38.6
14	Charleston	I26 EB5	Urban Restricted Access	823	1299	16.9
15	Charleston	I26 EB6	Urban Restricted Access	587	2131	24.5
16	Charleston	I26 EB7	Urban Restricted Access	784	833	53.3
17	Charleston	I26 EB8	Urban Restricted Access	1164	1330	53.3
18	Charleston	I26 WB1	Urban Restricted Access	1489	2803	62.4
19	Charleston	I26 WB2	Urban Restricted Access	1618	2234	62.5
20	Charleston	I26 WB3	Urban Restricted Access	1130	1988	63.4
21	Charleston	I26 WB4	Urban Restricted Access	1764	4997	61.1
22	Charleston	I526 to I26 R1	Urban Restricted Access	2774	1753	48.9
23	Charleston	I526 to I26 R2	Urban Restricted Access	1116	2100	55.4
24	Charleston	I526 to I26 R3	Urban Restricted Access	976	501	35.7
25	Charleston	I526 to I26 R4	Urban Restricted Access	3374	1612	43.4
26	Charleston	I526 to I26 R5	Urban Restricted Access	1402	567	41.5
27	Charleston	I526 to I26 R6	Urban Restricted Access	1662	1419	47.6
28	Charleston	I526 to I26 L1	Urban Restricted Access	830	833	27
29	Charleston	I526 to I26 L2	Urban Restricted Access	925	1300	30.2
30	Charleston	I526 to I26 L3	Urban Restricted Access	991	256	32.1

*Link descriptions containing “R#” indicate a ramp link; link descriptions containing “L#” indicate a loop link, all other links are free-flow links through the interchange.

Table 3-4. 2050 No-Build MOVES2014b Link Details

MOVES2014b Link ID	County	Link Description*	MOVES Road Type	Link Length (ft)	Link Traffic Volume (veh/hr)	Link Average Speed (mph)
1	Charleston	I526 EB1	Urban Restricted Access	1306	3899	54.8
2	Charleston	I526 EB2	Urban Restricted Access	1839	1806	28.4
3	Charleston	I526 EB3	Urban Restricted Access	816	2371	9.2
4	Charleston	I526 EB4	Urban Restricted Access	1421	3176	12.3
5	Charleston	I526 WB1	Urban Restricted Access	471	3966	45.7
6	Charleston	I526 WB2	Urban Restricted Access	1177	2851	47.1
7	Charleston	I526 WB3	Urban Restricted Access	542	3572	38.2
8	Charleston	I526 WB4	Urban Restricted Access	1289	3019	43.7
9	Charleston	I526 WB5	Urban Restricted Access	1990	3982	33.7
10	Charleston	I26 EB1	Urban Restricted Access	1609	5008	10
11	Charleston	I26 EB2	Urban Restricted Access	4515	3448	33.9
12	Charleston	I26 EB3	Urban Restricted Access	398	4890	24.6
13	Charleston	I26 EB4	Urban Restricted Access	1189	1529	8.3
14	Charleston	I26 EB5	Urban Restricted Access	823	623	4
15	Charleston	I26 EB6	Urban Restricted Access	587	1174	6.1
16	Charleston	I26 EB7	Urban Restricted Access	784	561	45.4
17	Charleston	I26 EB8	Urban Restricted Access	1164	1378	28.7
18	Charleston	I26 WB1	Urban Restricted Access	1489	3969	60.2
19	Charleston	I26 WB2	Urban Restricted Access	1618	3152	60.7
20	Charleston	I26 WB3	Urban Restricted Access	1130	2432	63.1
21	Charleston	I26 WB4	Urban Restricted Access	1764	4823	62
22	Charleston	I526 to I26 R1	Urban Restricted Access	2274	903	34.3
23	Charleston	I526 to I26 R2	Urban Restricted Access	1116	2087	54.2
24	Charleston	I526 to I26 R3	Urban Restricted Access	976	808	32.2
25	Charleston	I526 to I26 R4	Urban Restricted Access	3374	1288	47
26	Charleston	I526 to I26 R5	Urban Restricted Access	1402	824	40.4
27	Charleston	I526 to I26 R6	Urban Restricted Access	1662	1134	49.2
28	Charleston	I526 to I26 L1	Urban Restricted Access	830	568	9.7
29	Charleston	I526 to I26 L2	Urban Restricted Access	925	603	3.8
30	Charleston	I526 to I26 L3	Urban Restricted Access	991	731	30.1

*Link descriptions containing "R#" indicate a ramp link; link descriptions containing "L#" indicate a loop link, all other links are free-flow links through the interchange.

Table 3-5 2050 Build MOVES2014b Link Details

MOVES2014b Link ID	County	Link Description*	MOVES Road Type	Link Length (ft)	Link Traffic Volume (veh/hr)	Link Average Speed (mph)
1	Charleston	Build I526 EB1	Urban Restricted Access	2525	1265	58
2	Charleston	Build I526 EB2	Urban Restricted Access	2043	1962	48
3	Charleston	Build I526 EB3	Urban Restricted Access	2124	3268	53
4	Charleston	Build I526 WB1	Urban Restricted Access	1360	2653	52
5	Charleston	Build I526 WB2	Urban Restricted Access	1526	3025	56
6	Charleston	Build I526 WB3	Urban Restricted Access	2211	5293	51
7	Charleston	Build I526 WB4	Urban Restricted Access	1723	2823	31
8	Charleston	Build I26 EB1	Urban Restricted Access	1607	3367	61
9	Charleston	Build I26 EB2	Urban Restricted Access	2099	2745	61
10	Charleston	Build I26 EB3	Urban Restricted Access	2411	3763	50
11	Charleston	Build I26 EB4	Urban Restricted Access	398	5674	50
12	Charleston	Build I26 EB5	Urban Restricted Access	2150	3983	39
13	Charleston	Build I26 EB6	Urban Restricted Access	312	1653	40
14	Charleston	Build I26 EB7	Urban Restricted Access	758	1007	36
15	Charleston	Build I26 EB8	Urban Restricted Access	1164	1950	28
16	Charleston	Build I26 WB1	Urban Restricted Access	4237	1564	64
17	Charleston	Build I26 WB2	Urban Restricted Access	1126	2449	64
18	Charleston	Build I26 WB3	Urban Restricted Access	521	2076	41
19	Charleston	Build I26 WB5	Urban Restricted Access	873	1706	36
20	Charleston	Build I26 WB6	Urban Restricted Access	2679	667	42
21	Charleston	Build I26 WB7	Urban Restricted Access	1381	3860	47
22	Charleston	Build I526 to I26 R1	Urban Restricted Access	2021	2256	47
23	Charleston	Build I526 to I26 R2	Urban Restricted Access	1394	983	23
24	Charleston	Build I526 to I26 R3	Urban Restricted Access	3018	1969	47
25	Charleston	Build I526 to I26 R4	Urban Restricted Access	650	897	63
26	Charleston	Build I526 to I26 R5	Urban Restricted Access	1302	1381	53
27	Charleston	Build I526 to I26 R6	Urban Restricted Access	1865	1838	44
28	Charleston	Build I526 to I26 R7	Urban Restricted Access	1505	1036	41
29	Charleston	Build I526 to I26 L1	Urban Restricted Access	3538	973	10
30	Charleston	Build I526 to I26 L2	Urban Restricted Access	2065	710	36
31	Charleston	Build I526 to I26 L3	Urban Restricted Access	3495	381	47
32	Charleston	Build I526 to I26 L4	Urban Restricted Access	4590	632	44
33	Charleston	Build I526 to I26 L5	Urban Restricted Access	2225	1670	56

*Link descriptions containing “R#” indicate a ramp link; link descriptions containing “L#” indicate a loop link, all other links are free-flow links through the interchange.

3.9 MOVES2014b Link-level Emission Factors

Tables 3-6 through 3-8 show the MOVES2014b link-level emission factors used in each scenario modeled. Note that MOVES2014b outputs emission factors in grams per hour whereas the AERMOD dispersion model, discussed in Section 4.0, accepts inputs with units of grams per second. The emission factors shown in Tables 3.6 through 3.8 were each converted from grams per hour (MOVES output format) to grams per second (AERMOD input format) prior to input into AERMOD using Equation 1.

Equation 1

$$EF\left(\frac{g}{hr}\right) \div 3600\left(\frac{s}{hr}\right) = EF\left(\frac{g}{s}\right)$$

Table 3-6. MOVES2014b Link-Level Emission Factor Outputs for 2015 Existing Conditions

MOVES2014b Link ID	Diesel Exhaust PM (g/s)	Benzene (g/s)	1,3-Butadiene (g/s)	Form-aldehyde (g/s)	Acet-aldehyde (g/s)	Acrolein (g/s)	2,2,4-Trimethyl pentane (g/s)	Ethyl Benzene (g/s)	Hexane (g/s)	Propion-aldehyde (g/s)	Styrene (g/s)	Toluene (g/s)	Xylene (g/s)
1	3.86E-02	2.14E-01	2.49E-02	9.57E-02	7.70E-02	5.02E-03	1.06E-01	1.14E-01	1.11E-01	5.51E-03	6.14E-03	5.12E-01	4.16E-01
2	1.35E-02	7.48E-02	8.67E-03	3.34E-02	2.68E-02	1.75E-03	3.69E-02	3.99E-02	3.88E-02	1.92E-03	2.14E-03	1.79E-01	1.45E-01
3	2.55E-02	1.39E-01	1.66E-02	6.28E-02	5.08E-02	3.30E-03	6.95E-02	7.50E-02	7.23E-02	3.63E-03	4.03E-03	3.35E-01	2.73E-01
4	3.11E-02	1.72E-01	2.05E-02	7.76E-02	6.29E-02	4.08E-03	8.59E-02	9.27E-02	8.94E-02	4.49E-03	4.98E-03	4.15E-01	3.37E-01
5	4.15E-02	2.27E-01	2.69E-02	1.02E-01	8.26E-02	5.36E-03	1.13E-01	1.22E-01	1.17E-01	5.90E-03	6.54E-03	5.45E-01	4.43E-01
6	2.83E-02	1.56E-01	1.82E-02	6.98E-02	5.63E-02	3.66E-03	7.72E-02	8.34E-02	8.08E-02	4.02E-03	4.48E-03	3.73E-01	3.03E-01
7	3.06E-02	1.68E-01	1.98E-02	7.54E-02	6.09E-02	3.96E-03	8.34E-02	9.01E-02	8.72E-02	4.35E-03	4.84E-03	4.03E-01	3.28E-01
8	2.23E-02	1.24E-01	1.44E-02	5.53E-02	4.45E-02	2.90E-03	6.11E-02	6.61E-02	6.42E-02	3.18E-03	3.55E-03	2.95E-01	2.40E-01
9	4.35E-02	2.41E-01	2.80E-02	1.08E-01	8.66E-02	5.65E-03	1.19E-01	1.29E-01	1.25E-01	6.20E-03	6.91E-03	5.76E-01	4.69E-01
10	9.01E-02	4.96E-01	5.82E-02	2.22E-01	1.79E-01	1.17E-02	2.46E-01	2.65E-01	2.57E-01	1.28E-02	1.43E-02	1.19E+00	9.66E-01
11	5.91E-02	3.29E-01	3.81E-02	1.47E-01	1.18E-01	7.69E-03	1.62E-01	1.75E-01	1.71E-01	8.44E-03	9.41E-03	7.85E-01	6.39E-01
12	7.54E-02	4.20E-01	4.85E-02	1.87E-01	1.50E-01	9.81E-03	2.07E-01	2.24E-01	2.18E-01	1.08E-02	1.20E-02	1.00E+00	8.15E-01
13	2.93E-02	1.62E-01	1.95E-02	7.33E-02	5.95E-02	3.86E-03	8.12E-02	8.75E-02	8.40E-02	4.25E-03	4.70E-03	3.91E-01	3.18E-01
14	9.66E-03	5.05E-02	6.34E-03	2.32E-02	1.90E-02	1.23E-03	2.57E-02	2.76E-02	2.61E-02	1.36E-03	1.49E-03	1.23E-01	1.00E-01
15	1.61E-02	9.10E-02	1.12E-02	4.15E-02	3.39E-02	2.20E-03	4.60E-02	4.94E-02	4.71E-02	2.42E-03	2.66E-03	2.21E-01	1.80E-01
16	9.68E-03	5.34E-02	6.25E-03	2.39E-02	1.93E-02	1.26E-03	2.65E-02	2.86E-02	2.77E-02	1.38E-03	1.53E-03	1.28E-01	1.04E-01
17	1.55E-02	8.53E-02	9.97E-03	3.82E-02	3.08E-02	2.00E-03	4.22E-02	4.56E-02	4.43E-02	2.20E-03	2.45E-03	2.04E-01	1.66E-01
18	3.66E-02	2.04E-01	2.34E-02	9.05E-02	7.26E-02	4.74E-03	1.00E-01	1.08E-01	1.06E-01	5.19E-03	5.81E-03	4.85E-01	3.95E-01
19	2.92E-02	1.63E-01	1.87E-02	7.22E-02	5.80E-02	3.78E-03	8.00E-02	8.65E-02	8.44E-02	4.15E-03	4.64E-03	3.87E-01	3.15E-01
20	2.64E-02	1.47E-01	1.68E-02	6.52E-02	5.23E-02	3.41E-03	7.22E-02	7.82E-02	7.63E-02	3.74E-03	4.19E-03	3.50E-01	2.85E-01
21	6.37E-02	3.55E-01	4.08E-02	1.58E-01	1.27E-01	8.27E-03	1.75E-01	1.89E-01	1.84E-01	9.06E-03	1.01E-02	8.45E-01	6.88E-01
22	1.95E-02	1.07E-01	1.26E-02	4.80E-02	3.88E-02	2.52E-03	5.31E-02	5.74E-02	5.55E-02	2.77E-03	3.08E-03	2.57E-01	2.09E-01
23	2.49E-02	1.38E-01	1.60E-02	6.16E-02	4.96E-02	3.23E-03	6.81E-02	7.36E-02	7.15E-02	3.55E-03	3.95E-03	3.29E-01	2.68E-01
24	4.58E-03	2.55E-02	3.08E-03	1.15E-02	9.38E-03	6.08E-04	1.28E-02	1.38E-02	1.32E-02	6.70E-04	7.40E-04	6.16E-02	5.01E-02
25	1.67E-02	9.17E-02	1.09E-02	4.13E-02	3.35E-02	2.17E-03	4.57E-02	4.93E-02	4.75E-02	2.39E-03	2.65E-03	2.21E-01	1.80E-01
26	5.72E-03	3.14E-02	3.76E-03	1.42E-02	1.15E-02	7.46E-04	1.57E-02	1.69E-02	1.63E-02	8.21E-04	9.09E-04	7.57E-02	6.16E-02
27	1.56E-02	8.53E-02	1.01E-02	3.83E-02	3.10E-02	2.01E-03	4.24E-02	4.58E-02	4.42E-02	2.22E-03	2.46E-03	2.05E-01	1.67E-01
28	6.58E-03	3.70E-02	4.54E-03	1.68E-02	1.38E-02	8.90E-04	1.87E-02	2.01E-02	1.91E-02	9.83E-04	1.08E-03	8.98E-02	7.31E-02
29	1.08E-02	6.05E-02	7.40E-03	2.75E-02	2.25E-02	1.45E-03	3.05E-02	3.28E-02	3.13E-02	1.60E-03	1.77E-03	1.47E-01	1.19E-01
30	2.20E-03	1.23E-02	1.50E-03	5.58E-03	4.55E-03	2.95E-04	6.19E-03	6.66E-03	6.36E-03	3.25E-04	3.58E-04	2.98E-02	2.42E-02

Table 3-7. MOVES2014b Link-Level Emission Factor Outputs for 2050 No-Build Alternative

MOVES2014b Link ID	Diesel Exhaust PM (g/s)	Benzene (g/s)	1,3-Butadiene (g/s)	Form-aldehyde (g/s)	Acet-aldehyde (g/s)	Acrolein (g/s)	2,2,4-Trimethyl pentane (g/s)	Ethyl Benze ne (g/s)	Hexane (g/s)	Propion-aldehyd e (g/s)	Styrene (g/s)	Toluen e (g/s)	Xylene (g/s)
1	4.57E-03	5.16E-02	9.46E-06	2.07E-02	9.02E-03	9.76E-04	1.64E-02	1.84E-02	2.79E-02	6.56E-04	1.91E-03	8.32E-02	7.04E-02
2	1.33E-03	1.52E-02	3.29E-06	6.23E-03	2.70E-03	2.94E-04	4.82E-03	5.43E-03	8.23E-03	1.95E-04	5.61E-04	2.45E-02	2.07E-02
3	1.69E-03	1.33E-02	3.25E-06	5.55E-03	2.39E-03	2.61E-04	4.21E-03	4.74E-03	7.19E-03	1.72E-04	4.90E-04	2.14E-02	1.81E-02
4	2.22E-03	1.94E-02	4.70E-06	8.09E-03	3.48E-03	3.81E-04	6.15E-03	6.93E-03	1.05E-02	2.51E-04	7.16E-04	3.13E-02	2.65E-02
5	4.19E-03	4.58E-02	8.93E-06	1.85E-02	8.04E-03	8.72E-04	1.45E-02	1.63E-02	2.48E-02	5.84E-04	1.69E-03	7.38E-02	6.24E-02
6	3.07E-03	3.37E-02	6.50E-06	1.36E-02	5.91E-03	6.40E-04	1.07E-02	1.20E-02	1.82E-02	4.29E-04	1.24E-03	5.42E-02	4.59E-02
7	3.26E-03	3.62E-02	7.37E-06	1.47E-02	6.38E-03	6.93E-04	1.15E-02	1.29E-02	1.96E-02	4.63E-04	1.34E-03	5.83E-02	4.94E-02
8	3.07E-03	3.37E-02	6.65E-06	1.36E-02	5.93E-03	6.43E-04	1.07E-02	1.20E-02	1.82E-02	4.30E-04	1.25E-03	5.43E-02	4.60E-02
9	3.30E-03	3.70E-02	7.74E-06	1.51E-02	6.54E-03	7.11E-04	1.17E-02	1.32E-02	2.00E-02	4.74E-04	1.37E-03	5.96E-02	5.04E-02
10	3.56E-03	2.87E-02	7.01E-06	1.20E-02	5.16E-03	5.64E-04	9.11E-03	1.02E-02	1.55E-02	3.72E-04	1.06E-03	4.63E-02	3.92E-02
11	2.87E-03	3.22E-02	6.74E-06	1.31E-02	5.69E-03	6.18E-04	1.02E-02	1.15E-02	1.74E-02	4.12E-04	1.19E-03	5.18E-02	4.39E-02
12	3.31E-03	3.88E-02	8.54E-06	1.59E-02	6.89E-03	7.50E-04	1.23E-02	1.38E-02	2.10E-02	4.98E-04	1.43E-03	6.25E-02	5.29E-02
13	1.08E-03	8.38E-03	2.06E-06	3.50E-03	1.51E-03	1.65E-04	2.66E-03	2.99E-03	4.53E-03	1.08E-04	3.09E-04	1.35E-02	1.14E-02
14	3.91E-04	3.12E-03	7.87E-07	1.31E-03	5.63E-04	6.16E-05	9.90E-04	1.11E-03	1.69E-03	4.05E-05	1.15E-04	5.03E-03	4.26E-03
15	7.83E-04	6.15E-03	1.53E-06	2.57E-03	1.11E-03	1.21E-04	1.95E-03	2.20E-03	3.33E-03	7.97E-05	2.27E-04	9.92E-03	8.39E-03
16	5.89E-04	6.44E-03	1.26E-06	2.61E-03	1.13E-03	1.23E-04	2.04E-03	2.30E-03	3.49E-03	8.22E-05	2.38E-04	1.04E-02	8.78E-03
17	1.02E-03	1.17E-02	2.52E-06	4.78E-03	2.07E-03	2.25E-04	3.69E-03	4.16E-03	6.31E-03	1.50E-04	4.30E-04	1.88E-02	1.59E-02
18	5.01E-03	5.70E-02	1.01E-05	2.28E-02	9.92E-03	1.07E-03	1.81E-02	2.03E-02	3.08E-02	7.23E-04	2.11E-03	9.18E-02	7.77E-02
19	4.03E-03	4.57E-02	8.07E-06	1.82E-02	7.95E-03	8.60E-04	1.45E-02	1.63E-02	2.47E-02	5.79E-04	1.69E-03	7.36E-02	6.22E-02
20	3.28E-03	3.68E-02	6.42E-06	1.47E-02	6.39E-03	6.91E-04	1.16E-02	1.31E-02	1.99E-02	4.66E-04	1.36E-03	5.92E-02	5.01E-02
21	6.35E-03	7.15E-02	1.26E-05	2.85E-02	1.24E-02	1.34E-03	2.27E-02	2.55E-02	3.87E-02	9.07E-04	2.64E-03	1.15E-01	9.75E-02
22	7.57E-04	8.49E-03	1.77E-06	3.46E-03	1.50E-03	1.63E-04	2.69E-03	3.03E-03	4.59E-03	1.09E-04	3.14E-04	1.37E-02	1.16E-02
23	2.43E-03	2.74E-02	5.04E-06	1.10E-02	4.79E-03	5.18E-04	8.68E-03	9.78E-03	1.48E-02	3.48E-04	1.01E-03	4.42E-02	3.74E-02
24	6.47E-04	7.28E-03	1.54E-06	2.98E-03	1.29E-03	1.40E-04	2.31E-03	2.60E-03	3.94E-03	9.33E-05	2.69E-04	1.17E-02	9.93E-03
25	1.38E-03	1.52E-02	2.94E-06	6.13E-03	2.66E-03	2.89E-04	4.81E-03	5.42E-03	8.21E-03	1.94E-04	5.61E-04	2.45E-02	2.07E-02
26	7.86E-04	2.31E-03	1.75E-06	3.53E-03	1.53E-03	1.66E-04	2.75E-03	3.10E-03	4.70E-03	1.11E-04	3.21E-04	1.40E-02	1.18E-02
27	1.25E-03	1.38E-02	2.63E-06	5.57E-03	2.42E-03	2.63E-04	4.38E-03	4.93E-03	7.48E-03	1.76E-04	5.11E-04	2.23E-02	1.89E-02
28	4.05E-04	3.23E-03	7.89E-07	1.35E-03	5.81E-04	6.34E-05	1.02E-03	1.15E-03	1.75E-03	4.18E-05	1.19E-04	5.21E-03	4.41E-03
29	3.76E-04	3.01E-03	7.60E-07	1.26E-03	5.43E-04	5.94E-05	9.54E-04	1.07E-03	1.63E-03	3.90E-05	1.11E-04	4.85E-03	4.11E-03
30	5.57E-04	6.31E-03	1.36E-06	2.59E-03	1.12E-03	1.22E-04	2.00E-03	2.25E-03	3.42E-03	8.10E-05	2.33E-04	1.02E-02	8.61E-03

Table 3-8. MOVES2014b Link-Level Emission Factor Outputs for 2050 Build Alternative

MOVES2014b Link ID	Diesel Exhaust PM (g/s)	Benzene (g/s)	1,3-Butadiene (g/s)	Form aldehyde (g/s)	Acet aldehyde (g/s)	Acrolein (g/s)	2,2,4-Trimethyl pentane (g/s)	Ethyl Benzene (g/s)	Hexane (g/s)	Propion aldehyde (g/s)	Styrene (g/s)	Toluene (g/s)	Xylene (g/s)
1	1.53E-03	1.75E-02	3.14E-06	7.01E-03	3.05E-03	3.30E-04	5.55E-03	6.25E-03	9.47E-03	2.22E-04	6.47E-04	2.82E-02	2.39E-02
2	2.13E-03	2.35E-02	4.51E-06	9.48E-03	4.12E-03	4.46E-04	7.44E-03	8.38E-03	1.27E-02	2.99E-04	8.68E-04	3.79E-02	3.20E-02
3	3.76E-03	4.22E-02	7.82E-06	1.69E-02	7.37E-03	7.98E-04	1.34E-02	1.50E-02	2.28E-02	5.37E-04	1.56E-03	6.80E-02	5.75E-02
4	3.02E-03	3.37E-02	6.29E-06	1.36E-02	5.90E-03	6.39E-04	1.07E-02	1.20E-02	1.83E-02	4.29E-04	1.25E-03	5.44E-02	4.60E-02
5	3.59E-03	4.07E-02	7.40E-06	1.63E-02	7.11E-03	7.69E-04	1.29E-02	1.45E-02	2.20E-02	5.18E-04	1.51E-03	6.56E-02	5.55E-02
6	5.95E-03	6.63E-02	1.25E-05	2.67E-02	1.16E-02	1.26E-03	2.10E-02	2.37E-02	3.59E-02	8.44E-04	2.45E-03	1.07E-01	9.04E-02
7	2.20E-03	2.48E-02	5.31E-06	1.01E-02	4.39E-03	4.78E-04	7.86E-03	8.85E-03	1.34E-02	3.18E-04	9.16E-04	4.00E-02	3.38E-02
8	4.33E-03	4.90E-02	8.66E-06	1.96E-02	8.54E-03	9.23E-04	1.55E-02	1.75E-02	6.74E-01	6.22E-04	1.81E-03	7.90E-02	6.68E-02
9	3.53E-03	4.00E-02	7.06E-06	1.60E-02	6.96E-03	7.52E-04	1.27E-02	1.43E-02	2.16E-02	5.07E-04	1.48E-03	6.44E-02	5.45E-02
10	4.18E-03	4.65E-02	8.79E-06	1.87E-02	8.14E-03	8.81E-04	1.47E-02	1.66E-02	2.51E-02	5.92E-04	1.72E-03	7.49E-02	6.33E-02
11	6.31E-03	7.00E-02	1.32E-05	2.82E-02	1.23E-02	1.33E-03	2.22E-02	2.50E-02	3.79E-02	8.92E-04	2.59E-03	1.13E-01	9.55E-02
12	3.69E-03	4.10E-02	8.30E-06	1.66E-02	7.22E-03	7.84E-04	1.30E-02	1.46E-02	2.22E-02	5.24E-04	1.51E-03	6.60E-02	5.59E-02
13	1.56E-03	1.73E-02	3.49E-06	7.03E-03	3.05E-03	3.31E-04	5.49E-03	6.18E-03	9.37E-03	2.21E-04	6.39E-04	2.79E-02	2.36E-02
14	8.77E-04	9.79E-03	2.02E-06	3.99E-03	1.73E-03	1.88E-04	3.10E-03	3.49E-03	5.30E-03	1.25E-04	3.62E-04	1.58E-02	1.33E-02
15	1.42E-03	1.63E-02	3.54E-06	6.69E-03	2.90E-03	3.15E-04	5.17E-03	5.82E-03	8.83E-03	2.09E-04	6.02E-04	2.63E-02	2.23E-02
16	2.15E-03	2.40E-02	4.17E-06	9.57E-03	4.17E-03	4.51E-04	7.60E-03	8.56E-03	1.30E-02	3.04E-04	8.87E-04	3.87E-02	3.27E-02
17	3.37E-03	3.76E-02	6.53E-06	1.50E-02	6.54E-03	7.06E-04	1.19E-02	1.34E-02	2.03E-02	4.77E-04	1.39E-03	6.06E-02	5.12E-02
18	2.00E-03	2.21E-02	4.43E-06	8.98E-03	3.90E-03	4.23E-04	7.01E-03	7.90E-03	1.20E-02	2.83E-04	8.17E-04	3.57E-02	3.02E-02
19	1.49E-03	1.66E-02	3.43E-06	6.76E-03	2.93E-03	3.18E-04	5.26E-03	5.92E-03	8.97E-03	2.12E-04	6.13E-04	2.67E-02	2.26E-02
20	6.57E-04	7.24E-03	1.44E-06	2.93E-03	1.27E-03	1.38E-04	2.29E-03	2.58E-03	3.92E-03	9.24E-05	2.67E-04	1.17E-02	9.86E-03
21	4.15E-03	4.55E-02	8.80E-06	1.84E-02	7.98E-03	8.65E-04	1.44E-02	1.62E-02	2.46E-02	5.80E-04	1.68E-03	7.33E-02	6.20E-02
22	2.42E-03	2.66E-02	5.14E-06	1.07E-02	4.67E-03	5.06E-04	8.42E-03	9.49E-03	1.44E-02	3.39E-04	9.82E-04	4.28E-02	3.62E-02
23	6.40E-04	7.59E-03	1.68E-06	3.12E-03	1.35E-03	1.47E-04	2.41E-03	2.71E-03	4.11E-03	9.76E-05	2.80E-04	1.22E-02	1.04E-02
24	2.12E-03	2.32E-02	4.49E-06	9.37E-03	4.07E-03	4.41E-04	7.35E-03	8.28E-03	1.26E-02	2.96E-04	8.57E-04	3.74E-02	3.16E-02
25	1.21E-03	1.35E-02	2.36E-06	5.40E-03	2.35E-03	2.54E-04	4.29E-03	4.83E-03	7.32E-03	1.72E-04	5.00E-04	2.18E-02	1.84E-02
26	1.59E-03	1.78E-02	3.30E-06	7.16E-03	3.12E-03	3.37E-04	5.65E-03	6.36E-03	9.65E-03	2.27E-04	6.59E-04	2.87E-02	2.43E-02
27	1.88E-03	2.06E-02	4.06E-06	8.35E-03	3.63E-03	3.93E-04	6.54E-03	7.36E-03	1.12E-02	2.63E-04	7.62E-04	3.32E-02	2.81E-02
28	1.00E-03	1.10E-02	2.21E-06	4.48E-03	1.94E-03	2.11E-04	3.50E-03	3.94E-03	5.98E-03	1.41E-04	4.08E-04	1.78E-02	1.51E-02
29	6.92E-04	5.58E-03	1.36E-06	2.33E-03	1.00E-03	1.10E-04	1.77E-03	1.99E-03	3.02E-03	7.22E-05	2.06E-04	8.99E-03	7.61E-03
30	6.18E-04	6.90E-03	1.43E-06	2.81E-03	1.22E-03	1.32E-04	2.19E-03	2.46E-03	3.73E-03	8.83E-05	2.55E-04	1.11E-02	9.41E-03
31	4.09E-04	4.49E-03	8.68E-07	1.81E-03	7.88E-04	8.54E-05	1.42E-03	1.60E-03	2.43E-03	5.73E-05	1.66E-04	7.24E-03	6.12E-03
32	6.46E-04	7.09E-03	1.40E-06	2.87E-03	1.25E-03	1.35E-04	2.25E-03	2.53E-03	3.84E-03	9.05E-05	2.62E-04	1.14E-02	9.67E-03
33	1.98E-03	2.25E-02	4.09E-06	9.01E-03	3.92E-03	4.25E-04	7.12E-03	8.02E-03	1.22E-02	2.86E-04	8.31E-04	3.62E-02	3.07E-02

4.1 DISPERSION MODEL SELECTION

EPA's current preferred dispersion model, AERMOD v19191, was used for all dispersion modeling scenarios include in this impact analysis. The BPIP-Prime building downwash algorithm was not used for this analysis since there are no non-roadway structures within the modeling domain that might cause significant downwash effects.

4.2 METEOROLOGY

Five years of surface profile and upper air meteorological data (2014 – 2018) were processed via the AERMET v19191 meteorological data preprocessing software package and used for each modeling scenario in this analysis. AERMET was run for 12 wind sectors assuming an average atmospheric moisture profile. Surface profile data were obtained from station number 720606 located at the Charleston Executive Airport. Upper air data were obtained from station number 72215.

4.3 INITIAL VERTICAL DIMENSION

Every roadway link modeled in each scenario analyzed was modeled as an area source. Often, volume sources are used when modeling impacts from traffic on surface roads. However, the areapoly function within AERMOD was used to define source links in this analysis because receptors (i.e. the inhabitants of EJNs discussed in previous sections) are located within the model's volume source exclusion zone, defined as:

Equation 2

$$Volume\ Source\ Exclusion\ Zone = 2.15 \times \delta_Y + 1.0\ meters$$

Where σ_Y is defined as the source (i.e. vehicle) height in meters[9]. Specifically, some receptors are so close to elevated roadway links that they could arguably be described as "directly underneath" the elevated link when taking into account the volume source exclusion zone.

For areapoly sources within AERMOD, an initial vertical dimension must be calculated for every link modeled. The parameters necessary to calculate the initial dimension on a roadway include the average vehicle height of the fleet traveling along the roadway, the average plume height (equal to 1.7 X average vehicle height), and the source release height (equal to 0.5 X average plume height)[10].

Table 4-1 includes the assumed heights of each MOVES vehicle type. These individual vehicle heights were weighted according to the fraction of each vehicle type on the roadway during weekday morning peak hour traffic and an average fleet vehicle height of 1.59 meters was established. Using this fleet vehicle height, average plume height, source release height, and initial vertical dimension were determined using Equations 3 through 5, respectively.

[9] "Haul Road Workgroup Final Report Submission", EPA, December 11, 2011.

[10] Appendix W Guideline on Air Quality Models, Last Updated January 17, 2017.

Equation 3

$$Average\ Plume\ Height\ (m) = 1.7 \times Average\ Fleet\ Vehicle\ Height = 1.7 \times 1.59\ m = 2.70\ meters$$

Equation 4

$$Release\ Height\ (m) = 0.5 \times Average\ Plume\ Height = 0.5 \times 2.70\ m = 1.35\ meters$$

Equation 5

$$Initial\ Vertical\ Dimension\ (m) = Plume\ Height\ \div 2.15 = 2.70m \div 2.15 = 1.26\ meters$$

Table 4-1 Height Estimates for Each MOVES Vehicle Type

MOVES Vehicle Type ID	Description	Typical Vehicle Height (m)	Average Aggregate Fleet Vehicle Height, σ_Y (m)
11	Motorcycle	1.45	1.59
21	Passenger Car	1.45	
31	Passenger Truck	1.80	
32	Light Comm. Truck	1.80	
41	Intercity Bus	3.50	
42	Transit Bus	3.50	
43	School Bus	3.50	
51	Refuse Truck	3.50	
52	Single Unit Short Haul Truck	4.00	
53	Single Unit Long Haul Truck	4.00	
54	Motorhome	3.50	
61	Combo Short Haul Truck	4.00	
62	Combo Long Haul Truck	4.00	

4.4 Terrain & Link Elevations

Terrain elevation data was processed using the AERMAP v18081 for each source and receptor within the modeling domain for each design alternative scenario included in this analysis. 1/3 Arcsecond National Elevation Dataset (NED) data was obtained from the United States Geological Service (USGS) for the project area using the online National Map Viewer[11].

AERMAP assigns an elevation to every source, object and receptor in the model assuming that these points are pinned to the ground. While this is indeed the case for many links within the interchange, several links in the 2015 existing, 2050 no-build and 2050 build scenarios are elevated above ground level. To

[11] https://viewer.nationalmap.gov/basic/

address this in each scenario, elevation inputs to AERMOD were examined on a link-by-link basis and the elevations assigned to raised sections of roadway were adjusted manually to reflect the actual (for existing and no-build) or design (for build alternative) elevations for free-flow links. For ramp and loop links that involves a graded increase in elevation along the length of the link, the midpoint elevation of the link was used. AERMOD source (i.e. roadway link) input parameters including link elevation are presented in Tables 4-2 and 4-3.

4.5 Receptors

For the purposes of this quantitative air quality impact analysis, model receptors were placed every 25 meters around the entire project boundary and every 100 meters from the boundary out to 1000 meters from the boundary. Receptor heights were set to 1.8 meters above ground level to simulate the approximate height of mouth and nose entry points to the human respiratory system. Figures 4-1 and 4-2 show the project boundary and receptor grids for the 2015 Existing/ 2050 No-Build and 2050 Build alternatives, respectively.

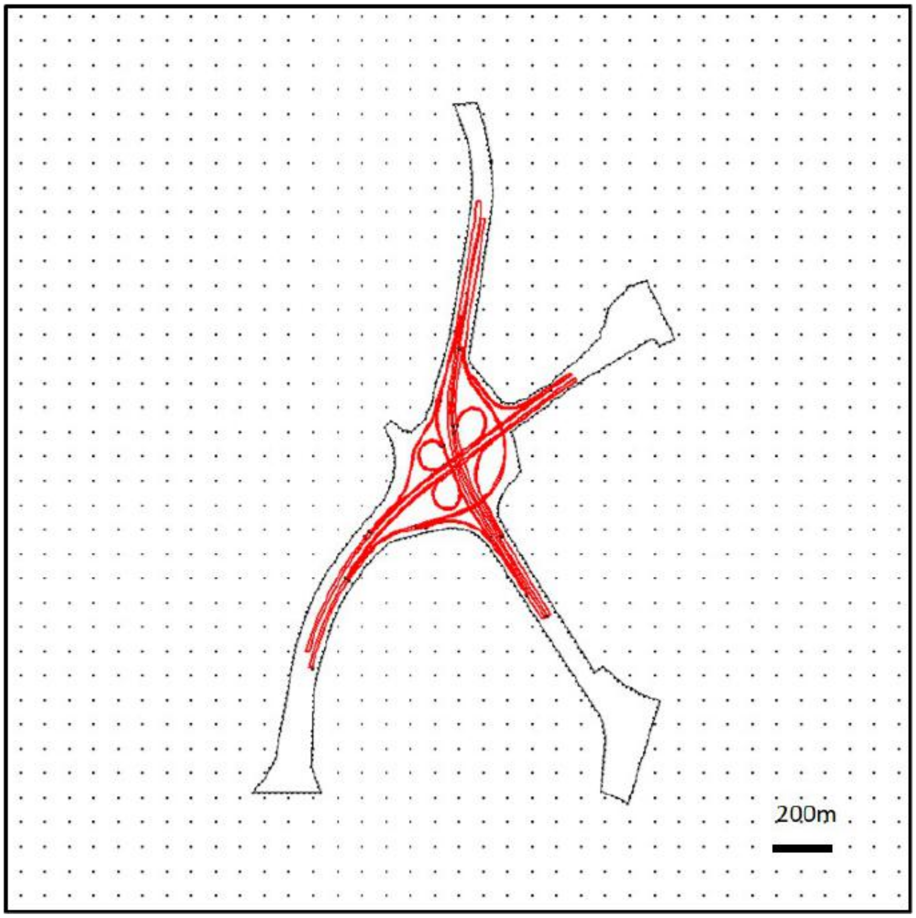


Figure 4-1. 2015 Existing and 2050 No-Build I-526 and I-26 Interchange Configuration and Receptor Locations.

Source: BEEST AERMOD software package. Note: Each small dot represents a discrete receptor location.

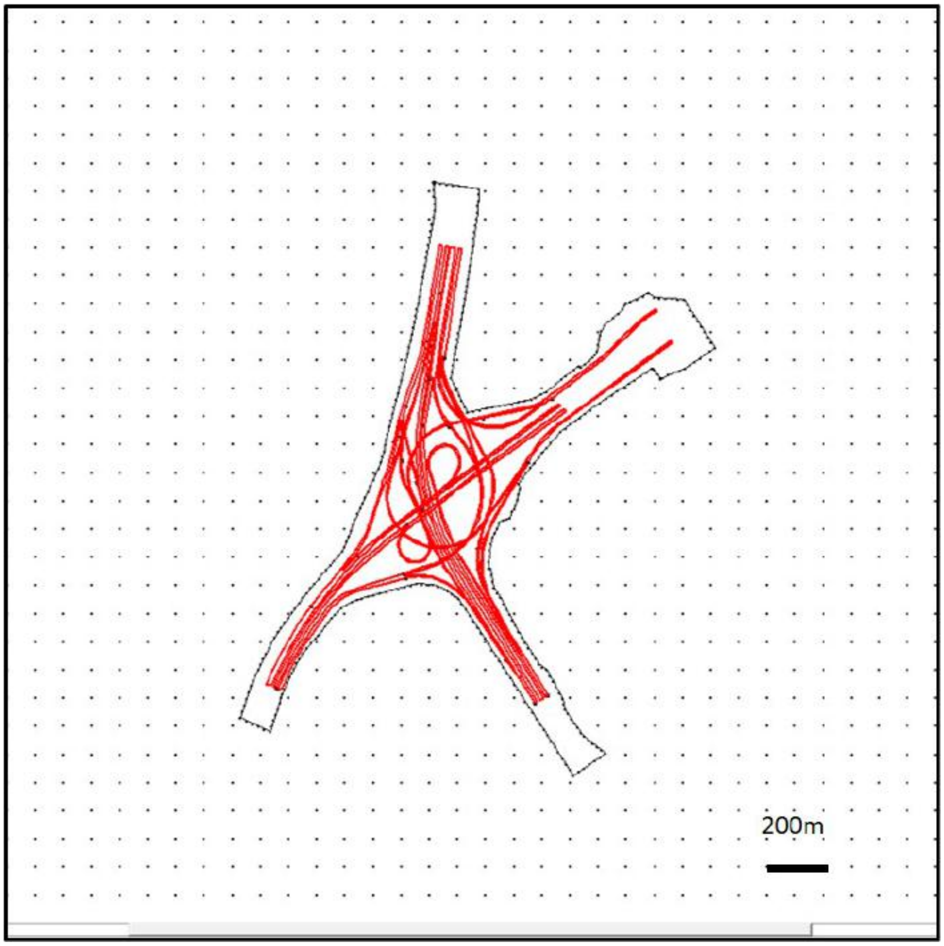


Figure 4-2. 2050 Build I-526 and I-26 Interchange Configuration and Receptor Locations

Source: BEEST AERMOD software package. Note: Each small dot represents a discrete receptor location.

4.6 Source Input Parameters

The AERMOD areapoly function was used to define each link in the I-526 and I-26 interchange. The number of vertices per link varied from as few as four to as many as 86 individual vertices for complex link shapes such as loops and ramps. Tables 4-2 and 4-3 present source input parameters for each AERMOD scenario. Each set of UTM coordinates are included in the electronic AERMOD input files which accompany this report.

Table 4-2 AERMOD Link-Level Source Input Parameters for 2015 Existing and 2050 No-build Alternatives

Link ID	Link Description*	Link Elevation Above Ground Surface (m)	Release Height (m)	Initial Vertical Dimension (m)	# of Link AreaPoly Vertices
1	I526_EB1	4.74	1.35	1.260	19
2	I526_EB2	5.29	1.35	1.260	19
3	I526_EB3	12.0	1.35	1.260	13
4	I526_EB4	14.0	1.35	1.260	15
5	I526_WB1	12.0	1.35	1.260	7
6	I526_WB2	14.0	1.35	1.260	9
7	I526_WB3	13.0	1.35	1.260	9
8	I526_WB4	9.00	1.35	1.260	21
9	I526_WB5	6.24	1.35	1.260	24
10	I26_EB1	17.33	1.35	1.260	18
11	I26_EB2	14.38	1.35	1.260	57
12	I26_EB3	7.50	1.35	1.260	4
13	I26_EB4	16.66	1.35	1.260	17
14	I26_EB5	7.22	1.35	1.260	20
15	I26_EB6	6.66	1.35	1.260	10
16	I26_EB7	6.46	1.35	1.260	18
17	I26_EB8	6.2	1.35	1.260	13
18	I26_WB1	7.53	1.35	1.260	6
19	I26_WB2	6.04	1.35	1.260	27
20	I26_WB3	6.09	1.35	1.260	15
21	I26_WB4	12.54	1.35	1.260	13
22	526-26_R1	6.29	1.35	1.260	48
23	526-26_R2	4.78	1.35	1.260	25
24	526-26_R3	8.00	1.35	1.260	32
25	526-26_R4	11.00	1.35	1.260	86
26	526-26_R5	9.00	1.35	1.260	44
27	526-26_R6	11.86	1.35	1.260	51
28	526-26_L1	7.50	1.35	1.260	55
29	526-26_L2	7.50	1.35	1.260	59
30	526-26_L3	9.50	1.35	1.260	51

*Link descriptions containing an "R" represent ramp links. Link descriptions containing an "L" represent loop links.

Table 4-3 AERMOD Link-Level Source Input Parameters for 2050 Build Alternative

Link ID	Link Description	Link Elevation Above Ground Surface (m)	Release Height (m)	Initial Vertical Dimension (m)	# of Link AreaPoly Vertices
1	Bld_526_EB1	5.11	1.35	1.260	36
2	Bld_526_EB2	12.00	1.35	1.260	15
3	Bld_526_EB3	9.00	1.35	1.260	33
4	Bld_526_WB1	14.00	1.35	1.260	7
5	Bld_526_WB2	12.00	1.35	1.260	19
6	Bld_526_WB3	6.17	1.35	1.260	24
7	Bld_526_WB4	13.00	1.35	1.260	35
8	Bld_I26_EB1	17.62	1.35	1.260	8
9	Bld_I26_EB2	13.65	1.35	1.260	37
10	Bld_I26_EB3	6.37	1.35	1.260	26
11	Bld_I26_EB4	7.27	1.35	1.260	4
12	Bld_I26_EB5	5.36	1.35	1.260	26
13	Bld_I26_EB6	16.0	1.35	1.260	9
14	Bld_I26_EB7	7.00	1.35	1.260	14
15	Bld_I26_EB8	7.25	1.35	1.260	7
16	Bld_I26_WB1	13.00	1.35	1.260	33
17	Bld_I26_WB2	12.23	1.35	1.260	9
18	Bld_I26_WB3	4.20	1.35	1.260	4
19	Bld_I26_WB5	7.00	1.35	1.260	8
20	Bld_I26_WB6	3.07	1.35	1.260	68
21	Bld_I26_WB7	6.36	1.35	1.260	11
22	Bd_526_26_R1	5.22	1.35	1.260	33
23	Bd_526_26_R2	8.00	1.35	1.260	25
24	Bd_526_26_R3	12.00	1.35	1.260	58
25	Bd_526_26_R4	7.57	1.35	1.260	18
26	Bd_526_26_R5	2.65	1.35	1.260	35
27	Bd_526_26_R6	15.00	1.35	1.260	65
28	Bd_526_26_R7	11.00	1.35	1.260	27
29	Bd_526_26_L1	10.00	1.35	1.260	87
30	Bd_526_26_L2	7.36	1.35	1.260	77
31	Bd_526_26_L3	7.00	1.35	1.260	74
32	Bd_526_26_L4	9.86	1.35	1.260	76
33	Bd_526_26_L5	12.00	1.35	1.260	18

*Link descriptions containing an "R" represent ramp links. Link descriptions containing an "L" represent loop links.

4.7 Model Results

2015 Existing Conditions, 2050 No-build Alternative, and 2050 Build Alternative dispersion modeling results were analyzed in order to ascertain the following for each pollutant modeled:

- The highest concentration receptor in the entire modeling domain
- The highest concentration receptor located within the Highland Terrace EJN
- The highest concentration receptor located within the Liberty Park EJN
- The highest concentration receptor located within the Russelldale EJN

Table 4-4 presents a comparison of the highest concentration receptor for each pollutant modeled and shows that the 2050 No-build and 2050 Build Alternatives demonstrate very large reductions in all MSATs when compared to 2015 pollutant concentration levels. The exception to this trend is hexane, which shows marginal reductions of 14.20% and 24.33 % for the 2050 No-build and Build Alternatives, respectively.

Table 4-4 Comparison of MSAT Reductions for 2050 No-Build and Build Alternatives

Pollutant	2015 Existing Conditions Highest Receptor Concentration (µg/m³)	2050 No-build Highest Receptor Concentration (µg/m³)	Reduction in Highest Receptor from 2015 to 2050 No-build Alternative (%)	2050 Build Highest Ambient Air Boundary Receptor Concentration (µg/m³)	Reduction in Highest Receptor from 2015 to 2050 Build Alternative (%)
1,3-Butadiene	1.36E+02	2.84E-02	99.98%	4.01E-02	99.97%
2,2,4-Trimethylpentane	5.82E+02	4.34E+01	92.54%	6.68E+01	88.52%
Acetaldehyde	4.22E+02	2.42E+01	94.27%	3.69E+01	91.24%
Acrolein	2.76E+01	2.62E+00	90.50%	3.04E+00	89.00%
Benzene	1.18E+03	1.36E+02	88.46%	1.17E+02	90.11%
Diesel PM	2.12E+02	1.22E+01	94.23%	1.90E+01	91.04%
Ethyl Benzene	6.29E+02	4.87E+01	92.26%	4.19E+01	93.34%
Formaldehyde	5.26E+02	5.57E+01	89.40%	8.50E+01	83.84%
Hexane	6.13E+02	5.26E+02	14.20%	4.64E+02	24.33%
Propionaldehyde	3.03E+01	1.75E+00	94.23%	2.69E+00	91.15%
Styrene	3.37E+01	5.05E+00	85.02%	7.79E+00	76.91%
Toluene	2.81E+03	2.21E+02	92.16%	3.40E+02	87.92%
Xylene	2.29E+03	1.87E+02	91.85%	2.87E+02	87.46%

4.7.1 2015 Existing Conditions

For the 2015 Existing Condition modeling analysis, all pollutants' highest concentration receptor location for the entire modeling domain occurred at 592031.10 m E, 3638105.40 m N (Table 4-5). Figure 4-3 shows that this location is at the southern end of the interchange right along the project boundary near a retail building complex just off of the I-26 southbound freeway.

Table 4-5 Location of Highest Concentration Receptor in the Entire Modeling Domain Under 2015 Existing Conditions

MSAT Pollutant	Highest Receptor Concentration in Modeling Domain (µg/m³)	Location of Highest Concentration Receptor in Modeling Domain	
		Easting (m)	Northing (m)
1,3-Butadiene	1.36E+02	592031.10	3638105.40
2,2,4-Trimethylpentane	5.82E+02	592031.10	3638105.40
Acetaldehyde	4.22E+02	592031.10	3638105.40
Acrolein	2.76E+01	592031.10	3638105.40
Benzene	1.18E+03	592031.10	3638105.40
Diesel PM	2.12E+02	592031.10	3638105.40
Ethyl Benzene	6.29E+02	592031.10	3638105.40
Formaldehyde	5.26E+02	592031.10	3638105.40
Hexane	6.13E+02	592031.10	3638105.40
Propionaldehyde	3.03E+01	592031.10	3638105.40
Styrene	3.37E+01	592031.10	3638105.40
Toluene	2.81E+03	592031.10	3638105.40
Xylene	2.29E+03	592031.10	3638105.40

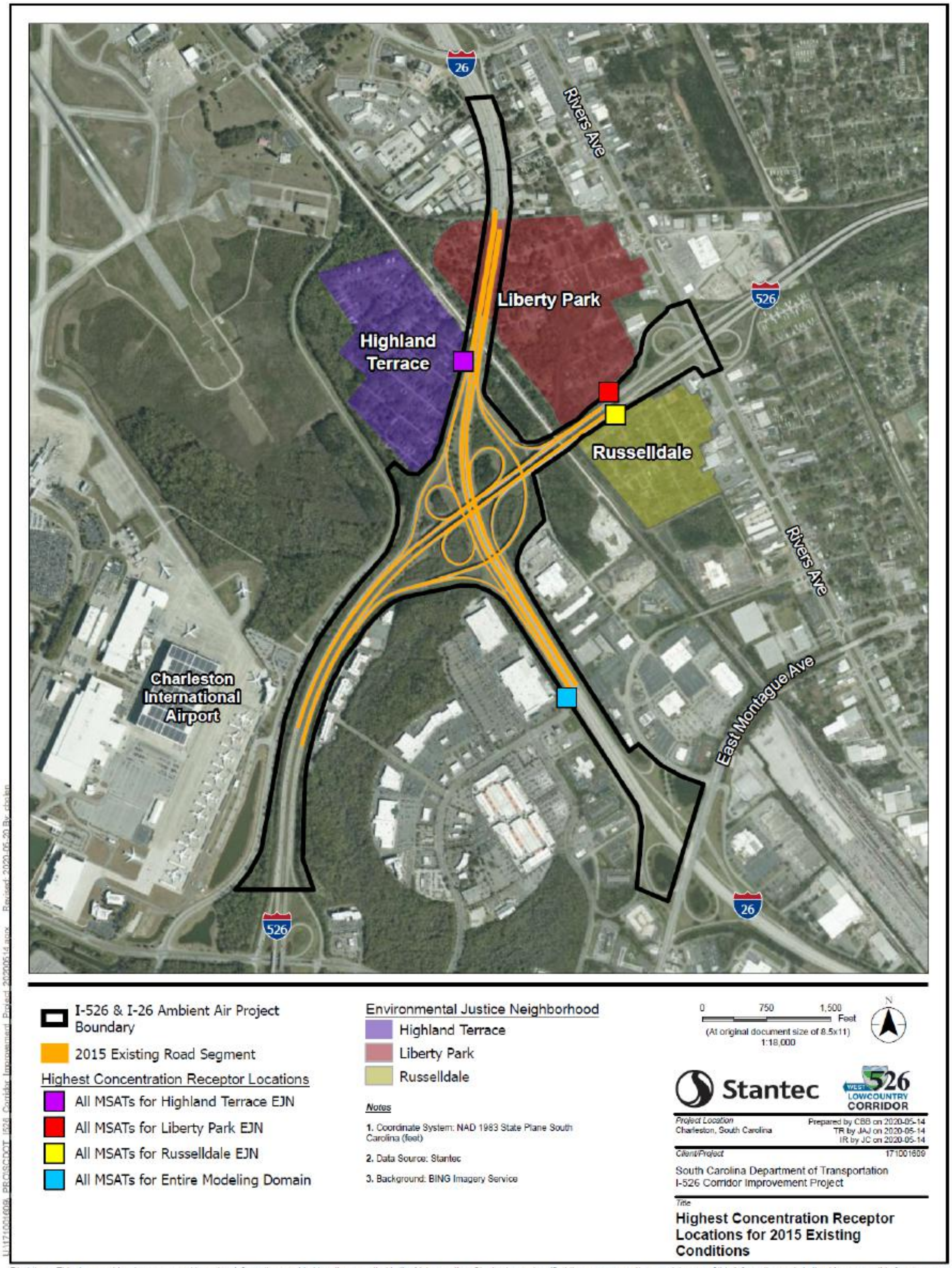
Also shown in Figure 4-3 are the highest receptor locations for the Highland Terrace, Liberty Park, and Russelldale EJNs. Table 4-6 shows that for each pollutant modeled, the highest concentration in each EJN is much lower than the highest receptor in the entire modeling domain. For example, the highest concentration for benzene in the entire modeling domain is 1,180 micrograms per cubic meter whereas the highest concentrations in each EJN are:

- Highland Terrace highest benzene concentration: 527 $\mu g/m^3$
- Liberty Park highest benzene concentration: 696 $\mu g/m^3$
- Russelldale highest benzene concentration: 505 $\mu g/m^3$

Table 4-6 Location of Highest Concentration Receptor In each EJN Under 2015 Existing Conditions

Pollutant	Highest Highland Terrace EJN Concentration (mg/m³)	Location of Highest Receptor in Highland Terrace EJN		Highest Liberty Park EJN Concentration (mg/m³)	Location of Highest Receptor in Liberty Park EJN		Highest Russelldale EJN Concentration (mg/m³)	Location of Highest Receptor in Russelldale EJN	
		Easting (m)	Northing (m)		Easting (m)	Northing (m)		Easting (m)	Northing (m)
1,3-Butadiene	6.23E+01	591664.20	3639302.50	8.23E+01	592183.70	3639191.00	5.99E+01	592207.40	3639111.90
2,2,4-Trimethylpentane	2.62E+02	591664.20	3639302.50	3.46E+02	592183.70	3639191.00	2.52E+02	592207.40	3639111.90
Acetaldehyde	1.91E+02	591664.20	3639302.50	2.53E+02	592183.70	3639191.00	1.84E+02	592207.40	3639111.90
Acrolein	1.24E+01	591664.20	3639302.50	1.64E+01	592183.70	3639191.00	1.19E+01	592207.40	3639111.90
Benzene	5.27E+02	591664.20	3639302.50	6.96E+02	592183.70	3639191.00	5.05E+02	592207.40	3639111.90
Diesel PM	9.51E+01	591664.20	3639302.50	1.27E+02	592183.70	3639191.00	9.21E+01	592207.40	3639111.90
Ethyl Benzene	2.83E+02	591664.20	3639302.50	3.74E+02	592183.70	3639191.00	3.72E+02	592207.40	3639111.90
Formaldehyde	2.37E+02	591664.20	3639302.50	3.13E+02	592183.70	3639191.00	2.27E+02	592207.40	3639111.90
Hexane	2.73E+02	591664.20	3639302.50	3.60E+02	592072.00	3639096.20	2.61E+02	592207.40	3639111.90
Propionaldehyde	1.37E+01	591664.20	3639302.50	1.81E+01	592183.70	3639191.00	1.32E+01	592207.40	3639111.90
Styrene	1.52E+01	591664.20	3639302.50	2.01E+01	592183.70	3639191.00	1.46E+01	592207.40	3639111.90
Toluene	1.26E+03	591664.20	3639302.50	1.67E+03	592183.70	3639191.00	1.22E+03	592207.40	3639111.90
Xylene	1.03E+03	591664.20	3639302.50	1.36E+03	592183.70	3639191.00	9.88E+02	592207.40	3639111.90

Figure 4-3. Location of Highest Concentration receptors in each EJN and the Highest Overall in the Entire Modeling Domain



4.7.2 2050 No-build Conditions

For the 2050 No-build Alternative modeling analysis, all pollutants' highest concentration receptor locations again shared the same location at 592031.10m E, 3638105.40 m N. Figure 4-4 shows that this location, like in the 2015 Existing Conditions scenario, is at the southern end of the interchange right along the project boundary near a retail building complex just off of the I-26 southbound freeway.

Table 4-7 Location of Highest Concentration Receptor in the Modeling Domain for 2050 No-Build

Pollutant	Highest Receptor Concentration in Modeling Domain (μg/m³)	Location of Highest Concentration in Modeling Domain	
		Easting (m)	Northing (m)
1,3-Butadiene	2.84E-02	592031.10	3638105.40
2,2,4-Trimethylpentane	4.34E+01	592031.10	3638105.40
Acetaldehyde	2.42E+01	592031.10	3638105.40
Acrolein	2.62E+00	592031.10	3638105.40
Benzene	1.36E+02	592031.10	3638105.40
Diesel PM	1.22E+01	592031.10	3638105.40
Ethyl Benzene	4.87E+01	592031.10	3638105.40
Formaldehyde	5.57E+01	592031.10	3638105.40
Hexane	5.26E+02	592031.10	3638105.40
Propionaldehyde	1.75E+00	592031.10	3638105.40
Styrene	5.05E+00	592031.10	3638105.40
Toluene	2.21E+02	592031.10	3638105.40
Xylene	1.87E+02	592031.10	3638105.40

Also shown in Figure 4-4 are the highest receptor locations for the Highland Terrace, Liberty Park, and Russelldale EJNs. As was the case for the 2015 Existing Conditions scenario, for each pollutant modeled, the highest concentration in each EJN was lower than the highest receptor in the entire modeling domain (Table 4-8). For example, the 2050 No-build scenario highest concentration for benzene in the entire modeling domain is 136 micrograms per cubic meter whereas the highest concentrations in each EJN are:

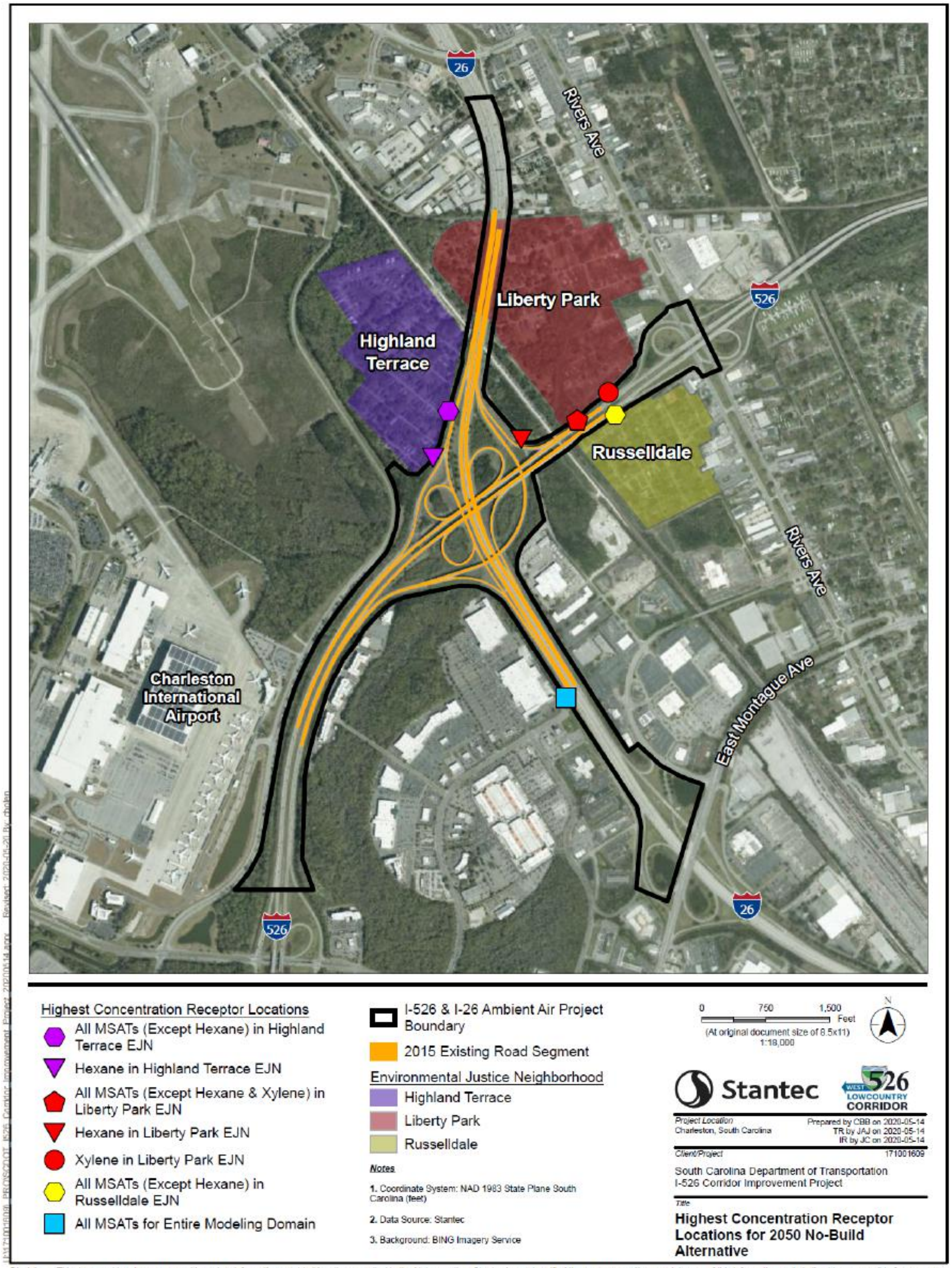
- Highland Terrace highest benzene concentration: 69.1 μg/m³
- Liberty Park highest benzene concentration: 131 μg/m³
- Russelldale highest benzene concentration: 87.3 μg/m³

It is important to note here that the overall concentrations of the pollutants modeled in both 2050 Alternatives are much lower than 2015 levels as was previously discussed in relation to the data presented in Table 4-4.

Table 4-8 Location of Highest Concentration Receptor in each EJN for 2050 No-Build Alternative

Pollutant	Highest Highland Terrace EJN Concentration (µg/m³)	Location of Highest Receptor in Highland Terrace EJN		Highest Liberty Park EJN Concentration (µg/m³)	Location of Highest Receptor in Liberty Park EJN		Highest Russelldale EJN Concentration (µg/m³)	Location of Highest Receptor in Russelldale EJN	
		Easting (m)	Northing (m)		Easting (m)	Northing (m)		Easting (m)	Northing (m)
1,3-Butadiene	1.39E-02	591613.60	3639125.70	2.60E-02	592072.00	3639096.20	1.77E-02	592207.40	3639111.90
2,2,4-Trimethylpentane	2.23E+01	591613.60	3639125.70	4.17E+01	592072.00	3639096.20	2.76E+01	592207.40	3639111.90
Acetaldehyde	1.24E+01	591613.60	3639125.70	2.31E+01	592072.00	3639096.20	1.53E+01	592207.40	3639111.90
Acrolein	1.34E+00	591613.60	3639125.70	2.51E+00	592072.00	3639096.20	1.67E+00	592207.40	3639111.90
Benzene	6.91E+01	591613.60	3639125.70	1.31E+02	592072.00	3639096.20	8.73E+01	592207.40	3639111.90
Diesel PM	6.62E+00	591613.60	3639125.70	1.22E+01	592072.00	3639096.20	8.34E+00	592207.40	3639111.90
Ethyl Benzene	2.51E+01	591613.60	3639125.70	4.68E+01	592072.00	3639096.20	3.11E+01	592207.40	3639111.90
Formaldehyde	2.85E+01	591613.60	3639125.70	5.33E+01	592072.00	3639096.20	3.55E+01	592207.40	3639111.90
Hexane	1.82E+02	591559.90	3638955.00	2.67E+02	591873.30	3639020.60	2.01E+02	592076.90	3639022.30
Propionaldehyde	8.98E-01	591613.60	3639125.70	1.68E+00	592072.00	3639096.20	1.12E+00	592207.40	3639111.90
Styrene	2.60E+00	591613.60	3639125.70	4.85E+00	592072.00	3639096.20	3.22E+00	592207.40	3639111.90
Toluene	1.13E+02	591613.60	3639125.70	2.12E+02	592072.00	3639096.20	1.41E+02	592207.40	3639111.90
Xylene	9.59E+01	591613.60	3639125.70	1.75E+02	592183.70	3639191.00	1.19E+02	592207.40	3639111.90

Figure 4-4. Location of Highest Concentration Receptor in each EJN and for the Entire Modeling Domain for the 2050 No-Build Alternative



Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

4.7.3 2050 Build Conditions

For the 2050 Build Alternative modeling analysis, all pollutants' highest concentration receptor locations consisted of four groups of pollutants:

- Group 1: 1,3-Butadiene, 2,2,4-Trimethylpentane, Acetaldehyde, Diesel PM, Formaldehyde, Propionaldehyde, Styrene, Toluene, and Xylene located at 592054.30 m E, 3638066.80 m N;
- Group 2: Acrolein located at 592653.10 m E, 3639437.20 m N;
- Group 3: Benzene and Ethyl Benzene located at 591570.00 m E, 3639108.90 m N;
- Group 4: Hexane located at 591808.00 m E, 3639916.30 m N.

Figure 4-5 shows that Group 1 pollutants' highest concentration receptor, similar to the 2015 Existing Conditions and 2050 No-build scenarios, is at the southern end of the interchange right along the project boundary near a retail building complex just off of the I-26 southbound freeway. Group 2 pollutants (only Acrolein) highest concentration receptor is located at the eastern edge of the project boundary. Group 4 pollutants' (only Hexane) highest concentration receptor is located at the northern end of the interchange just outside of the Liberty Park EJN.

Group 3 pollutants' highest concentration receptor is located at the eastern edge of the Highland Terrace EJN. The domain-wide highest concentration receptor for Group 3 pollutants Benzene and Ethyl Benzene is the same location as the highest receptor within the Highland Terrace EJN for these pollutants. This result indicates that residents of the EJN are experiencing the highest concentrations of these pollutants in the entire modeling domain during morning rush hour.

Figure 4-5 also shows the locations of the highest concentration receptor for each pollutant within each EJN. Tables 4-9 and 4-10 present the highest concentrations and accompanying receptor locations for the entire modeling domain (Table 4-9) and for each EJN (Table 4-10).

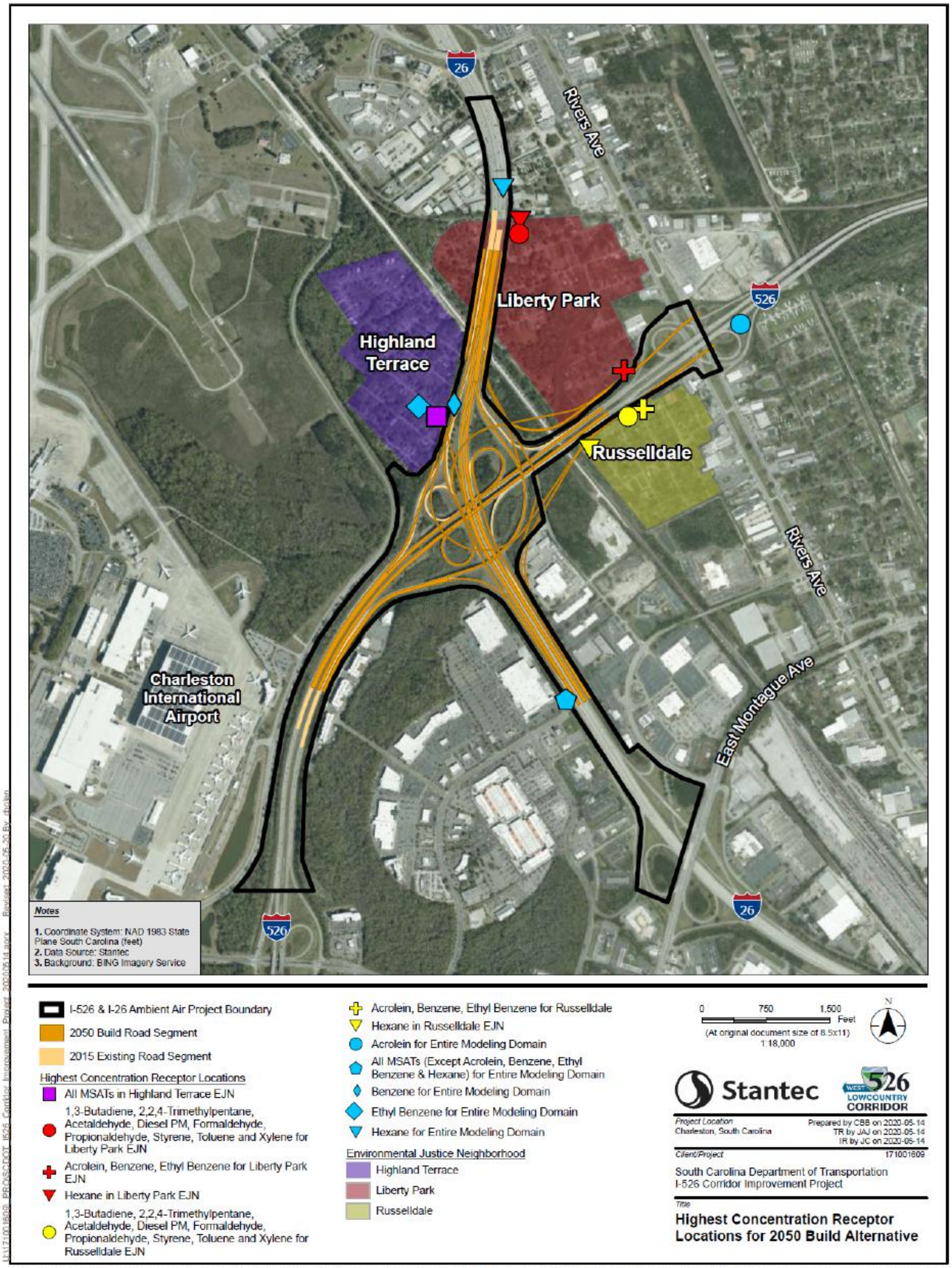
Table 4-9. Location of Highest Concentration Receptor in the Entire Modeling Domain for 2050 Build Alternative

Pollutant	Highest Receptor Concentration in Modeling Domain (µg/m³)	Location of Highest Concentration in Modeling Domain	
		Easting (m)	Northing (m)
1,3-Butadiene	4.01E-02	592054.30	3638066.80
2,2,4-Trimethylpentane	6.68E+01	592054.30	3638066.80
Acetaldehyde	3.69E+01	592054.30	3638066.80
Acrolein	3.04E+00	592653.10	3639437.20
Benzene	1.17E+02	591570.00	3639108.90
Diesel PM	1.90E+01	592054.30	3638066.80
Ethyl Benzene	4.19E+01	591570.00	3639108.90
Formaldehyde	8.50E+01	592054.30	3638066.80
Hexane	4.64E+02	591808.00	3639916.30
Propionaldehyde	2.69E+00	592054.30	3638066.80
Styrene	7.79E+00	592054.30	3638066.80
Toluene	3.40E+02	592054.30	3638066.80
Xylene	2.87E+02	592054.30	3638066.80

Table 4-10 Location of Highest Concentration Receptor in each EJN for 2050 Build Alternative

Pollutant	Highest Highland Terrace EJN Concentration (µg/m³)	Location of Highest Receptor in Highland Terrace EJN		Highest Liberty Park EJN Concentration (µg/m³)	Location of Highest Receptor in Liberty Park EJN		Highest Russelldale EJN Concentration (µg/m³)	Location of Highest Receptor in Russelldale EJN	
		Easting (m)	Northing (m)		Easting (m)	Northing (m)		Easting (m)	Northing (m)
1,3-Butadiene	1.71E-02	591570.00	3639108.90	1.80E-02	591865.50	3639776.70	8.68E-03	592253.50	3639108.20
2,2,4-Trimethylpentane	2.77E+01	591570.00	3639108.90	3.05E+01	591865.50	3639776.70	1.45E+01	592253.50	3639108.20
Acetaldehyde	1.54E+01	591570.00	3639108.90	1.68E+01	591865.50	3639776.70	8.02E+00	592253.50	3639108.20
Acrolein	2.54E+00	591570.00	3639108.90	1.94E+00	592238.80	3639271.20	2.82E+00	592288.30	3639134.40
Benzene	1.17E+02	591570.00	3639108.90	8.35E+01	592238.80	3639271.20	3.98E+01	592288.30	3639134.40
Diesel PM	7.80E+00	591570.00	3639108.90	8.65E+00	591865.50	3639776.70	4.13E+00	592253.50	3639108.20
Ethyl Benzene	4.19E+01	591570.00	3639108.90	2.98E+01	592238.80	3639271.20	1.54E+01	592288.30	3639134.40
Formaldehyde	3.54E+01	591570.00	3639108.90	3.86E+01	591865.50	3639776.70	1.84E+01	592253.50	3639108.20
Hexane	1.79E+02	591570.00	3639108.90	4.05E+02	591868.90	3639800.30	1.10E+02	592116.90	3638987.80
Propionaldehyde	1.12E+00	591570.00	3639108.90	1.22E+00	591865.50	3639776.70	5.83E-01	592253.50	3639108.20
Styrene	3.23E+00	591570.00	3639108.90	3.55E+00	591865.50	3639776.70	1.69E+00	592253.50	3639108.20
Toluene	1.41E+02	591570.00	3639108.90	1.55E+02	591865.50	3639776.70	7.37E+01	592253.50	3639108.20
Xylene	1.19E+02	591570.00	3639108.90	1.31E+02	591865.50	3639776.70	6.24E+01	592253.50	3639108.20

Figure 4-5. Locations of Highest Concentration Receptors in each EJN and for the Entire Modeling Domain for the 2050 Build Alternative



4.8 Conclusion

In conclusion, modeled concentrations of all MSAT pollutants are projected to experience significant reductions between 2015 and 2050 regardless of which alternative is selected. These reductions, in large part, are due to the tiered emission reduction requirements imposed on auto makers doing business within the United States. For most of the pollutant-alternative combinations examined in this analysis, the highest impact location with respect to MSAT concentrations is not located in any of the studied EJNs with the noted exception being concentrations of benzene and ethyl benzene in the Highland Terrace EJN for the 2050 Build Alternative. For this Build Alternative, several single-lane or multi-lane ramps with relatively low rates of average speed will be located very close to the location of highest impact in Highland Terrace.

The absolute concentrations of these two pollutants will experience a greater reduction in the 2050 Build scenario than in the 2050 No-build scenario. Between 2015 and 2050, concentrations of benzene are projected to experience an 88.46 % reduction in the No-build scenario whereas the projected reduction for the Build scenario is marginally higher, at 90.11 %. For ethyl benzene, the projected reduction in the No-build scenario is 92.26 % and that for the Build scenario is, again, marginally higher at 93.34 %.

5.1 HISTORICAL METEOROLOGICAL DATA

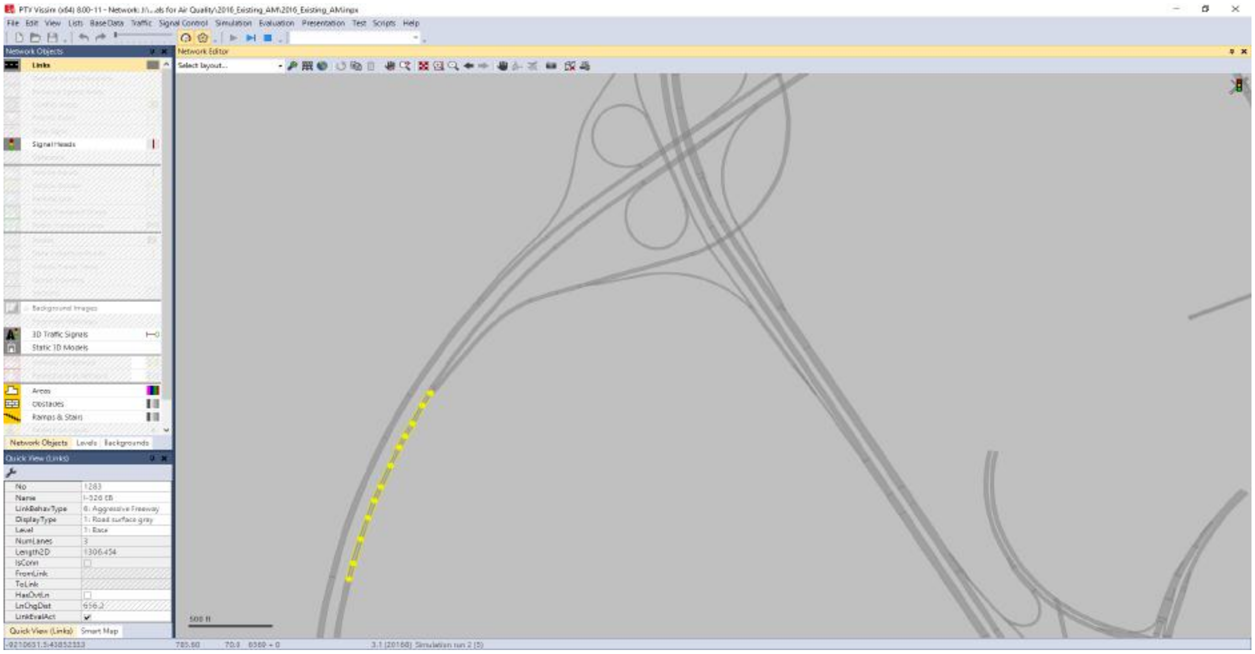
Table 5-1. Historical Meteorological Data

Year	Charleston Area Average Monthly Temperatures (Deg F)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
2000	47.3	53.1	60.9	62.8	75.5	79.7	81.5	80.2	75.2	64.9	55.3	42.6
2001	46.4	54.6	56.5	65.1	72.5	78.9	79.8	80.9	73.5	64.8	63.6	56.3
2002	51.3	51.8	60.4	69.5	71.4	78.7	82.7	79.6	79	70.6	56	48.3
2003	44.7	50.8	61.2	64.7	73.9	78.9	81.3	81.5	74.6	66.8	62.1	47
2004	46.3	47.8	59.7	64.9	75.7	80.4	82.7	79.3	76.4	69	59.9	49.7
2005	50.7	51.6	55.8	63.2	69.9	78.6	83.5	82.1	79.2	67.7	60	49.1
2006	54.1	50	57.1	68.1	72.2	78.4	82.1	82.6	75.5	65	57.6	56.4
2007	52.4	49.7	60.8	64.1	71.3	78.5	80.6	83.7	77.5	71.6	57.5	57
2008	48.9	55.2	58.6	65	71.7	81.2	81.1	81.2	76.2	64.5	54.5	56
2009	48.2	49.8	58	64.5	73.3	80.9	80.9	81.6	76.6	67.5	58.8	50.9
2010	44.5	45.9	55.9	66.9	75.5	83.4	82.7	83.3	78.8	68.4	58.2	42.7
2011	44.4	54.8	60	68.8	74.4	83.3	83.7	83.2	76.7	64.3	59.1	54.9
2012	52.7	55.3	65.3	67.1	75	76.1	83.7	80.3	76.4	67.2	53.4	55.4
2013	55.3	51.4	52.9	65.4	71.7	80.2	81.9	81.3	77.2	68.8	57.1	56.3
2014	45.6	53.4	55	68.1	76.1	82	83	83	78.3	69.8	54.8	53.1
2015	48.6	45.5	59.9	68.3	73.3	82.3	83.3	81.3	77.6	67.3	63.1	63.5
2016	47.8	52.2	64.3	66	73.8	82.3	86.2	83.8	79.8	70.2	59.6	54.8
2017	56.6	59.4	59.1	70.1	74.3	78.4	82.1	81.6	77.7	69.8	58.1	51.4
2018	45.3	62	56.5	63.7	76	82.3	82.3	82.4	81.5	71.5	58.3	53.3
2019	50.9	58.3	58.1	66.3	78.1	79.5	82.5	81.9	79.3	72	54.4	55.2
20-Year Average Temperature	49.1	52.63	58.8	66.13	73.78	80.2	82.38	81.74	77.35	68.09	58.07	52.70
Avg of January Temps for Input into MOVES2014b	49.1											

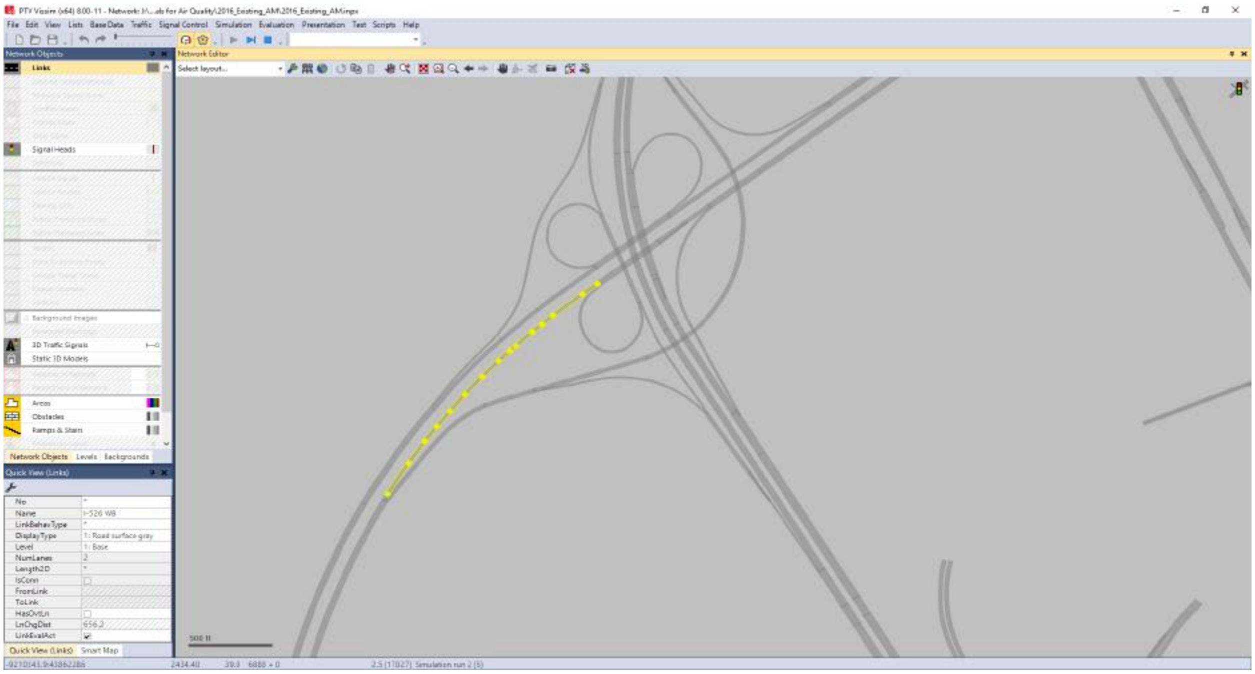
5.2 VISSIM Link-Level Traffic Data

In the sections below, each link is shown in a screenshot from VISSIM traffic modeling software along with link-specific model outputs for link length in feet, link traffic volume in vehicles per hour, and average link speed in miles per hour. This data was used in MOVES2014b, along with inputs described in Section 2.0 to generate link-level emission factors for every link in all three scenarios modeled.

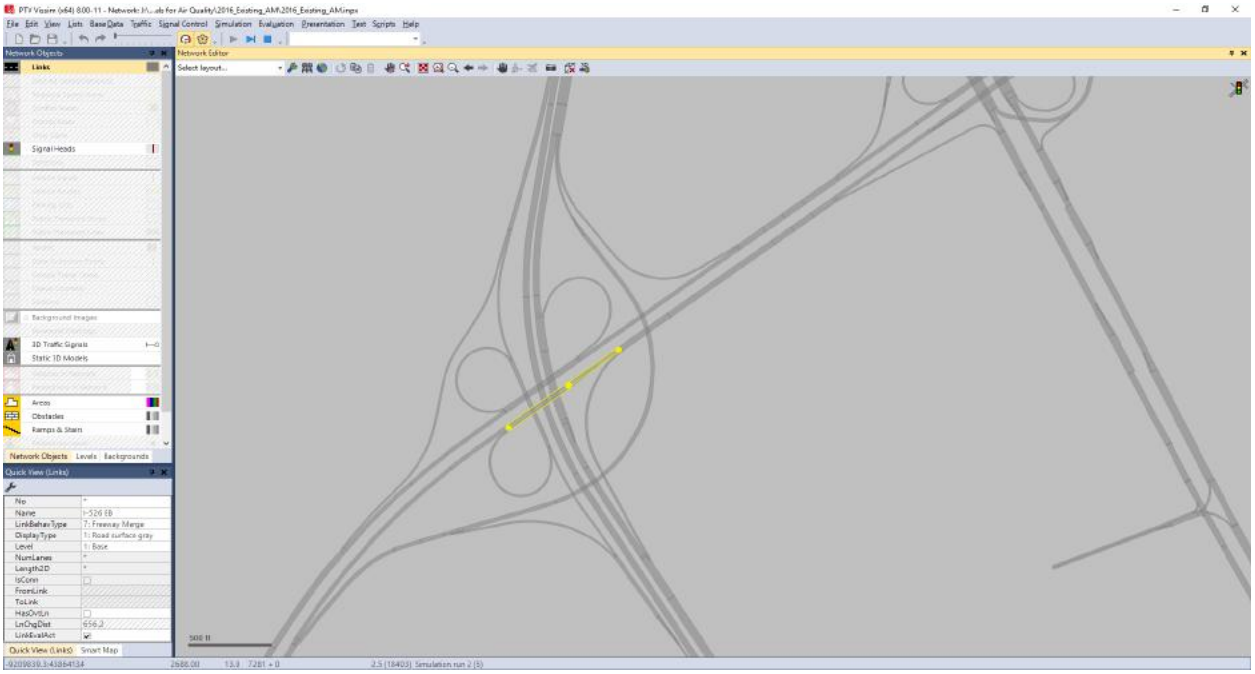
5.2.1 2015 Existing and 2050 No-Build Scenarios



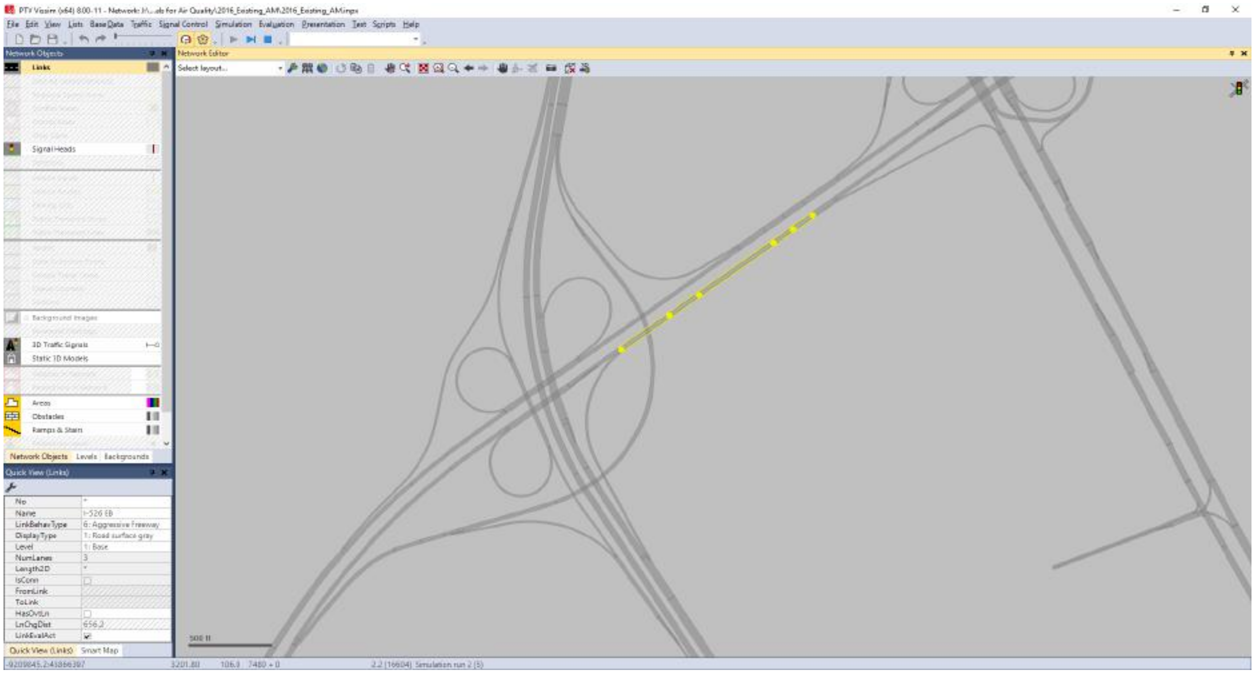
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I526 EB1	2015 Existing	1306	3218	56.7
I526 EB1	2050 No-build	1306	3899	54.8



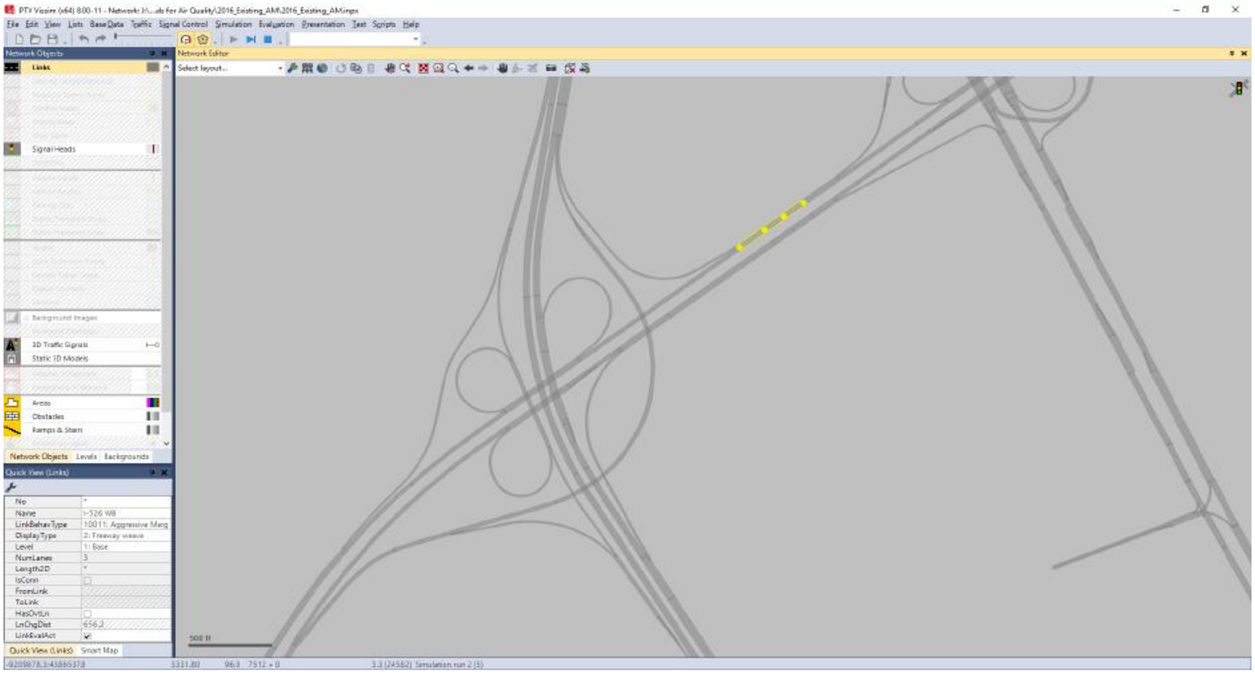
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I526 EB2	2015 Existing	1839	1113	57.6
I526 EB2	2050 No-build	1839	1806	28.4



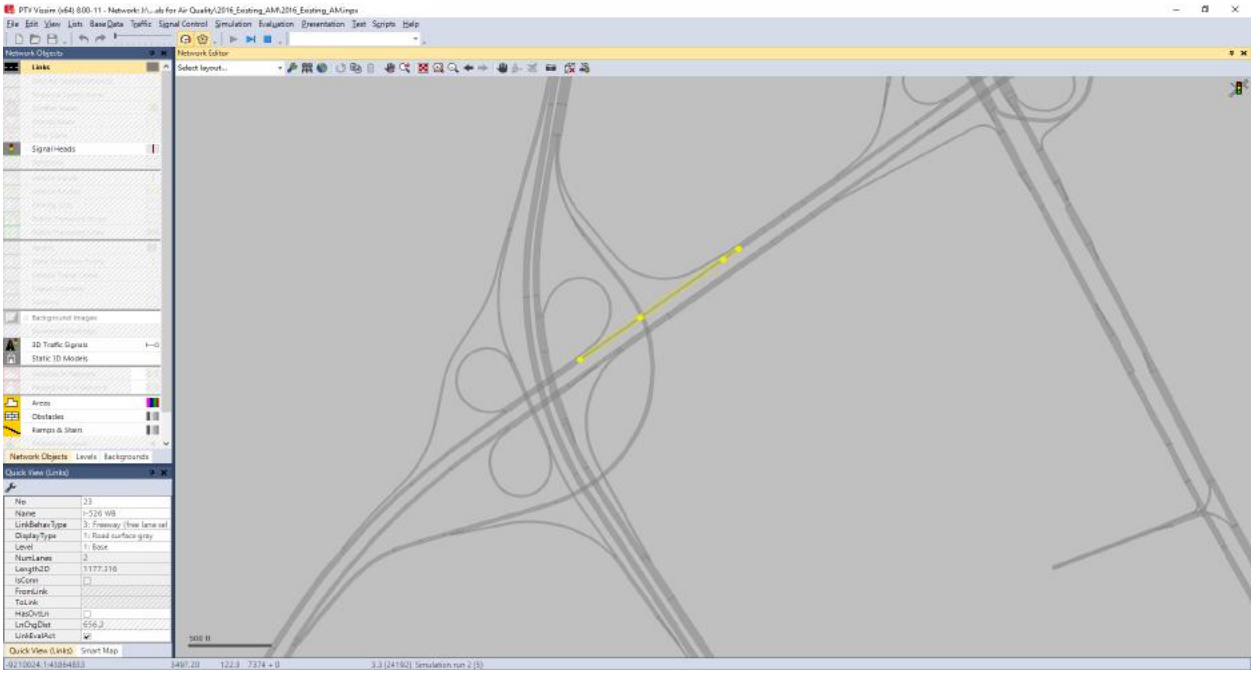
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I526 EB3	2015 Existing	816	2389	45.3
I526 EB3	2050 No-build	816	2371	9.2



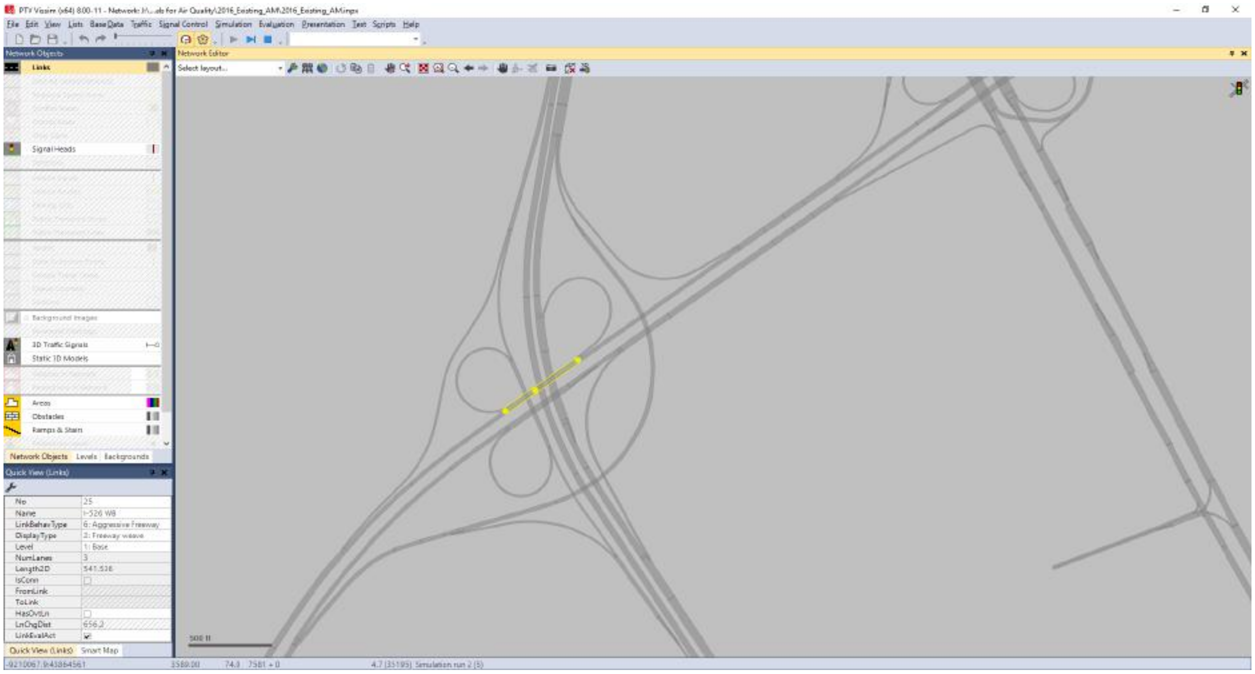
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I526 EB4	2015 Existing	1421	2958	45.2
I526 EB4	2050 No-build	1421	3176	12.3



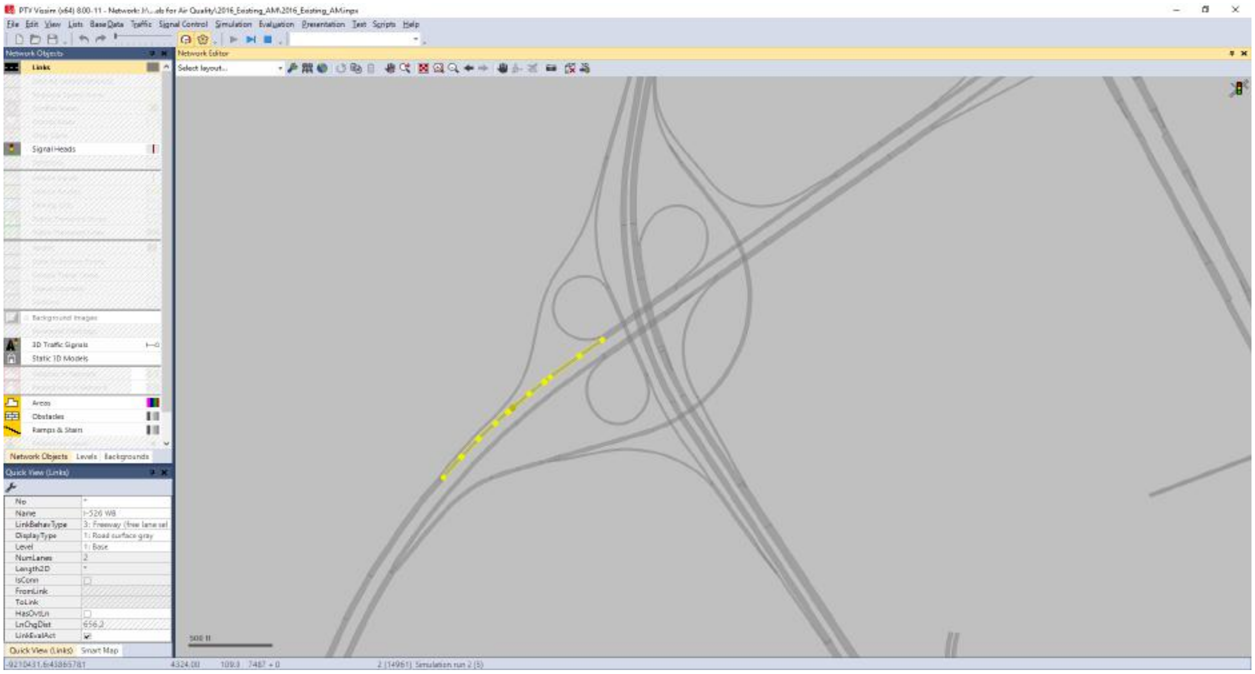
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I526 WB1	2015 Existing	471	3855	45.8
I526 WB1	2050 No-build	471	3966	45.7



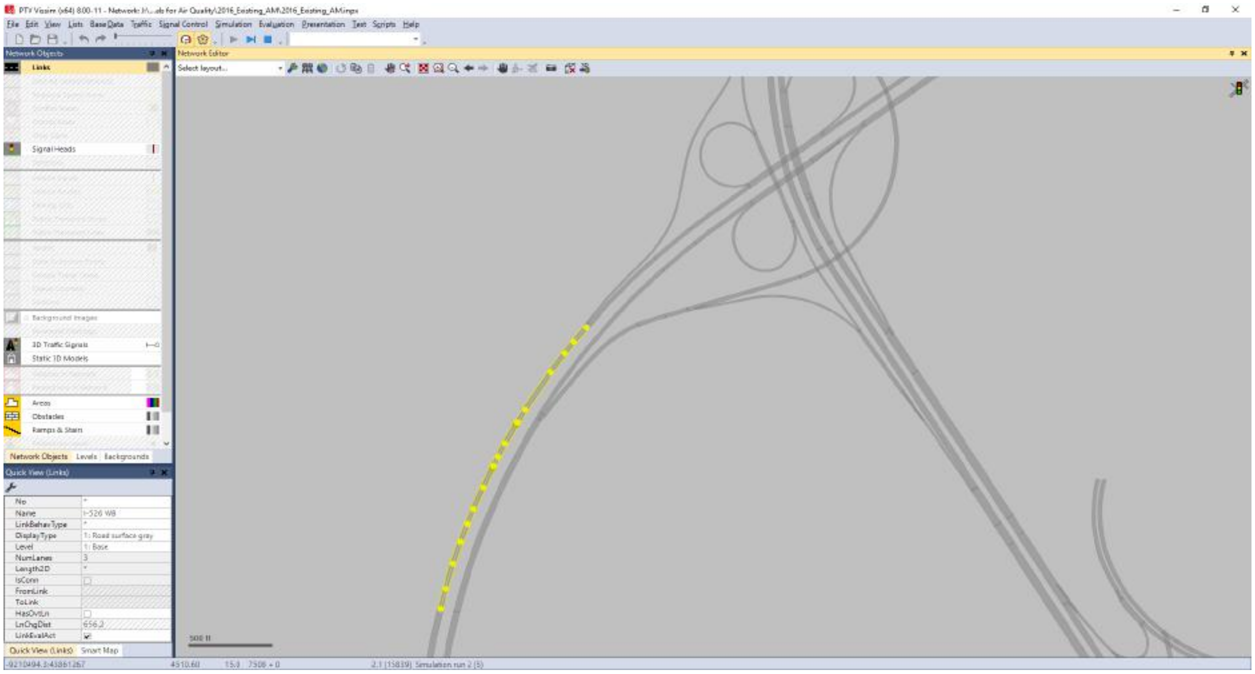
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I526 WB2	2015 Existing	1177	2453	52.4
I526 WB2	2050 No-build	1177	2851	47.1



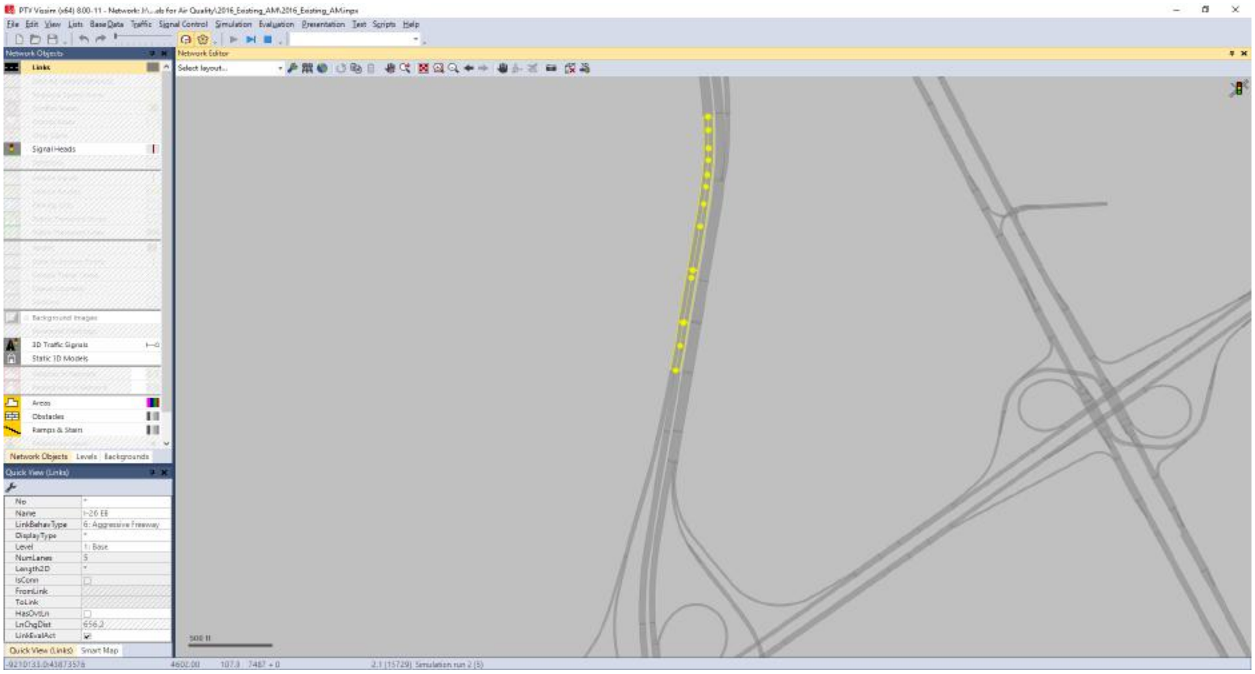
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I526 WB3	2015 Existing	542	2700	50.7
I526 WB3	2050 No-build	542	3572	38.2



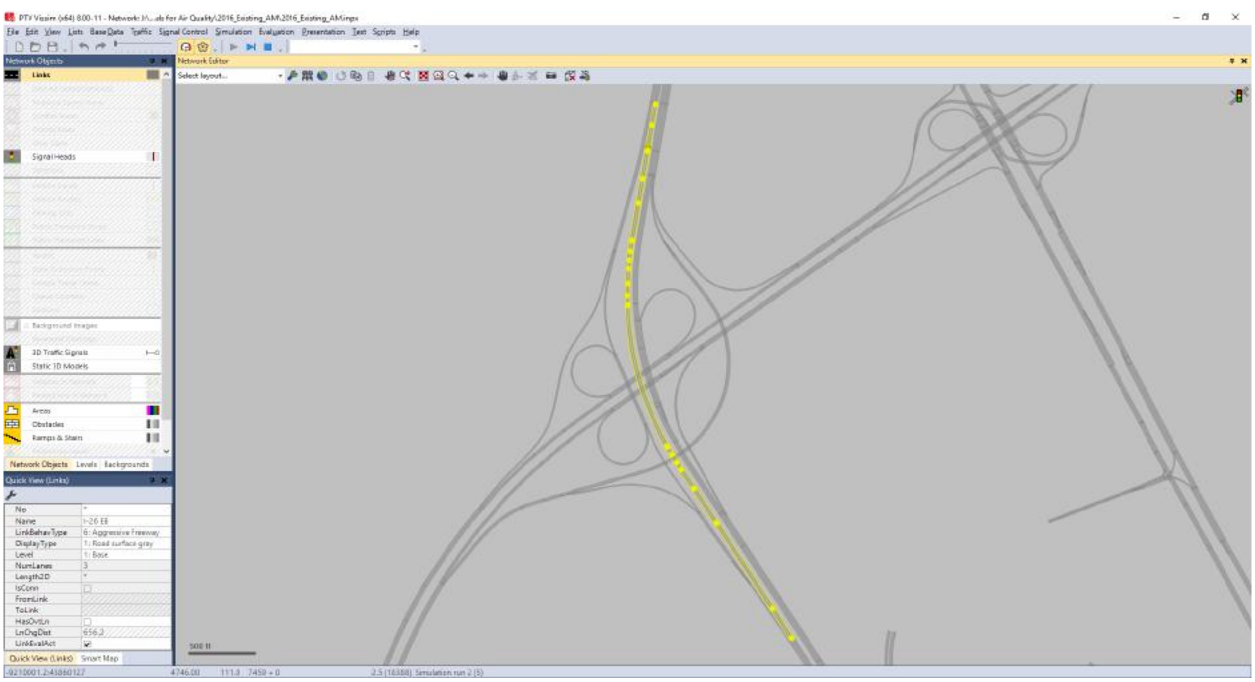
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I526 WB4	2015 Existing	1289	1876	55.8
I526 WB4	2050 No-build	1289	3019	43.7



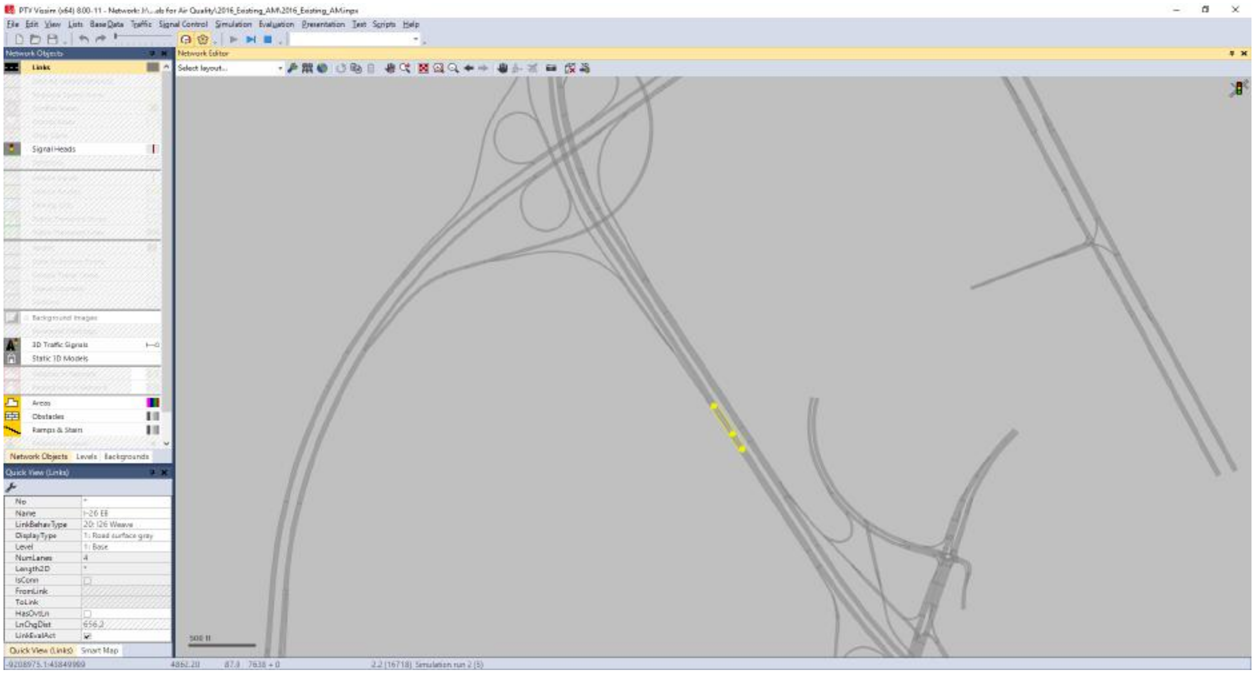
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I526 WB5	2015 Existing	1990	3633	56.4
I526 WB5	2050 No-build	1990	3982	33.7



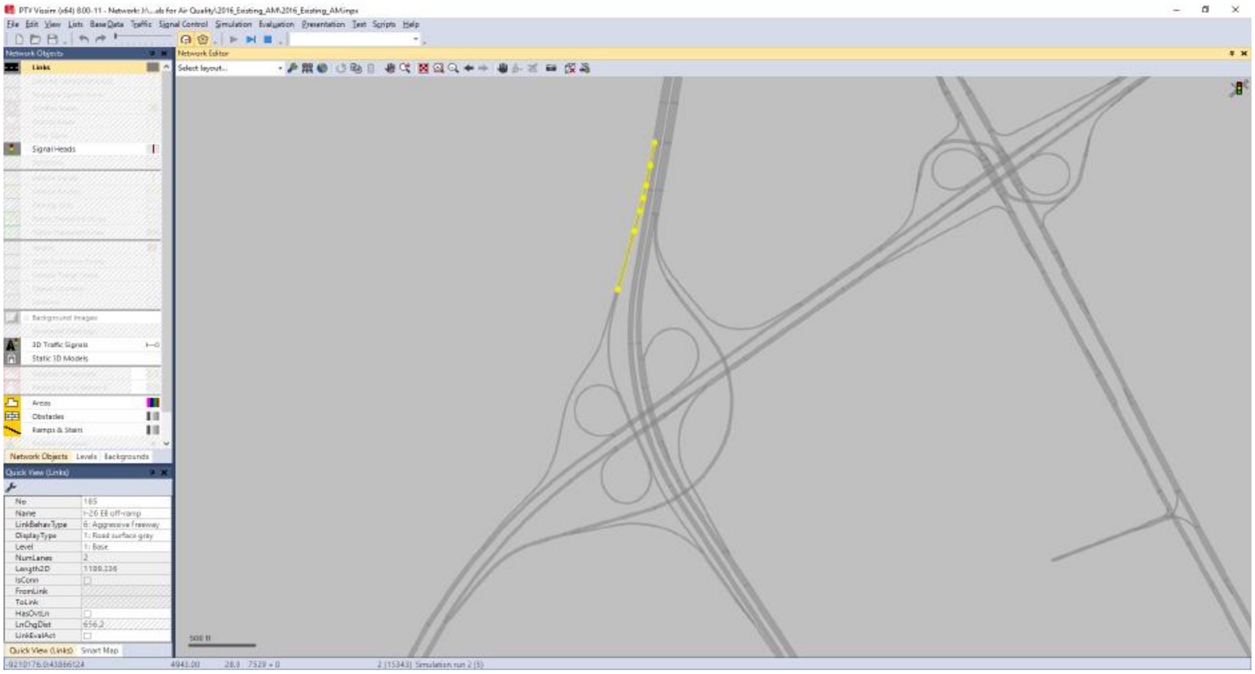
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I26 EB1	2015 Existing	1609	7912	51.2
I26 EB1	2050 No-build	1609	5008	10.0



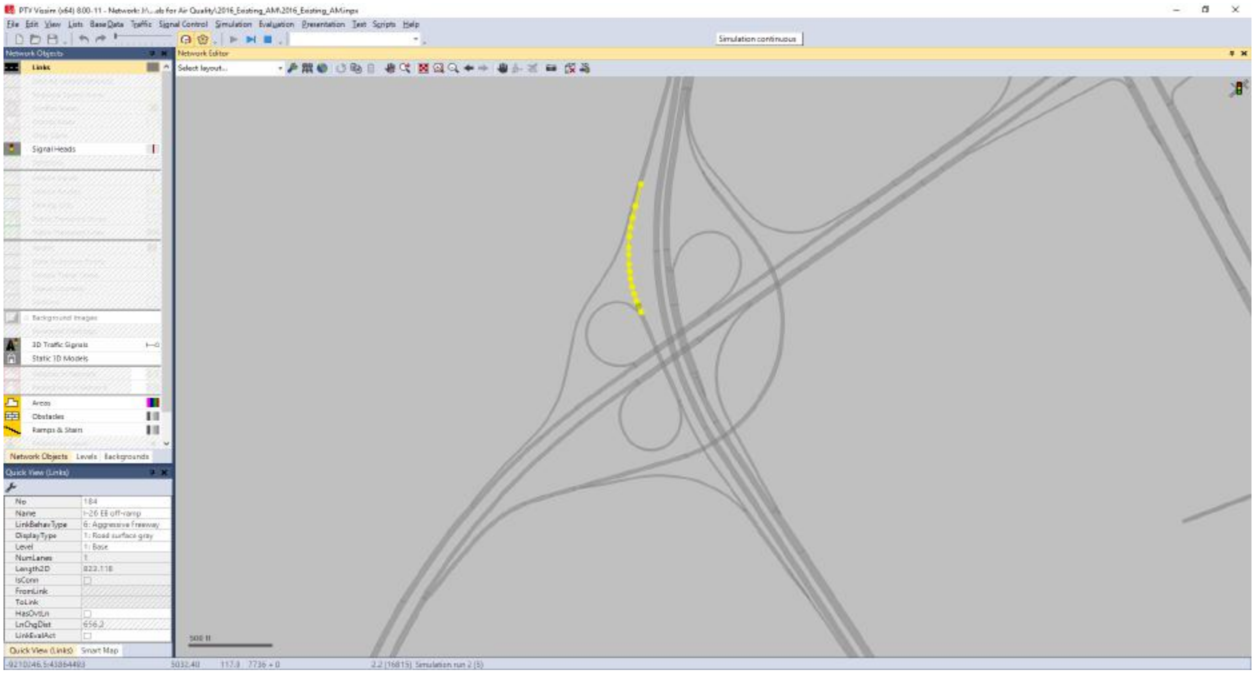
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I26 EB2	2015 Existing	4515	4886	57.7
I26 EB2	2050 No-build	4515	3448	33.9



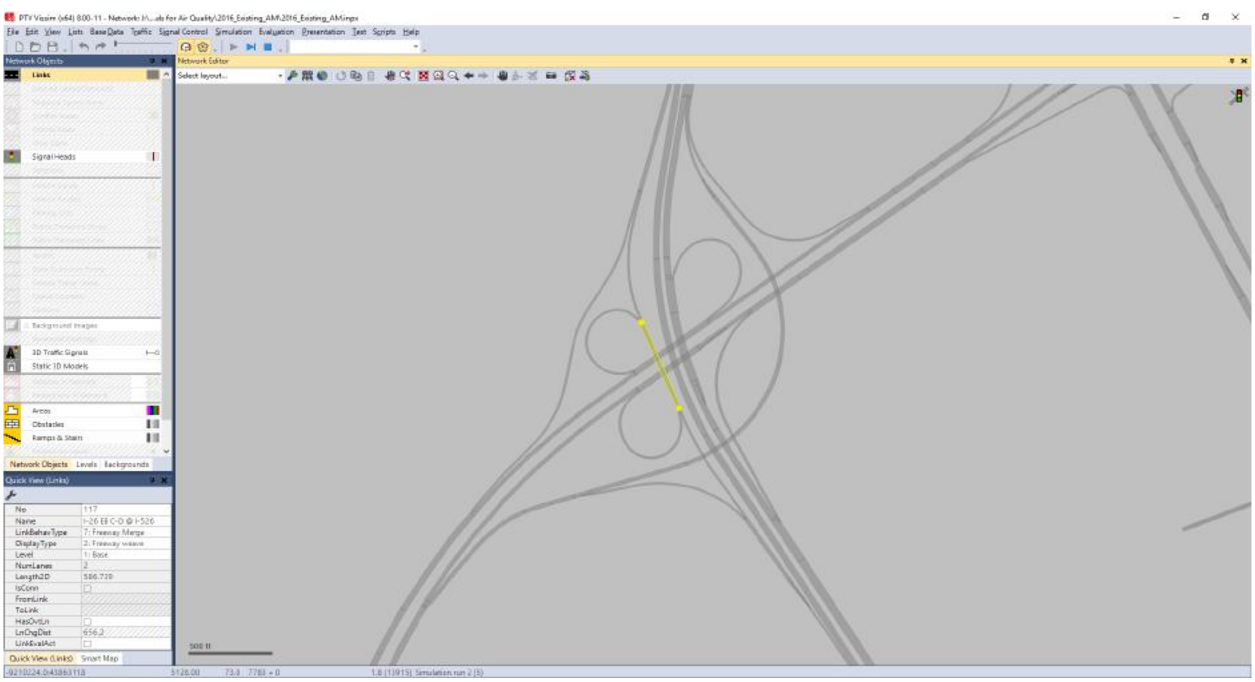
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I26 EB3	2015 Existing	398	6171	58.7
I26 EB3	2050 No-build	398	4890	24.6



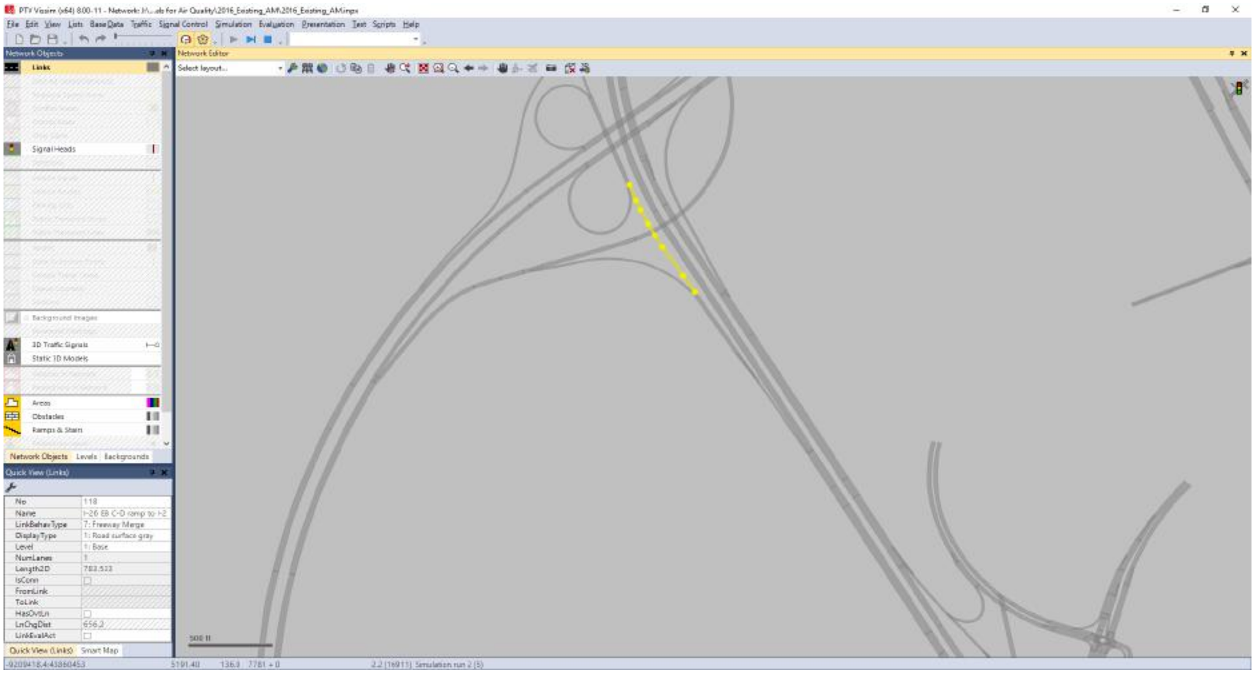
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I26 EB4	2015 Existing	1189	3052	38.6
I26 EB4	2050 No-build	1189	1529	8.3



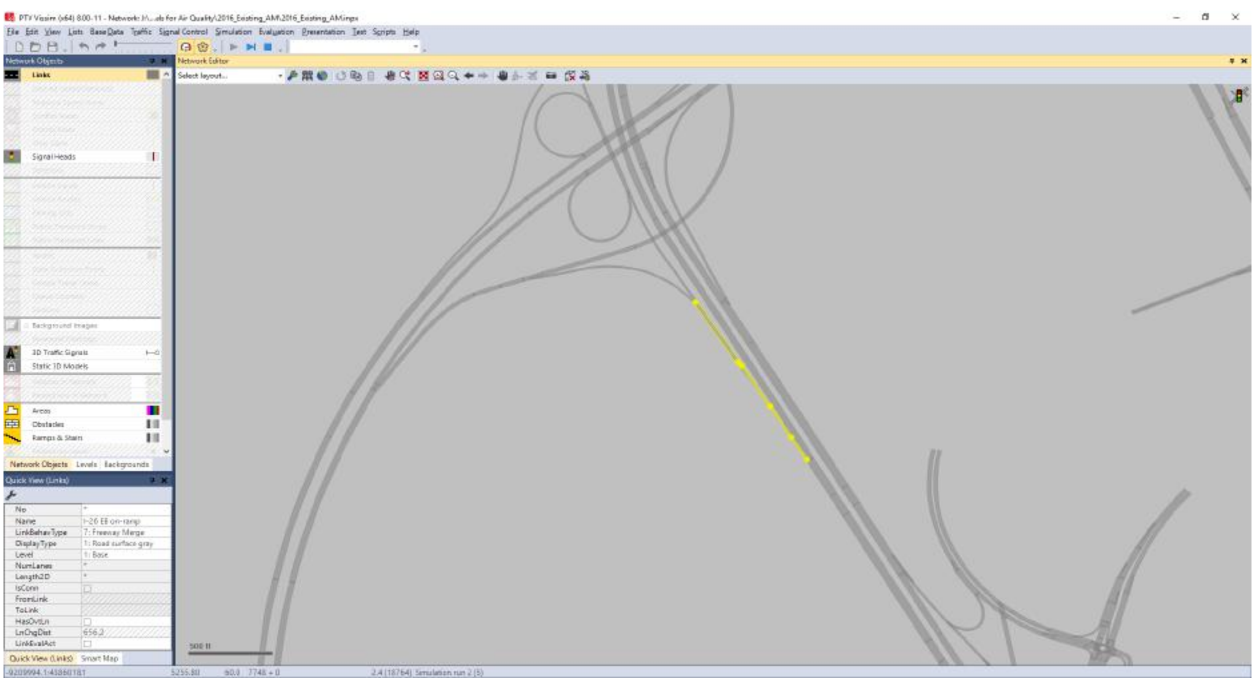
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I26 EB5	2015 Existing	823	1299	16.9
I26 EB5	2050 No-build	823	623	4.0



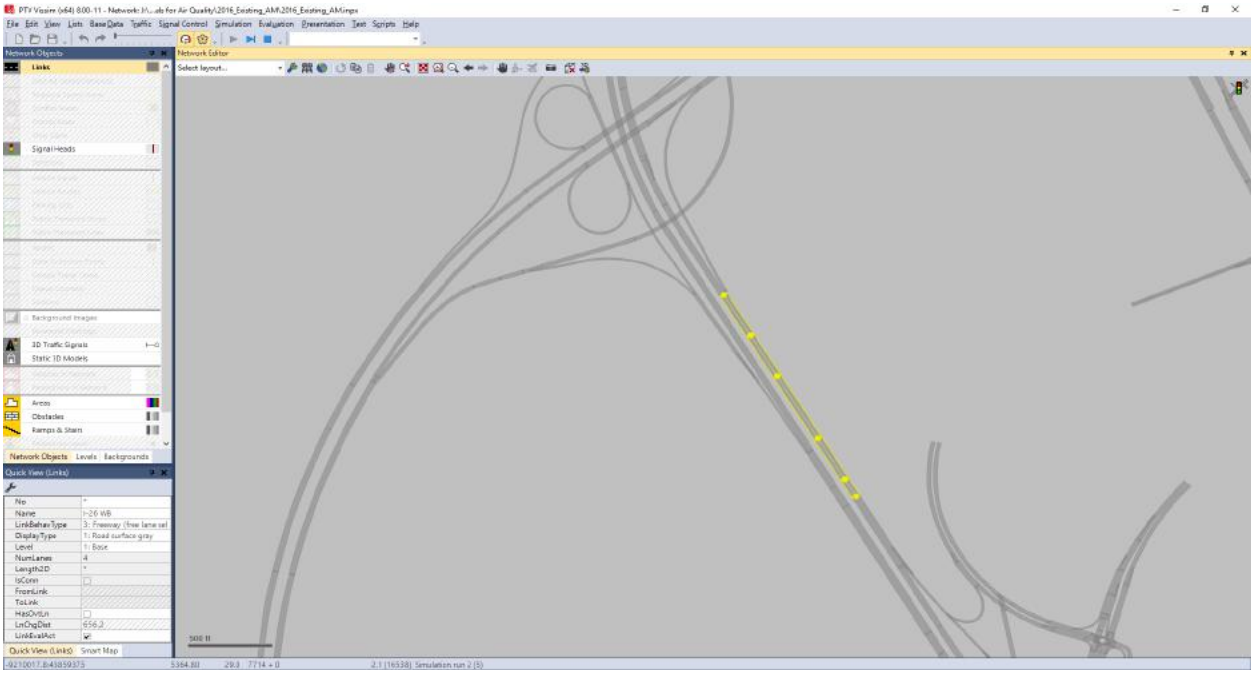
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I26 EB6	2015 Existing	587	2131	24.5
I26 EB6	2050 No-build	587	1174	6.1



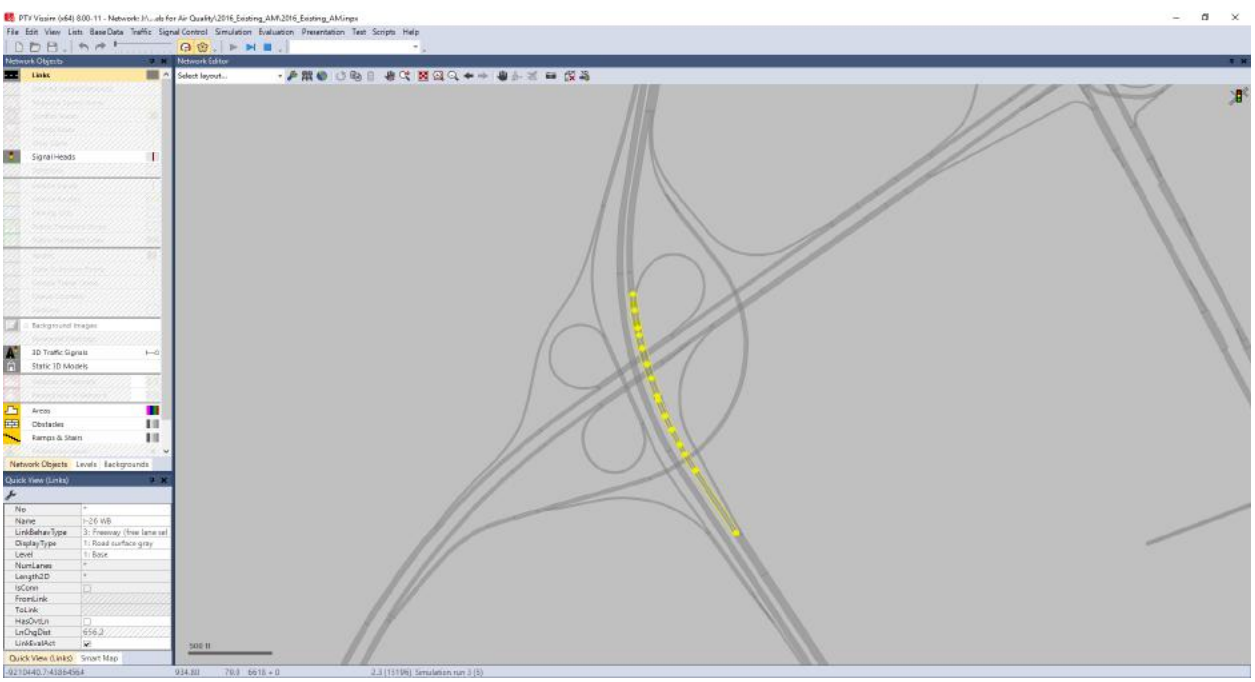
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I26 EB7	2015 Existing	784	833	53.3
I26 EB7	2050 No-build	784	561	45.4



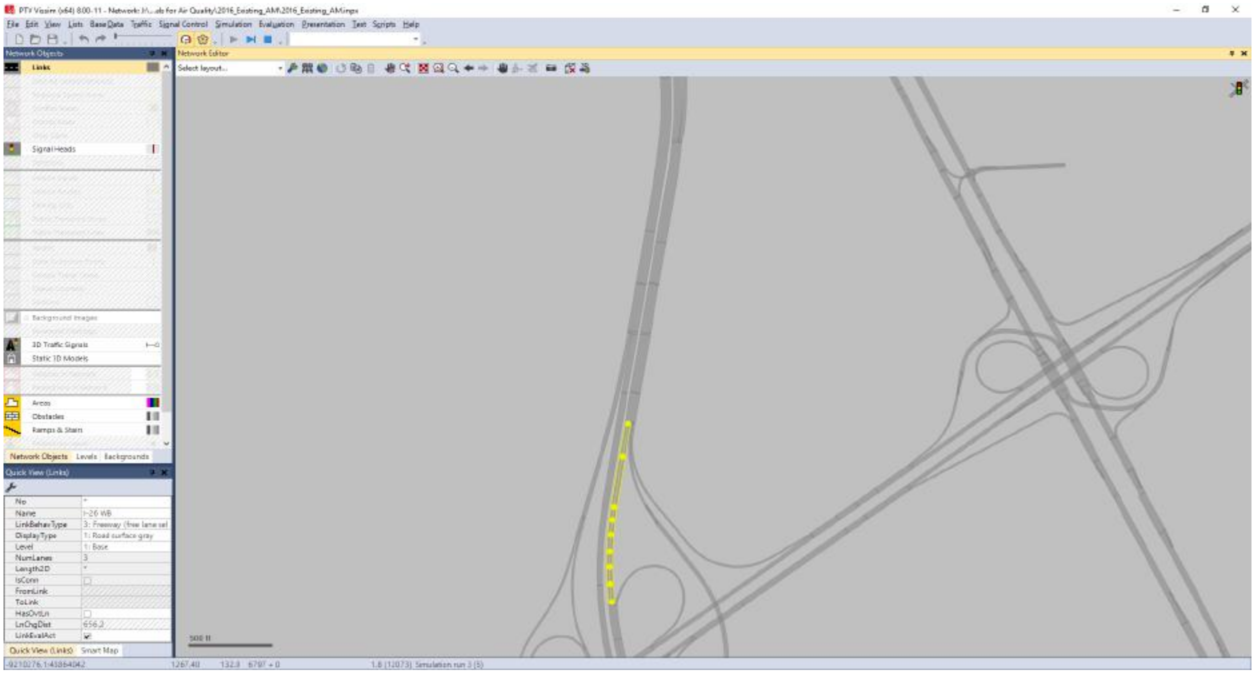
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I26 EB8	2015 Existing	1164	1330	53.3
I26 EB8	2050 No-build	1164	1378	28.7



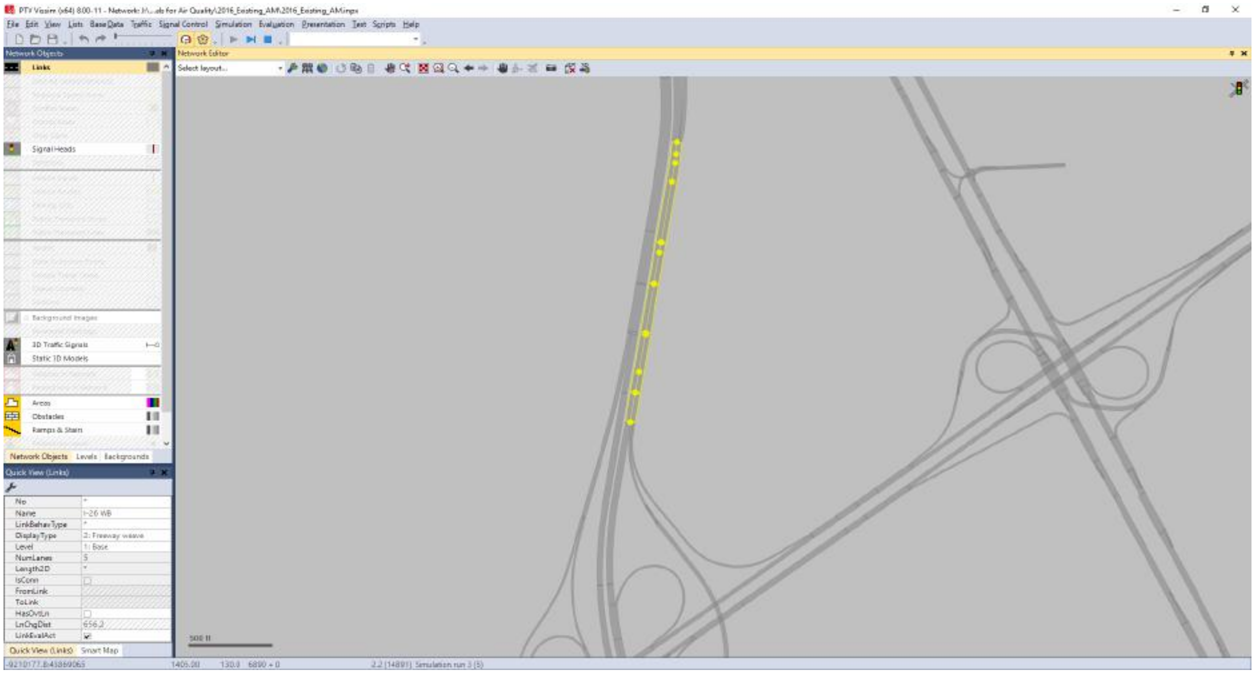
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I26 WB1	2015 Existing	1489	2803	62.4
I26 WB1	2050 No-build	1489	3969	60.2



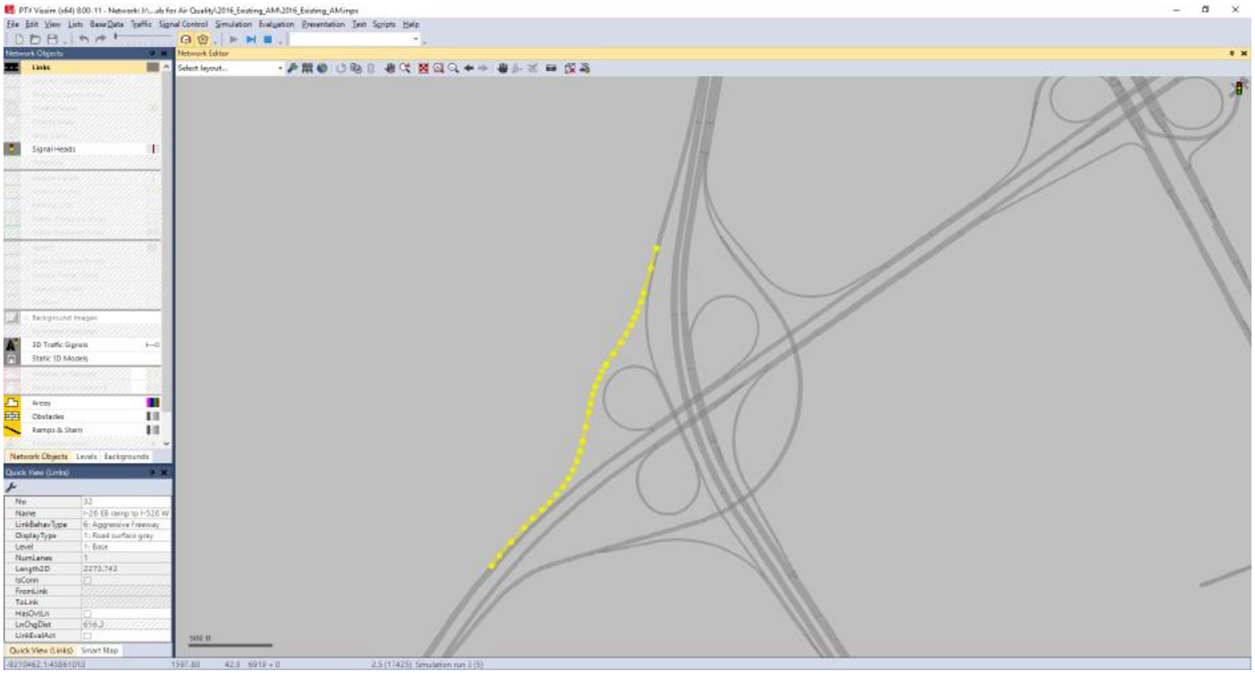
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I26 WB2	2015 Existing	1618	2234	62.5
I26 WB2	2050 No-build	1618	3152	60.7



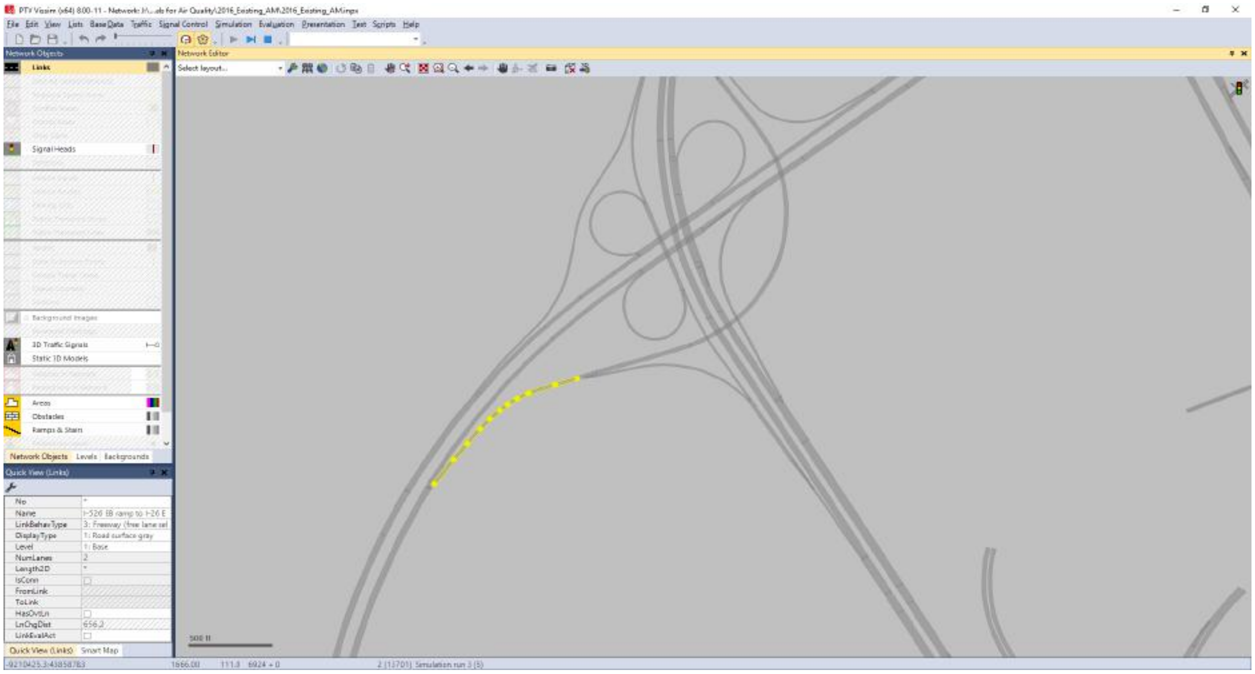
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I26 WB3	2015 Existing	1130	1988	63.4
I26 WB3	2050 No-build	1130	2432	63.1



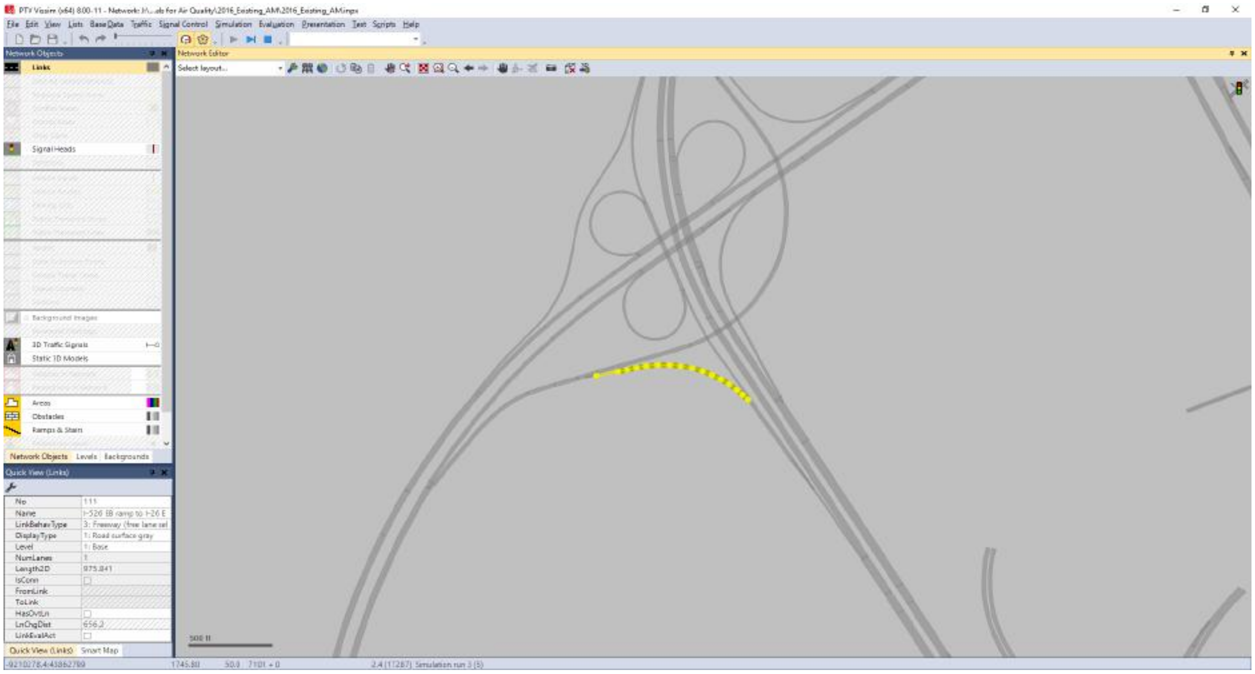
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
I26 WB4	2015 Existing	1764	4997	61.1
I26 WB4	2050 No-build	1764	4823	62.0



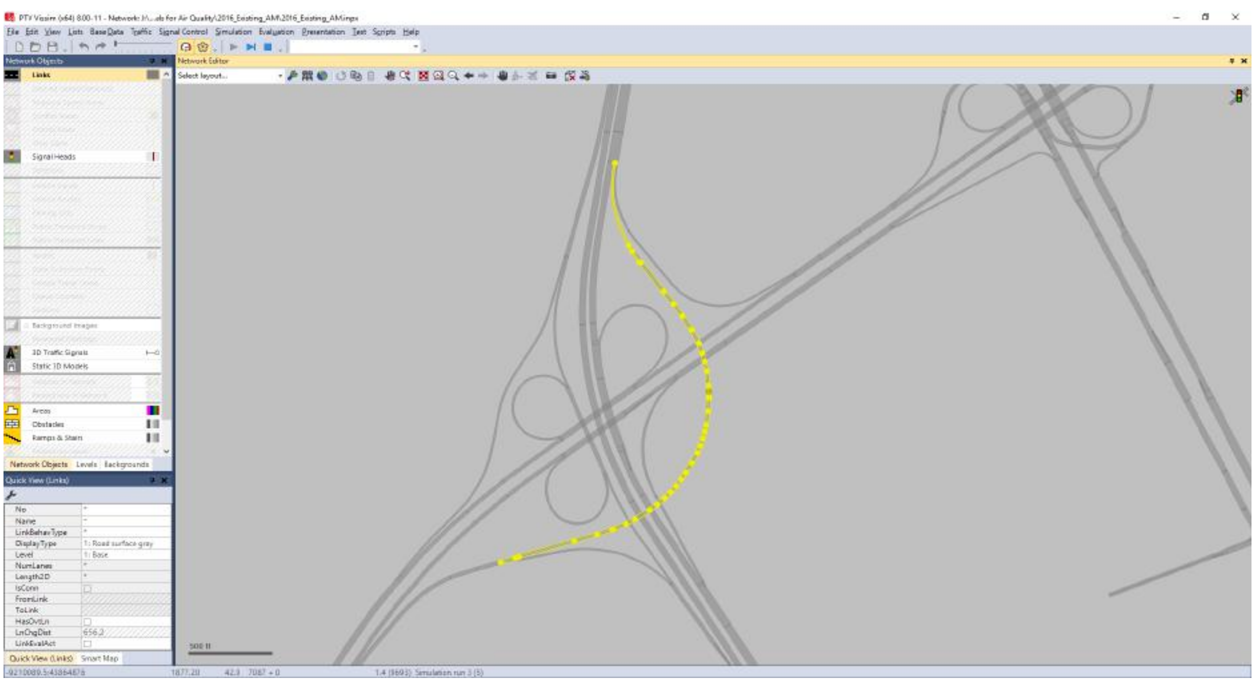
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
526-26 R1	2015 Existing	2274	1753	48.9
526-26 R1	2050 No-build	2274	903	34.3



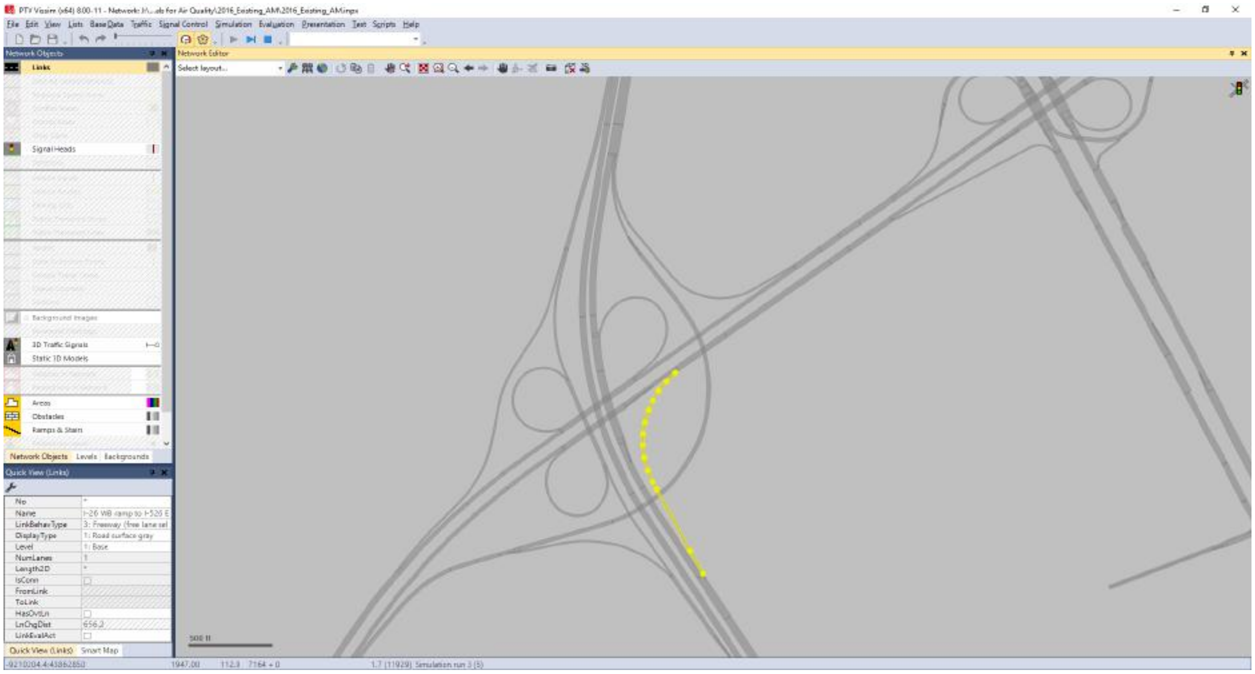
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
526-26 R2	2015 Existing	1116	2100	55.4
526-26 R2	2050 No-build	1116	2087	54.2



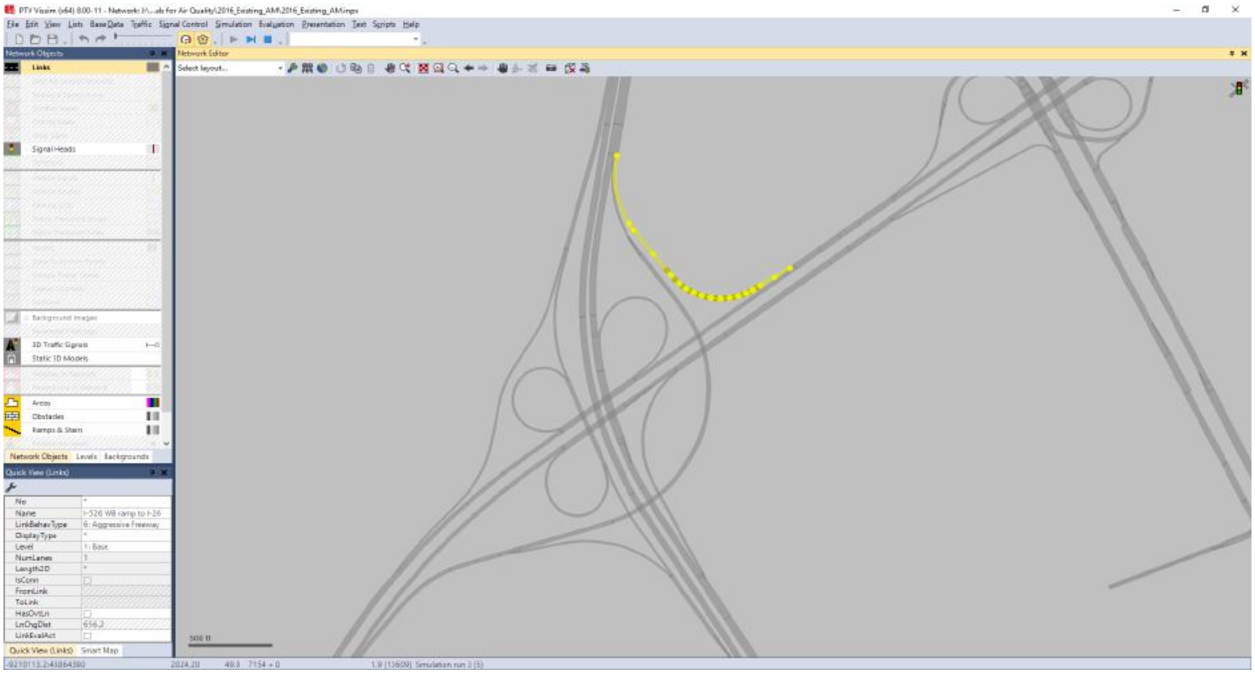
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
526-26 R3	2015 Existing	976	501	35.7
526-26 R3	2050 No-build	976	808	32.2



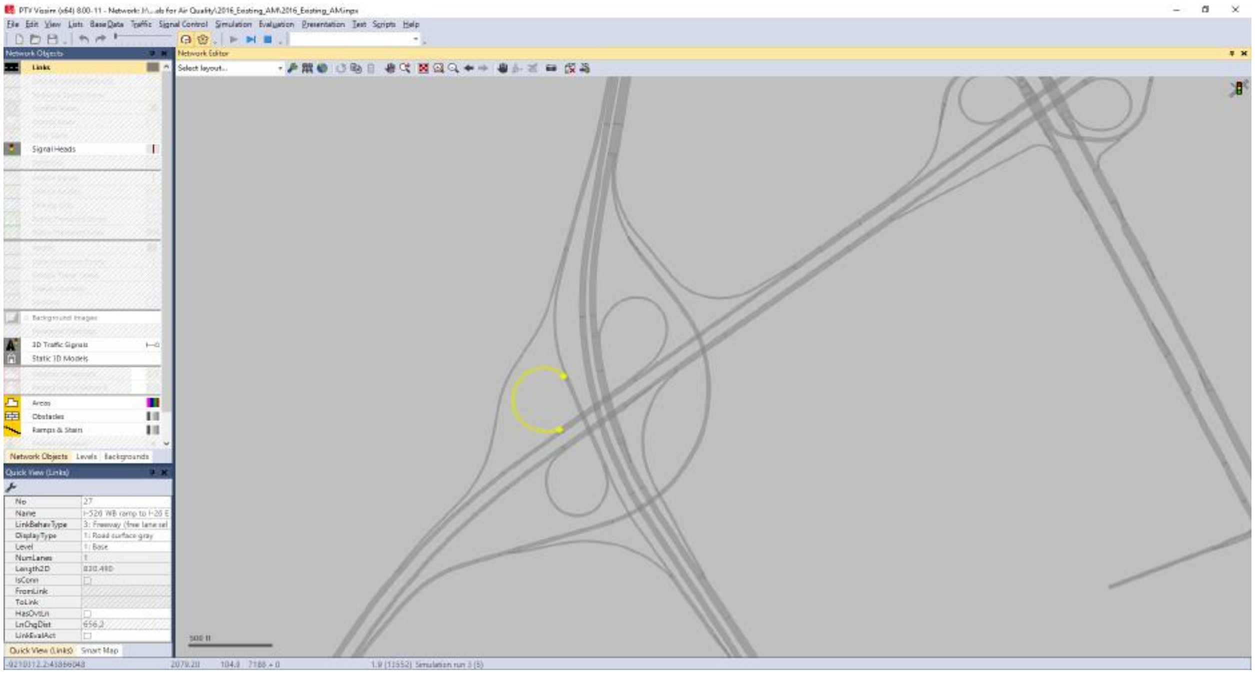
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
526-26 R4	2015 Existing	3374	1612	43.4
526-26 R4	2050 No-build	3374	1288	47.0



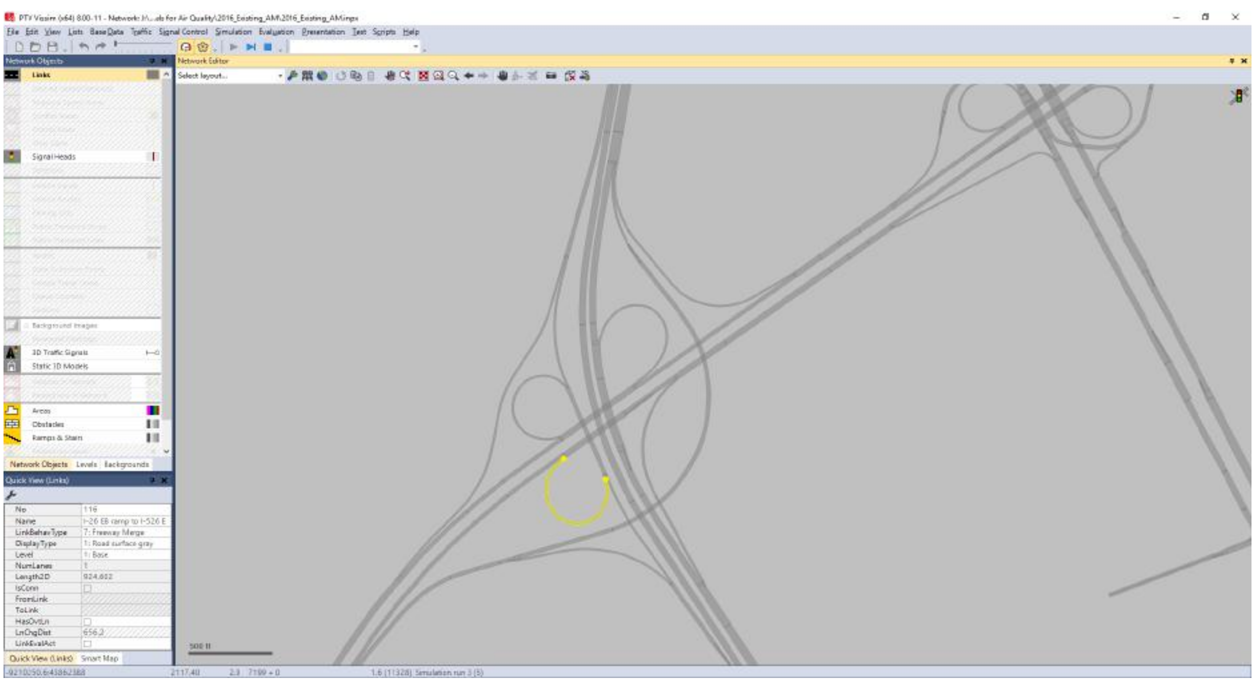
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
526-26 R5	2015 Existing	1402	567	41.5
526-26 R5	2050 No-build	1402	824	40.4



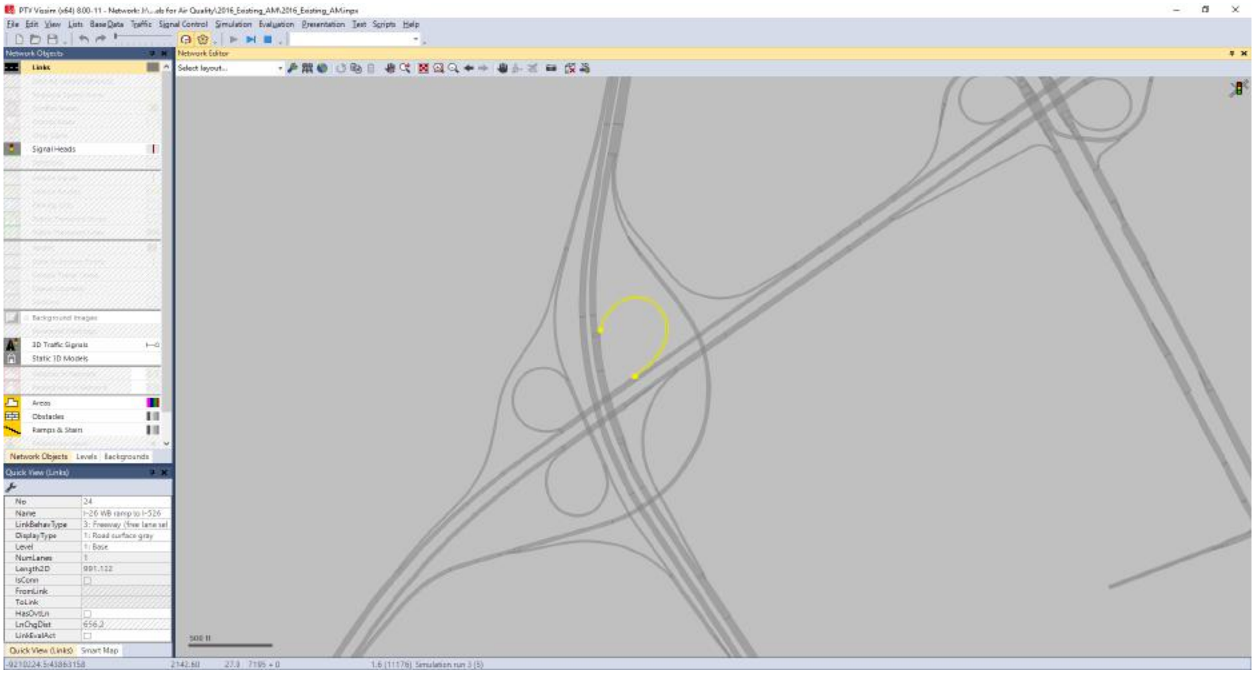
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
526-26 R6	2015 Existing	1662	1419	47.6
526-26 R6	2050 No-build	1662	1134	49.2



Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
526-26 L1	2015 Existing	830	833	27.0
526-26 L1	2050 No-build	860	568	9.7

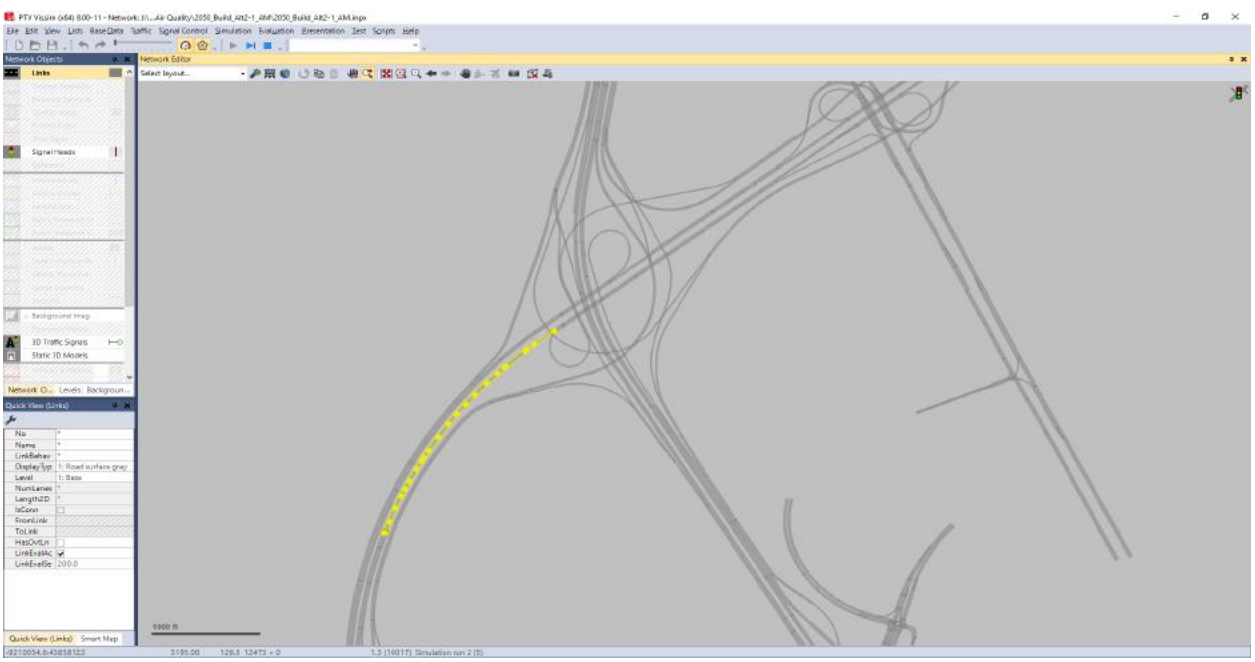


Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
526-26 L2	2015 Existing	925	1300	30.2
526-26 L2	2050 No-build	925	603	3.8

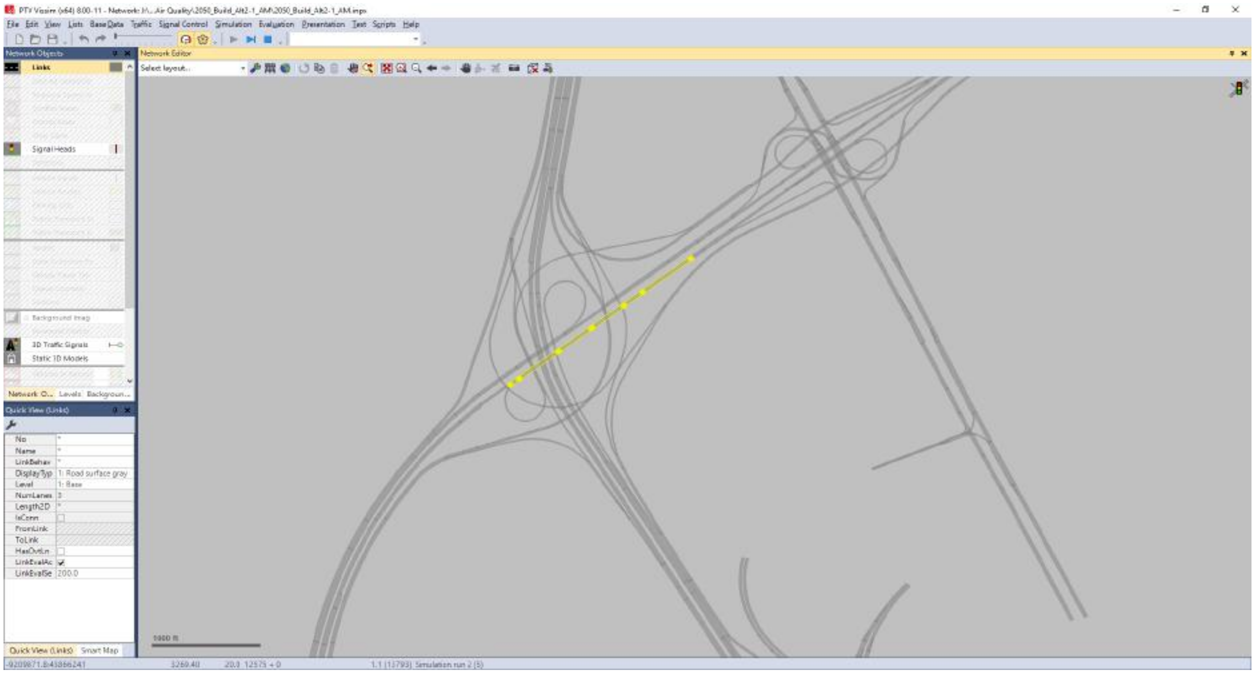


Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
526-26 L3	2015 Existing	991	256	32.1
526-26 L3	2050 No-build	991	731	30.1

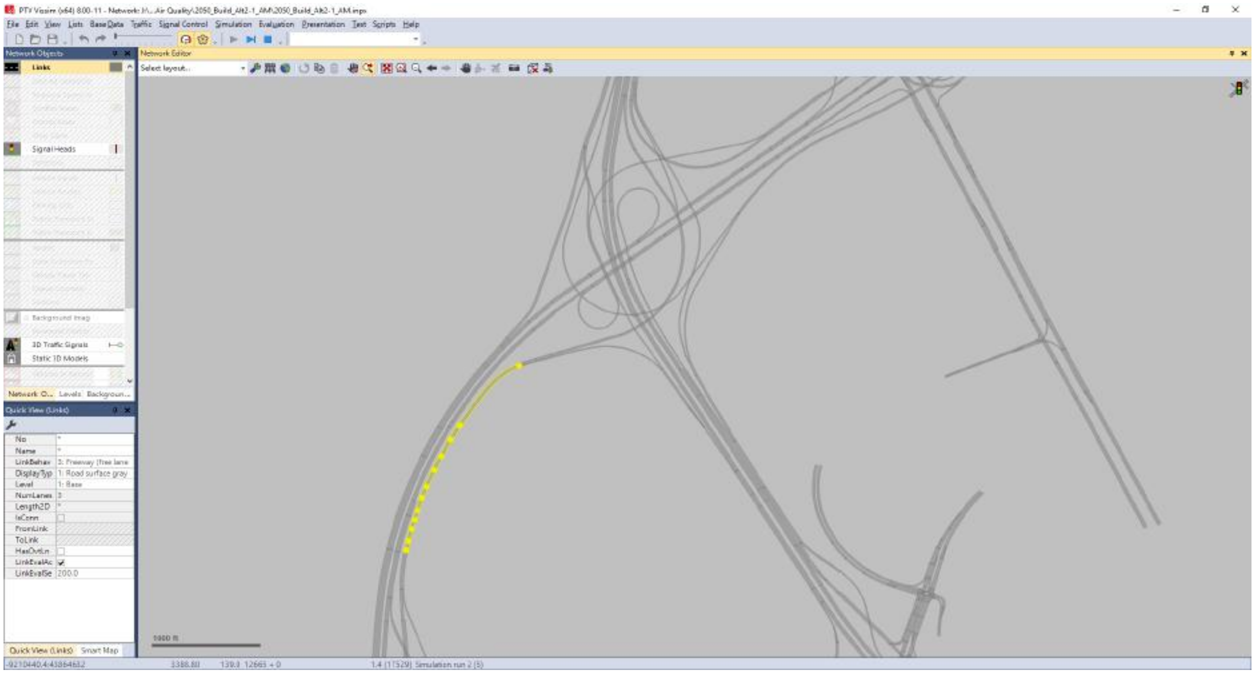
5.2.2 2050 Build Scenario



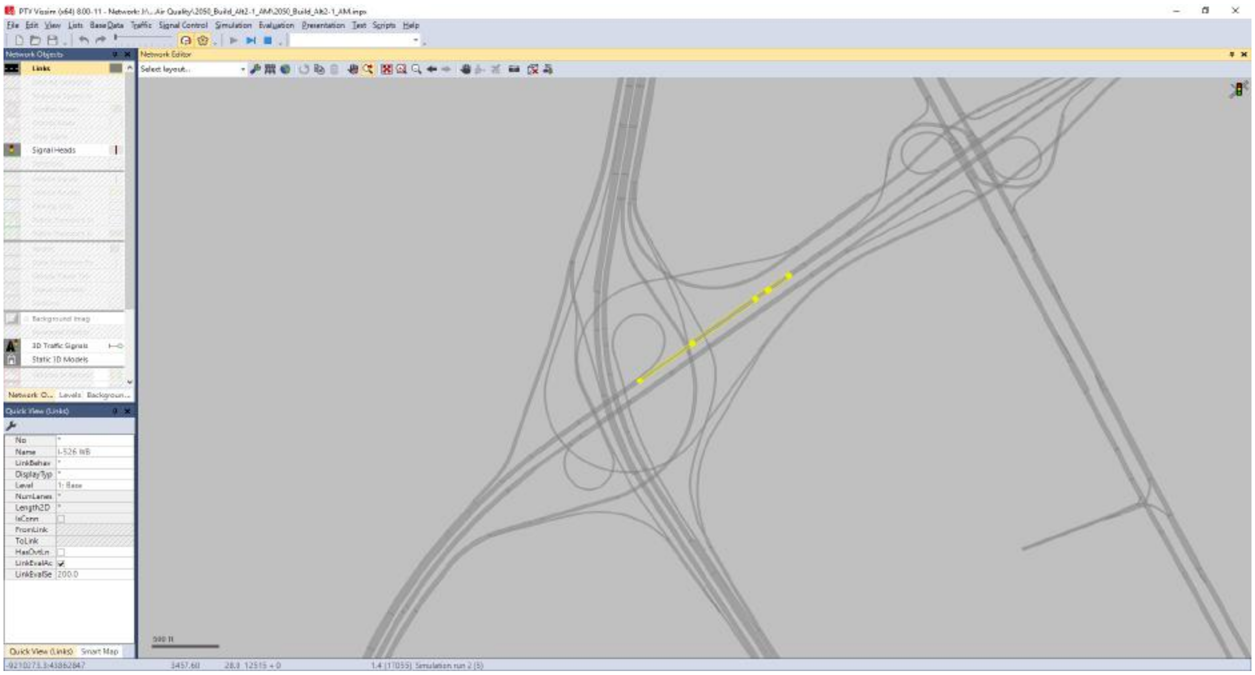
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build I526 EB1	2050 Build	2525	1265	57.7



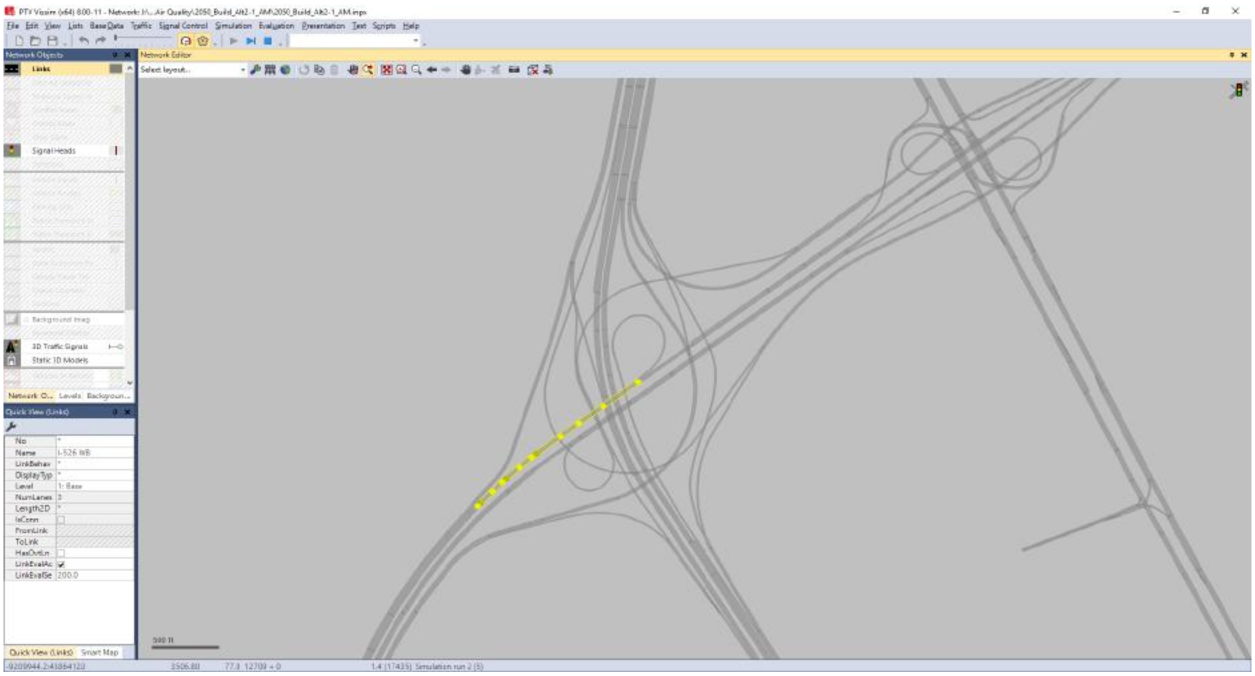
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build I526 EB2	2050 Build	2043	1962	48.4



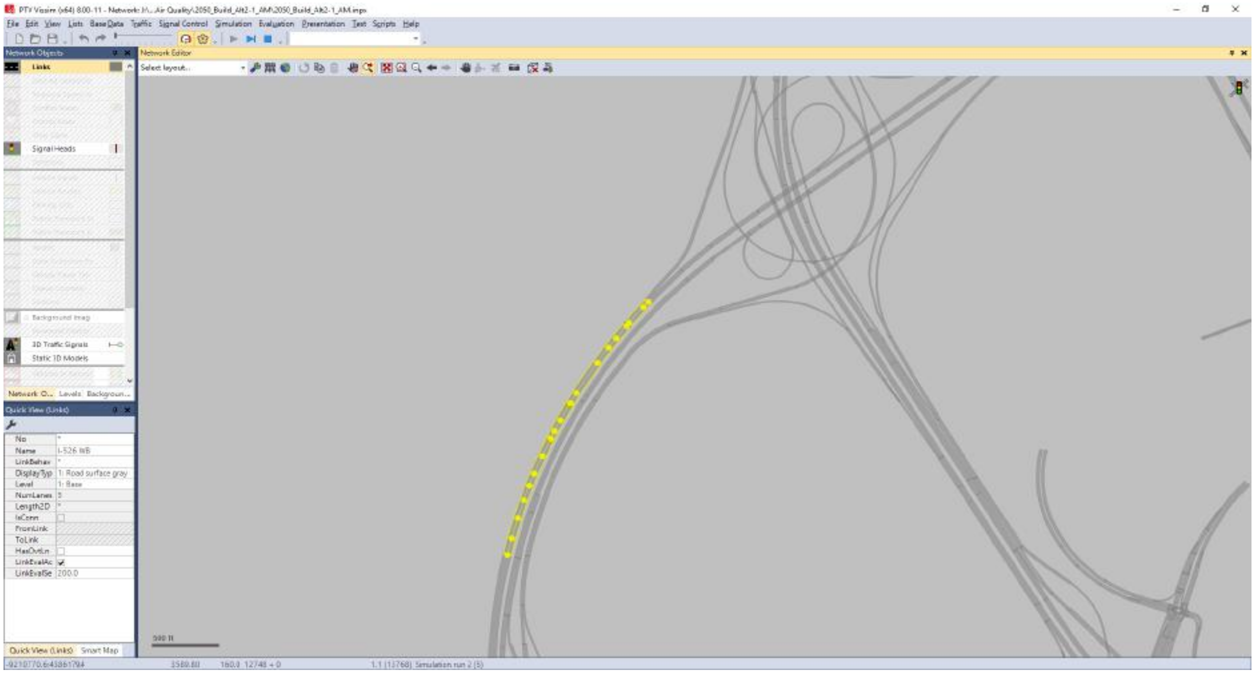
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build I526 EB3	2050 Build	2124	3268	53.2



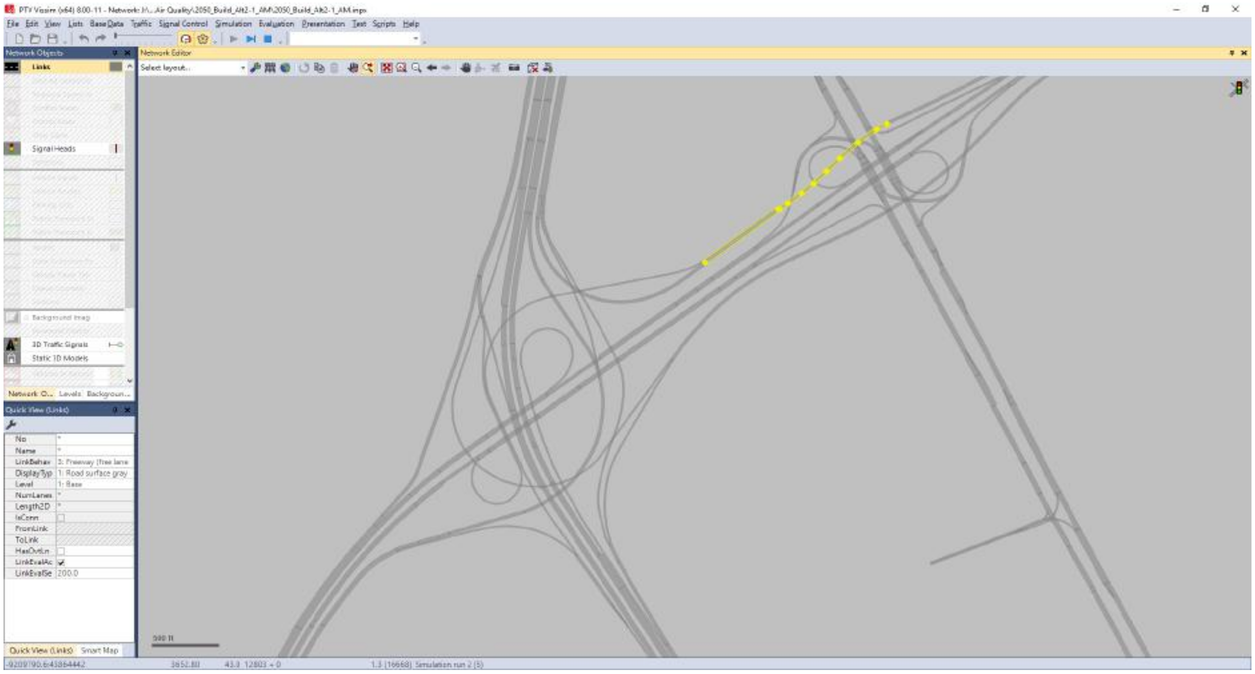
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build I526 WB1	2050 Build	1360	2653	51.8



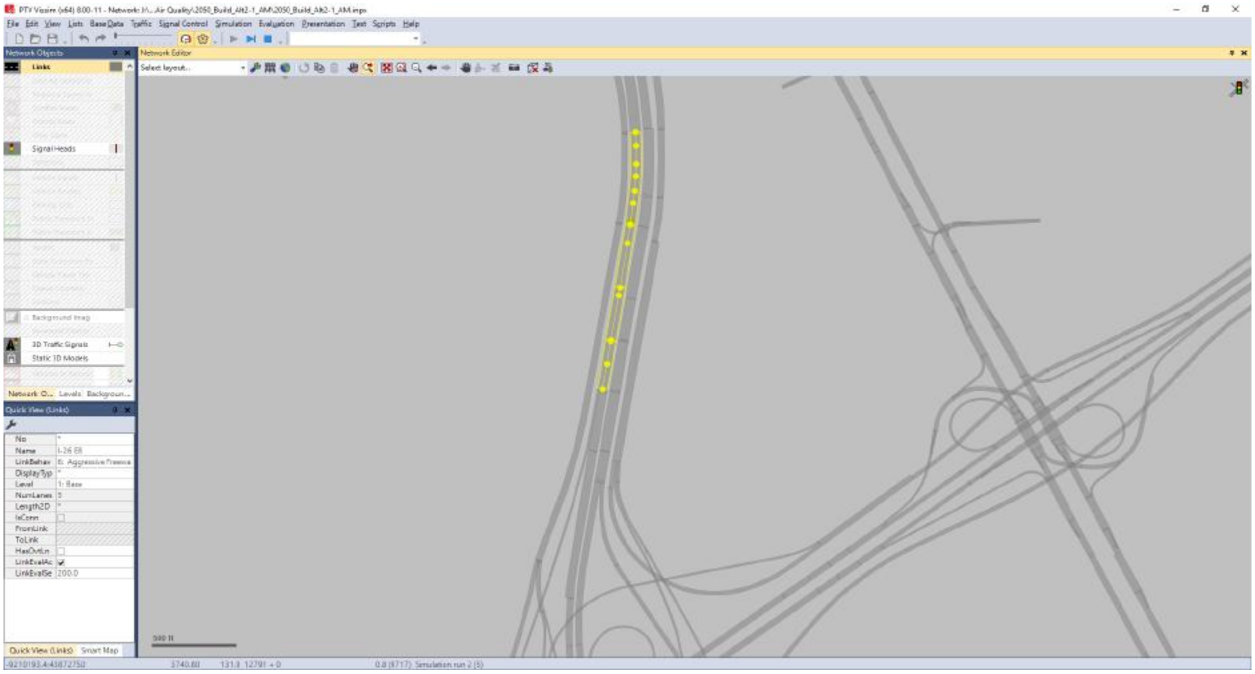
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build I526 WB2	2050 Build	1526	3025	55.8



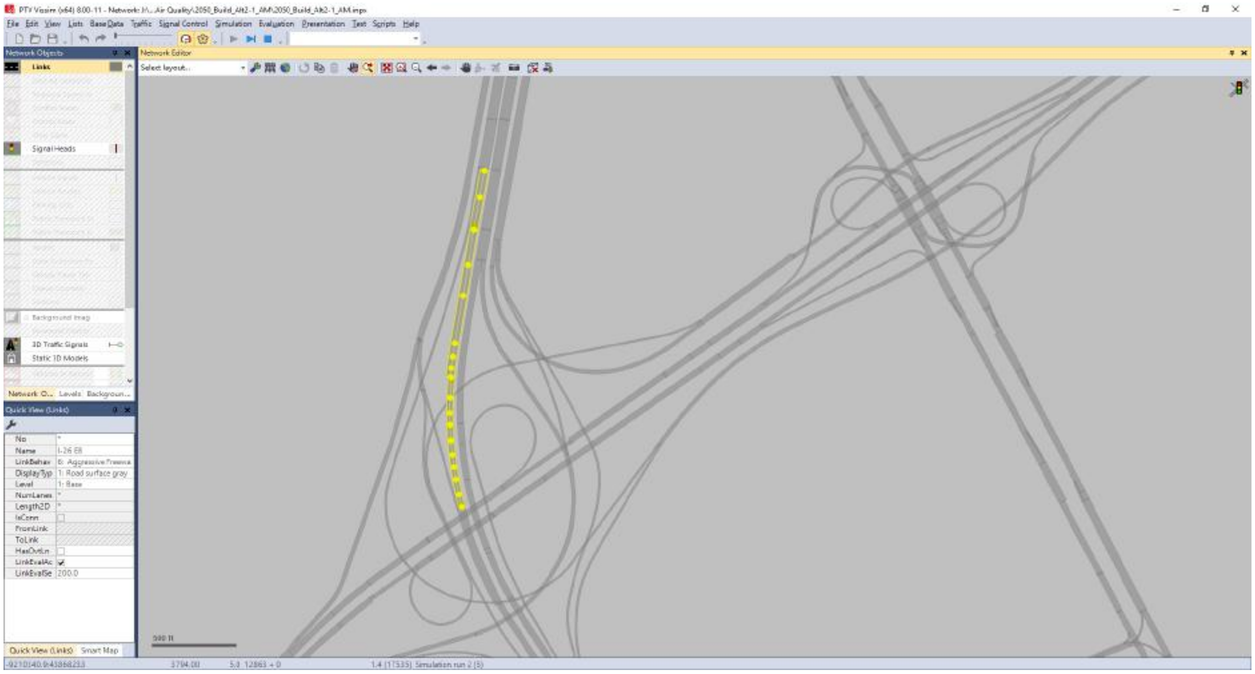
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build I526 WB3	2050 Build	2211	5293	51.4



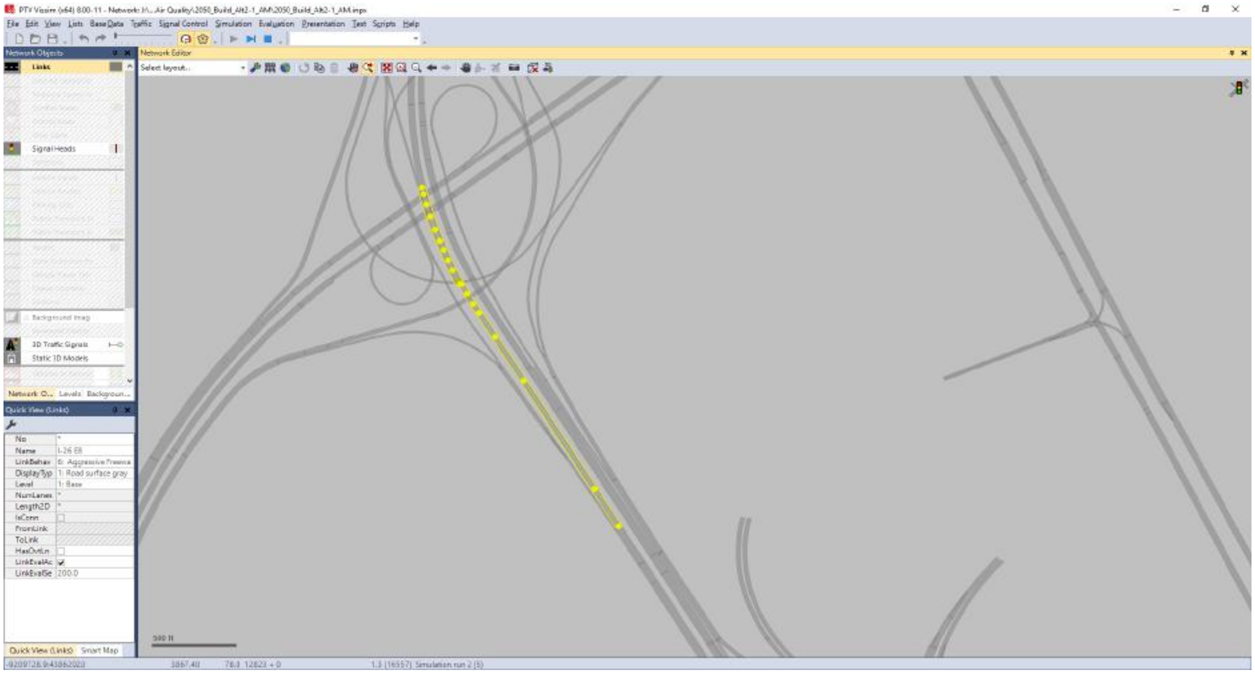
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build I526 WB4	2050 Build	1723	2823	31.3



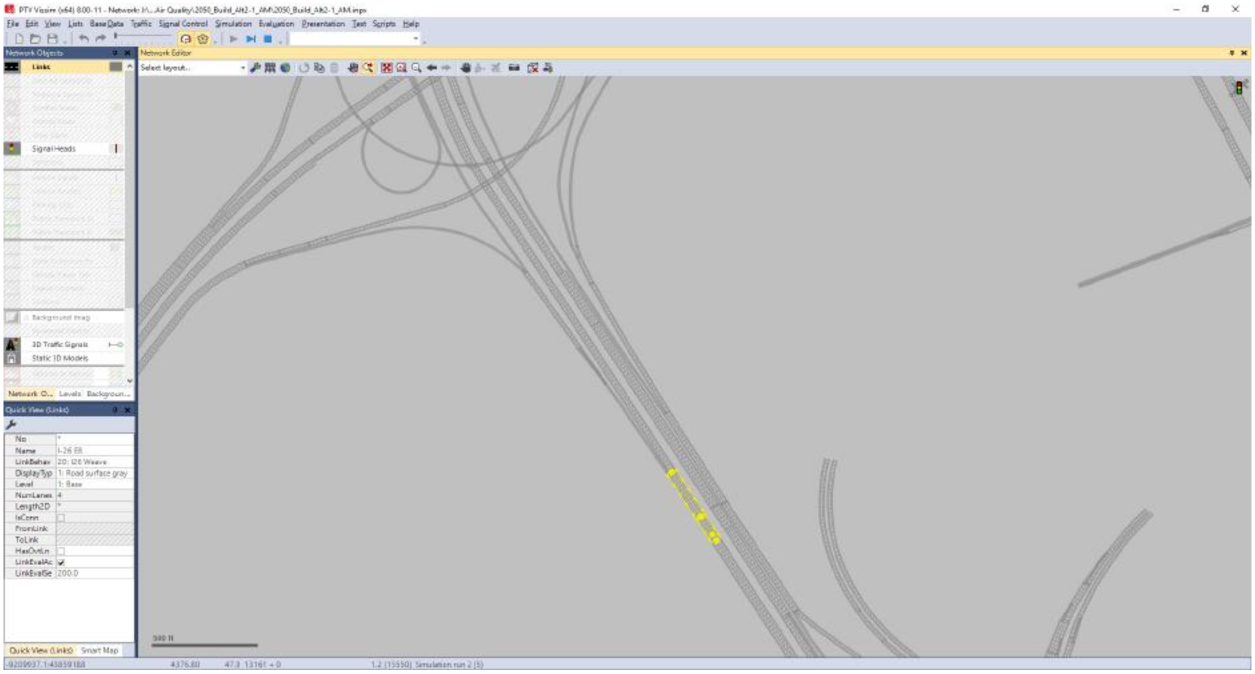
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build I26 EB1	2050 Build	1607	3367	61.1



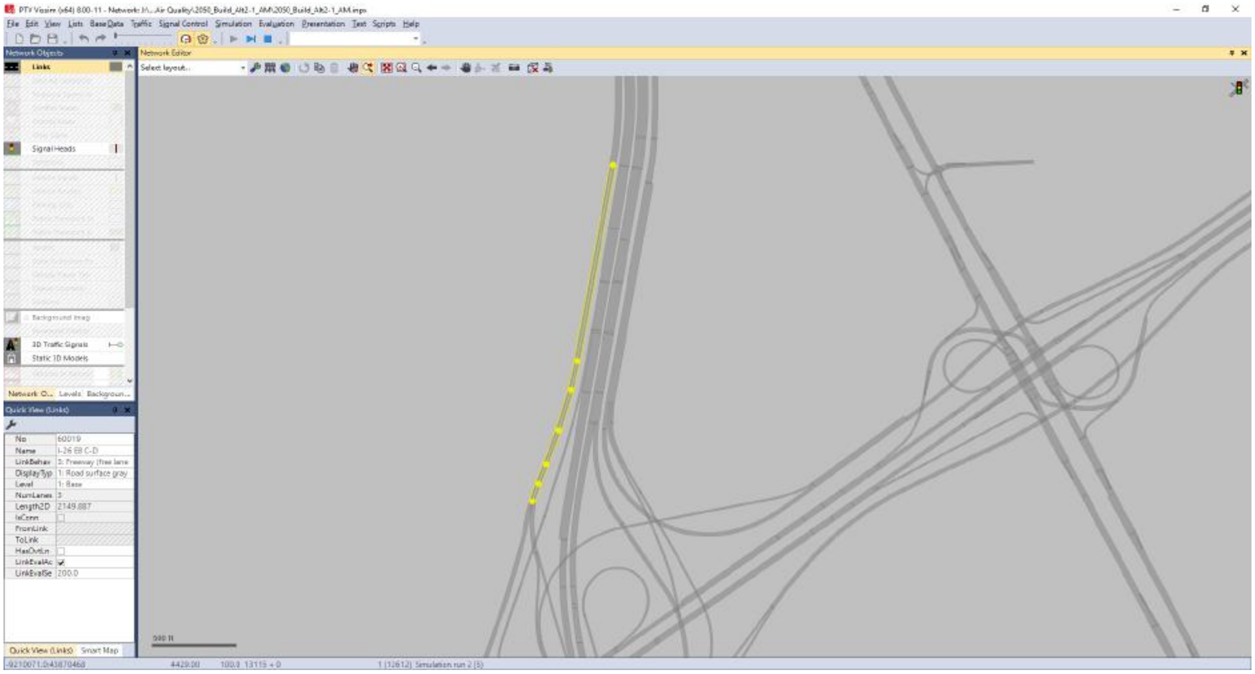
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build I26 EB2	2050 Build	2099	2745	60.6



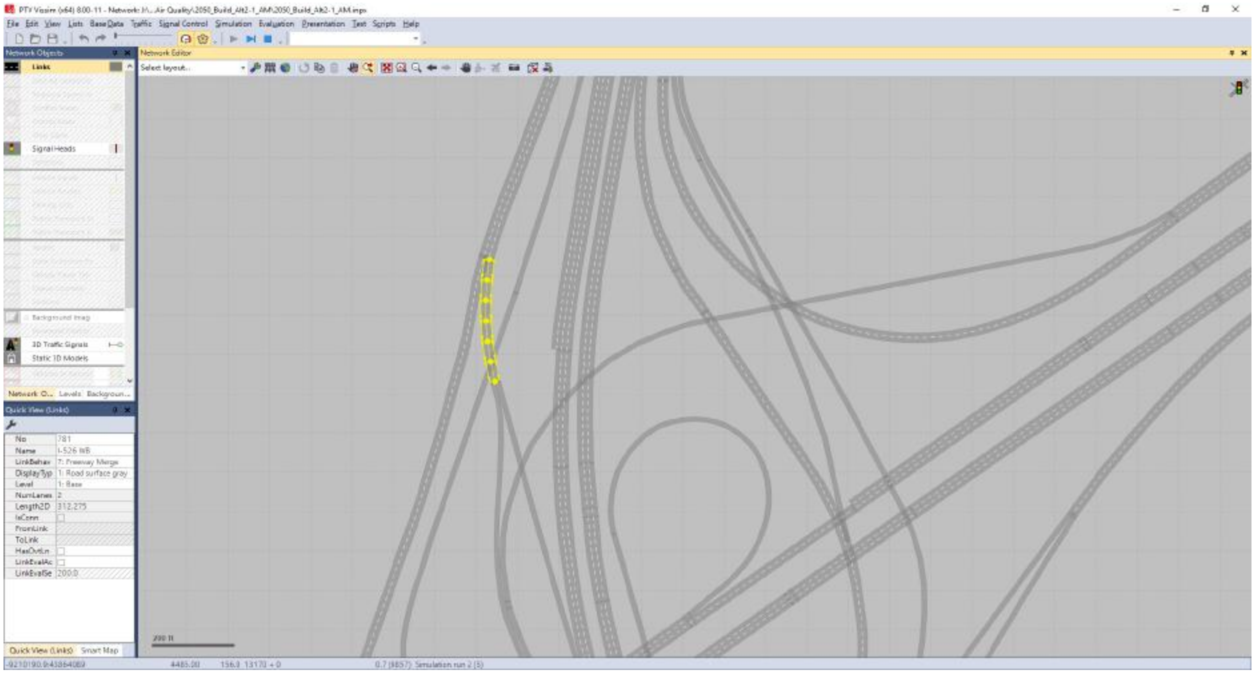
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build I26 EB3	2050 Build	2411	3763	49.6



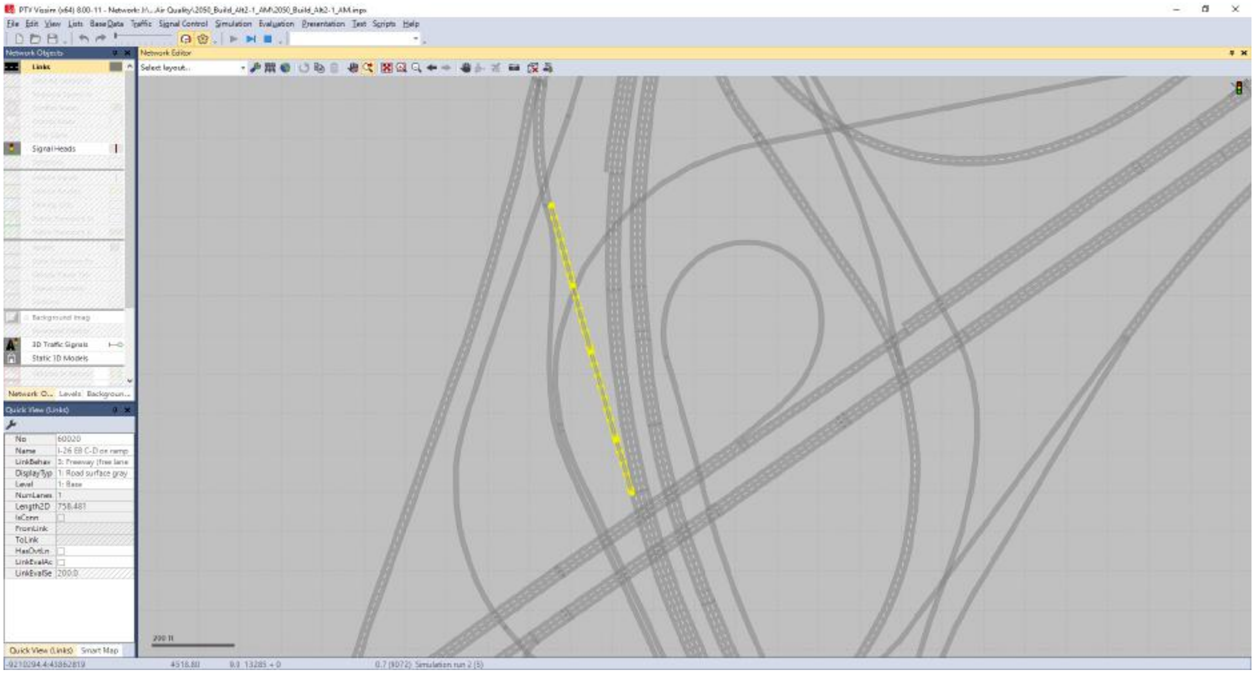
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build I26 EB4	2050 Build	398	5674	49.5



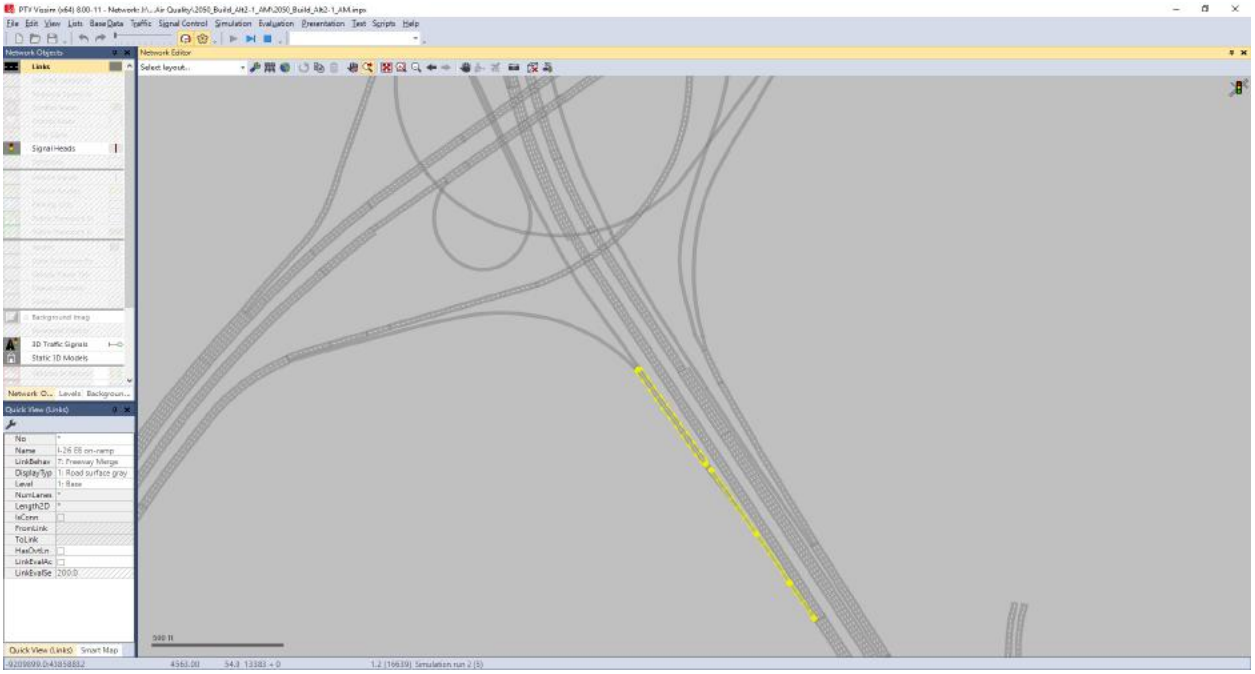
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build I26 EB5	2050 Build	2150	3983	38.7



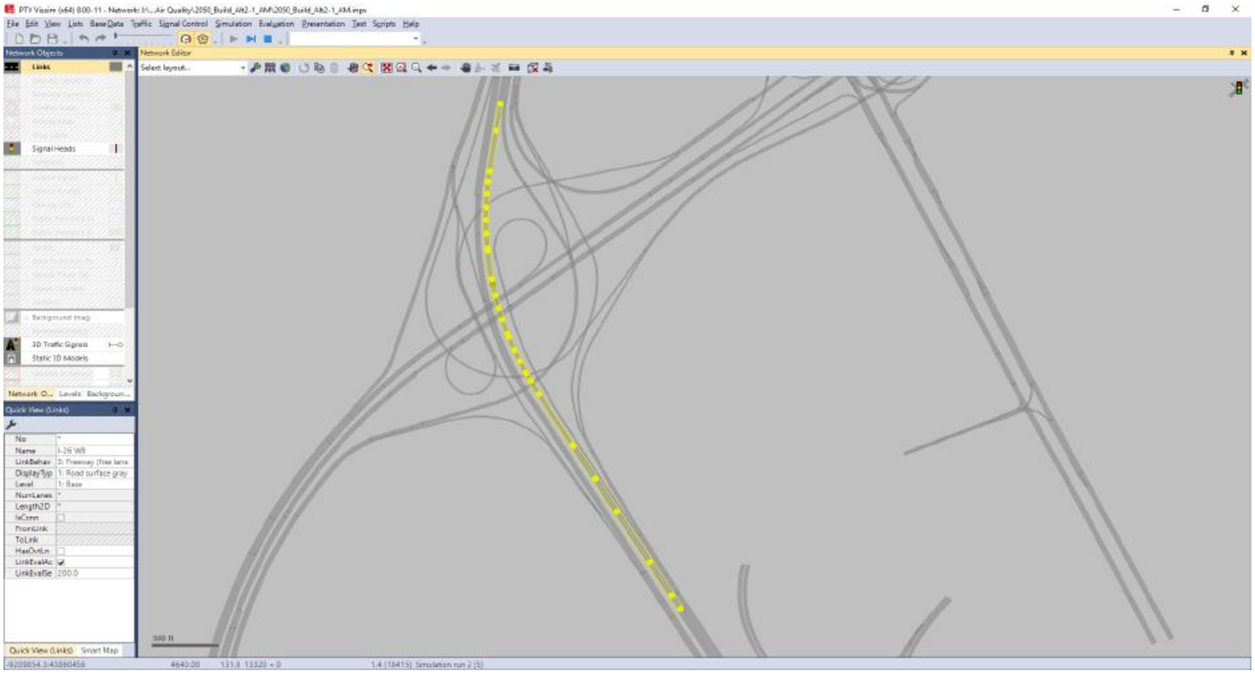
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build I26 EB6	2050 Build	312	1653	39.8



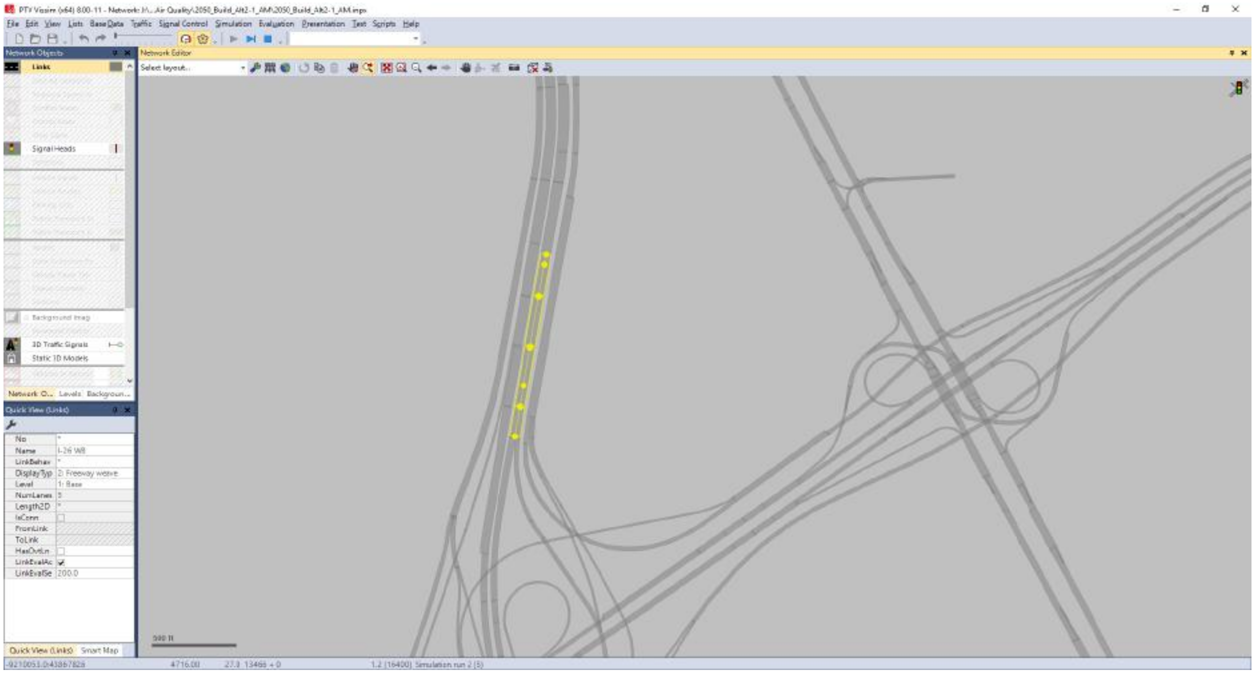
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build I26 EB7	2050 Build	758	1007	36.4



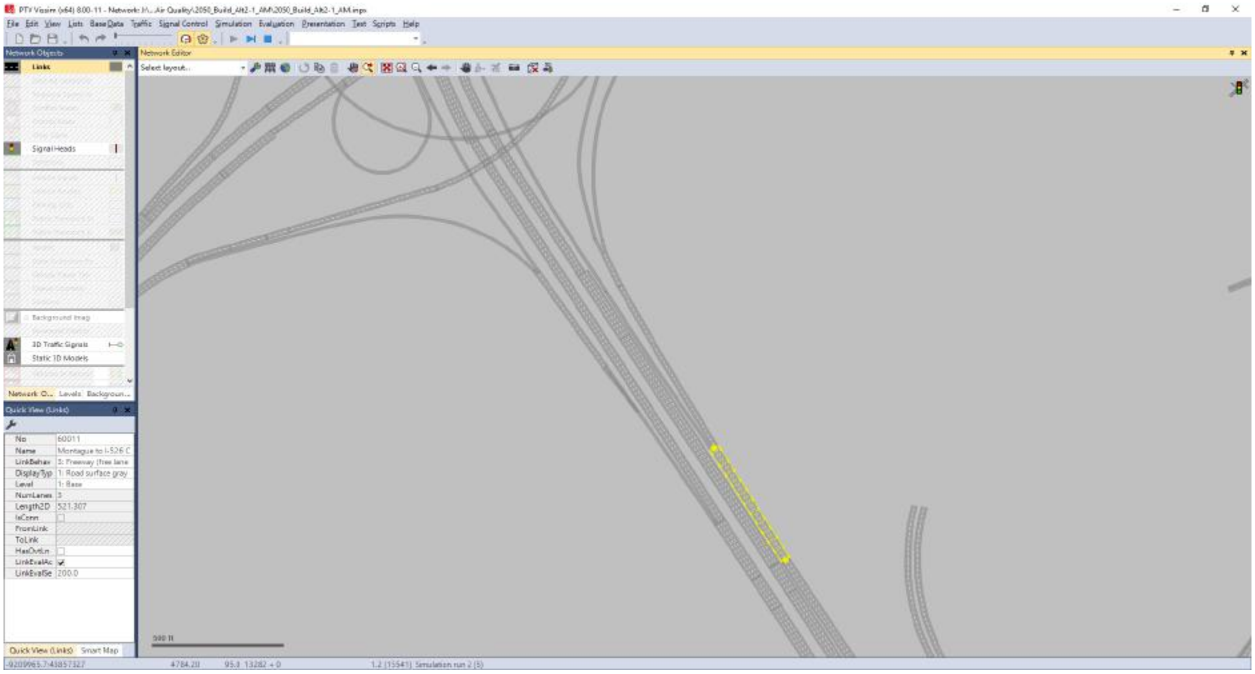
Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build I26 EB8	2050 Build	1164	1950	27.6



Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build I26 WB1	2050 Build	4237	1564	63.9



Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build I26 WB2	2050 Build	1126	2449	64.1



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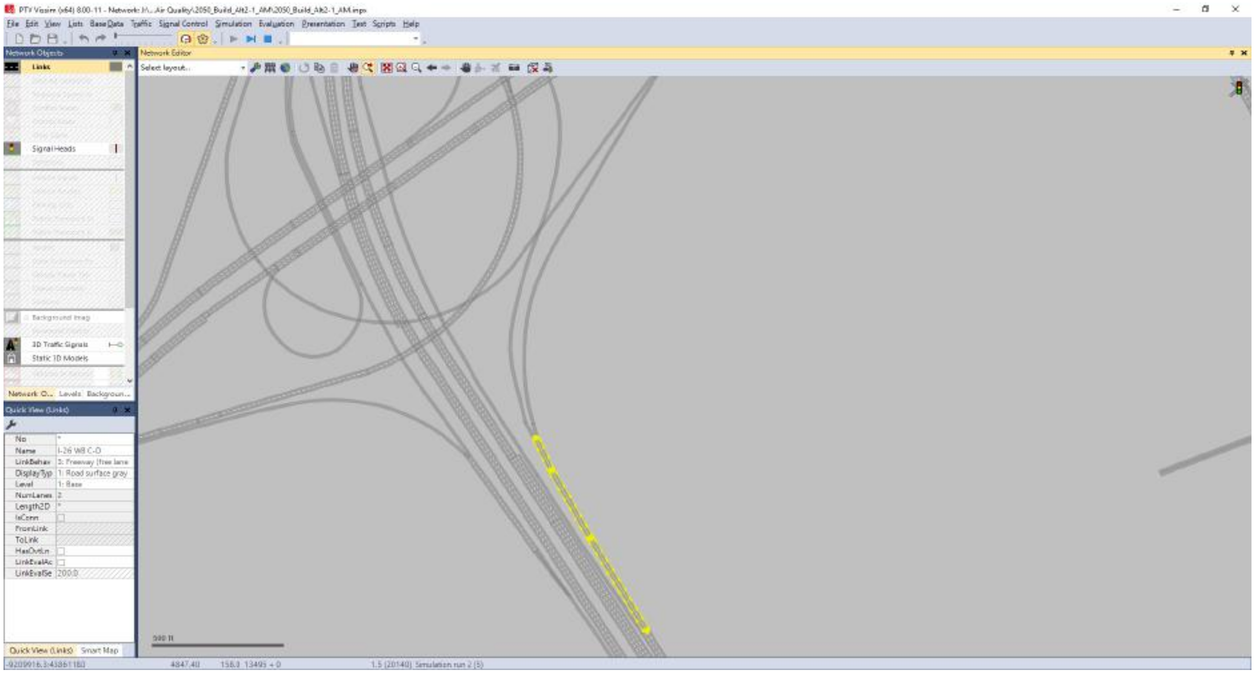
Build I26 WB3	2050 Build	521	2076	40.5



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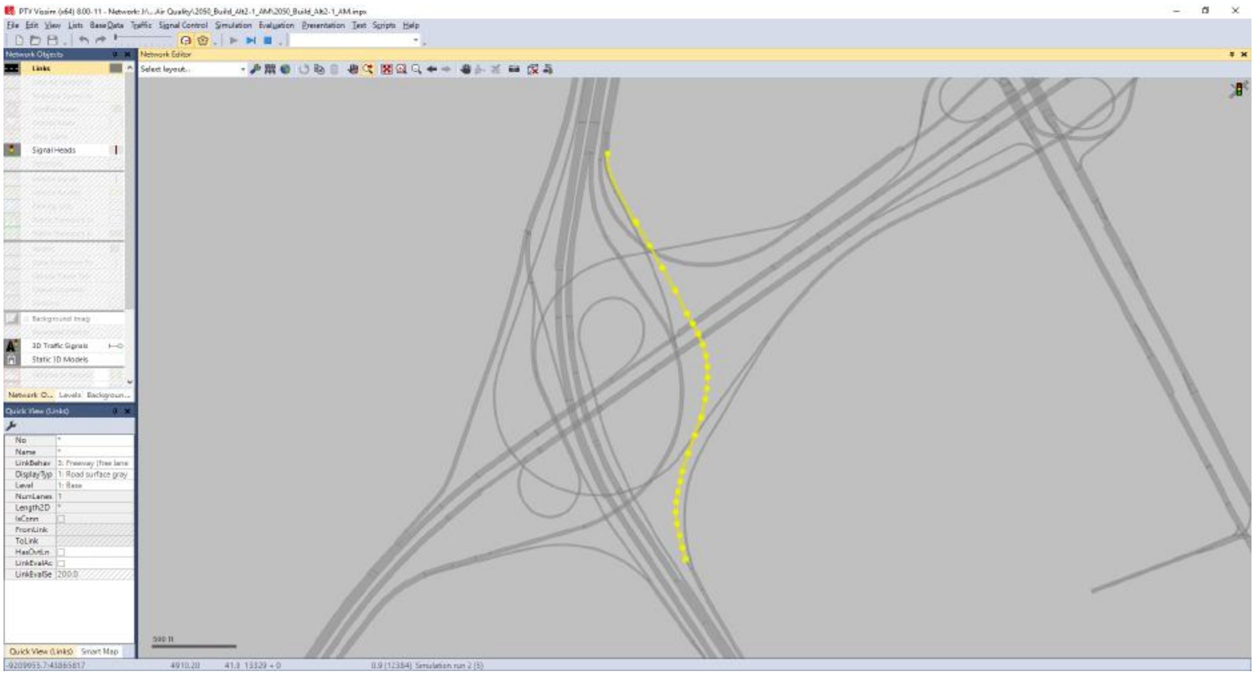
Build I26 WB5	2050 Build	873	1706	35.9



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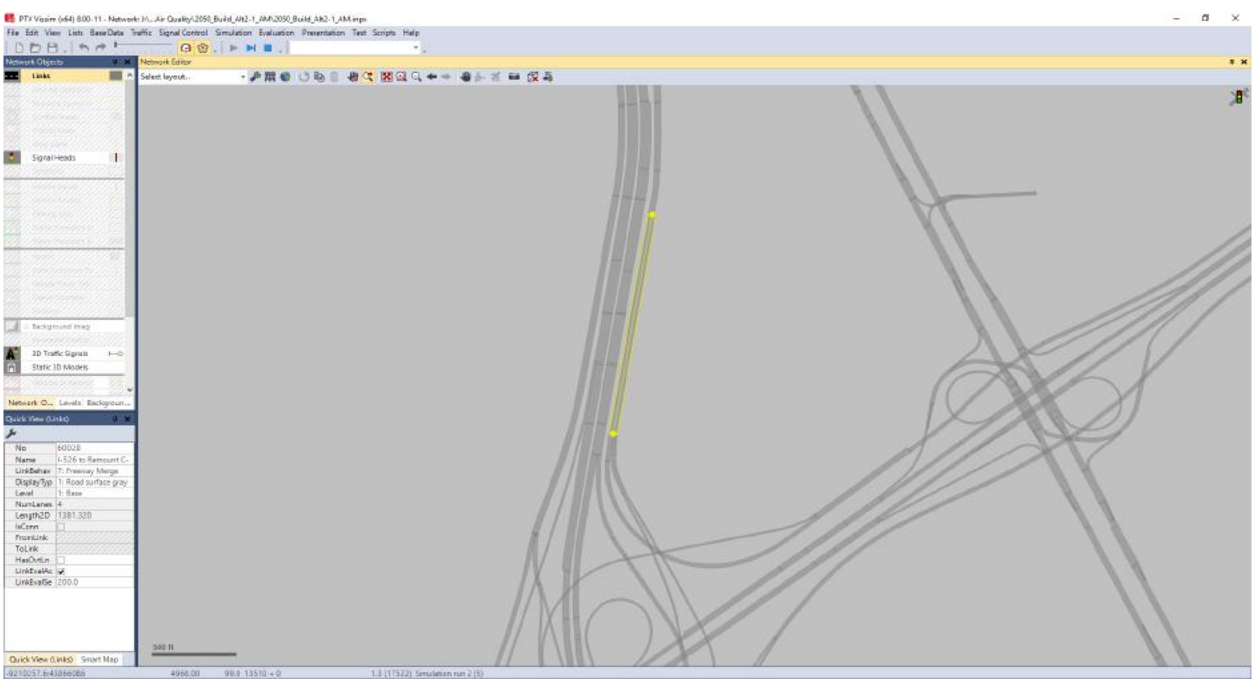
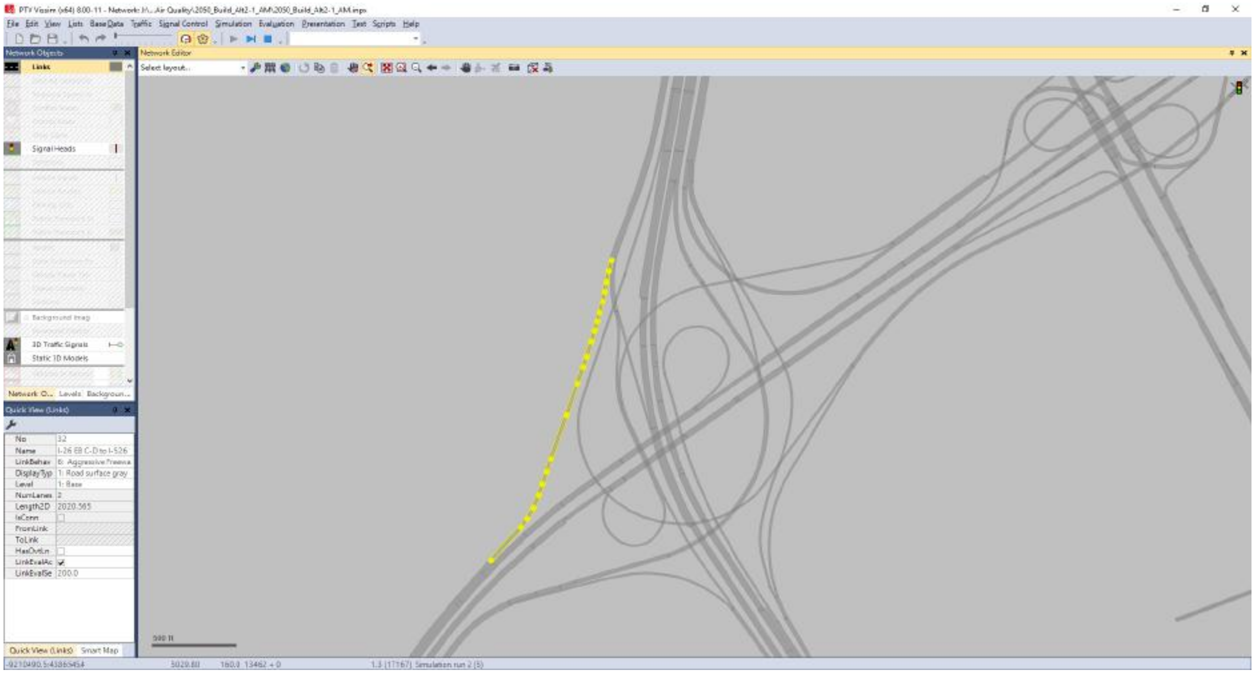
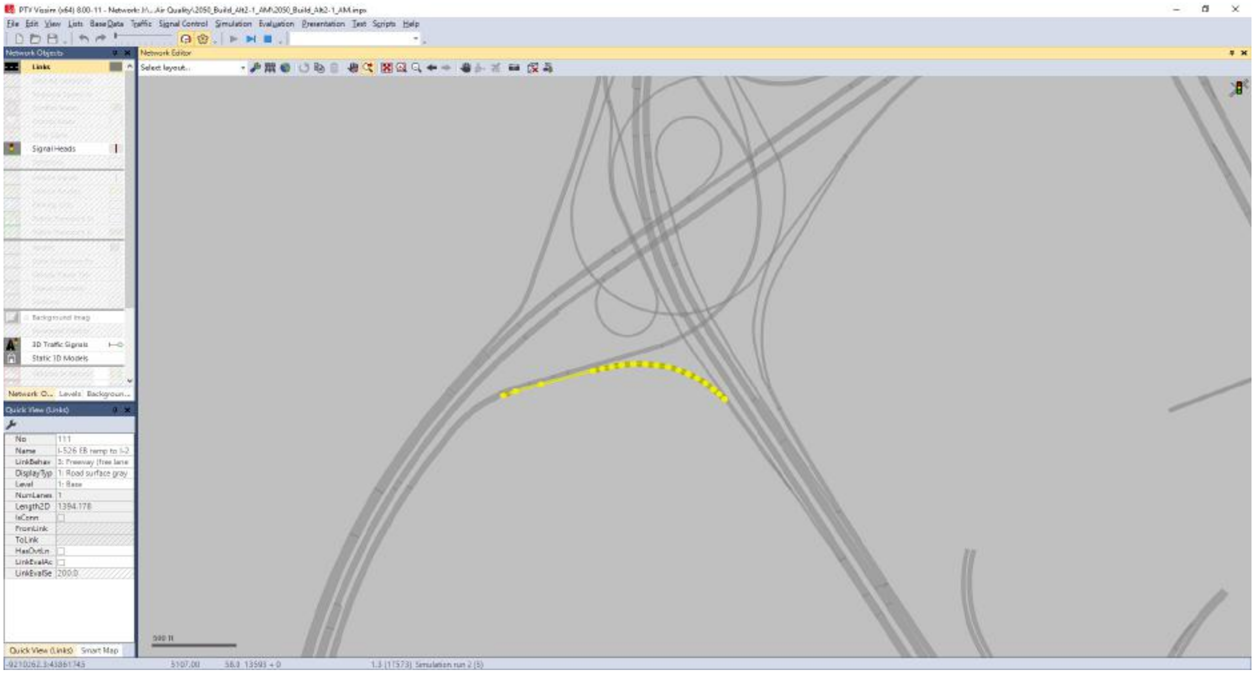
Build I26 WB6	2050 Build	2679	667	41.5



Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build I26 WB7	2050 Build	1381	3860	46.5



Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build 526-26 R1	2050 Build	2021	2256	46.9



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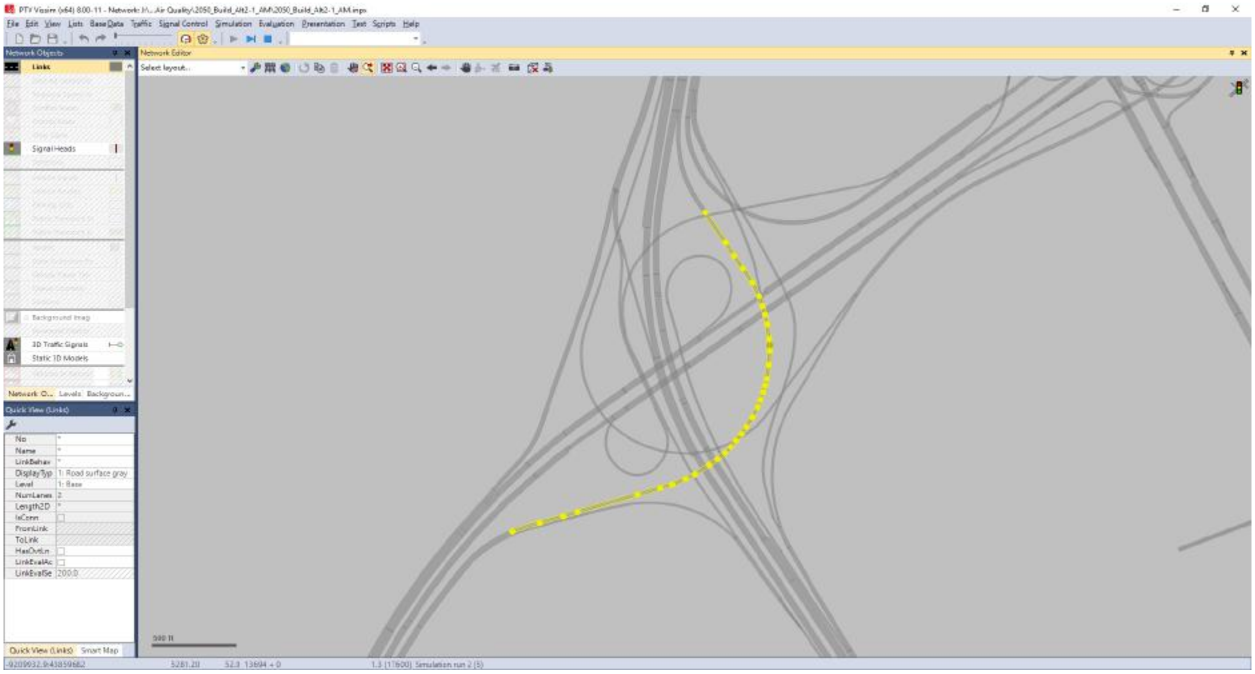
Build 526-26 R2	2050 Build	1394	983	23.4



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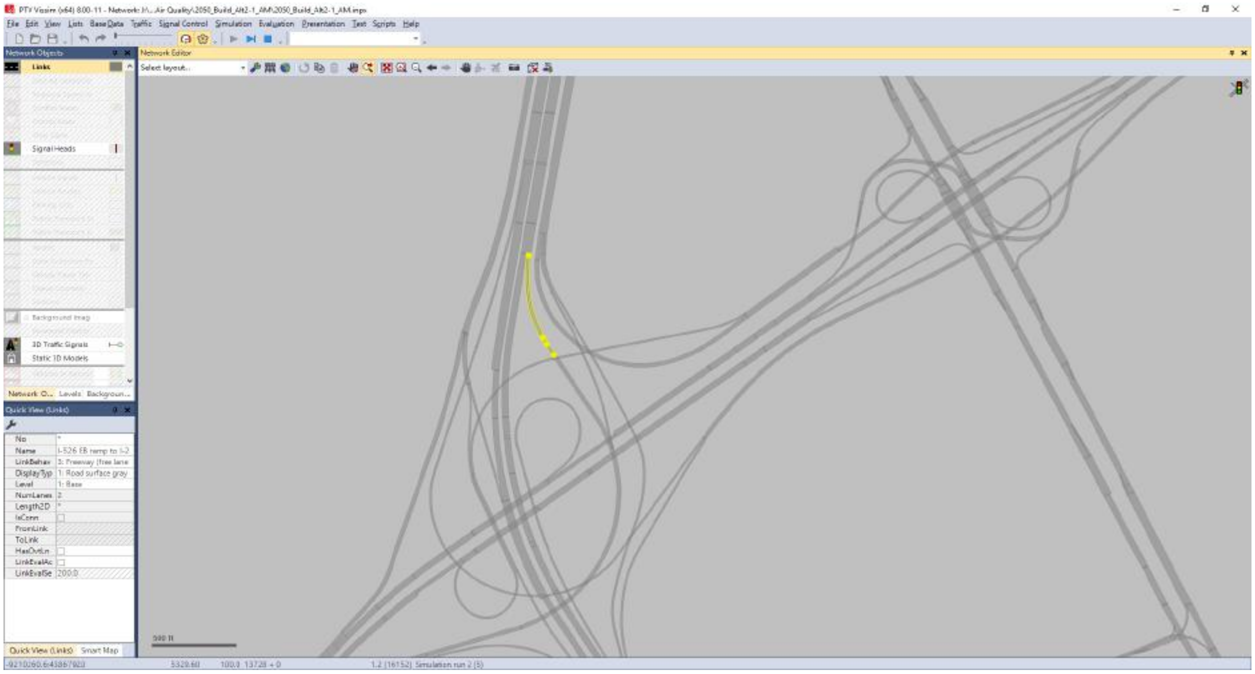
Build 526-26 R3	2050 Build	3018	1969	46.8



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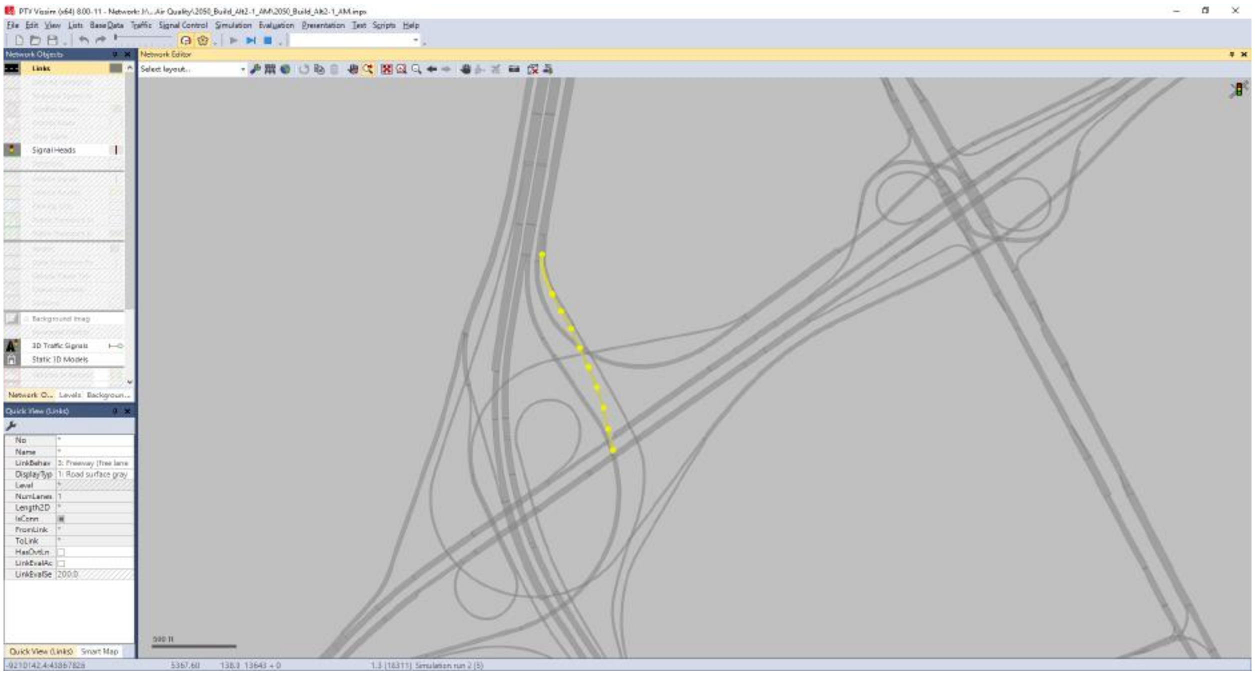
Build 526-26 R4	2050 Build	650	897	63.3



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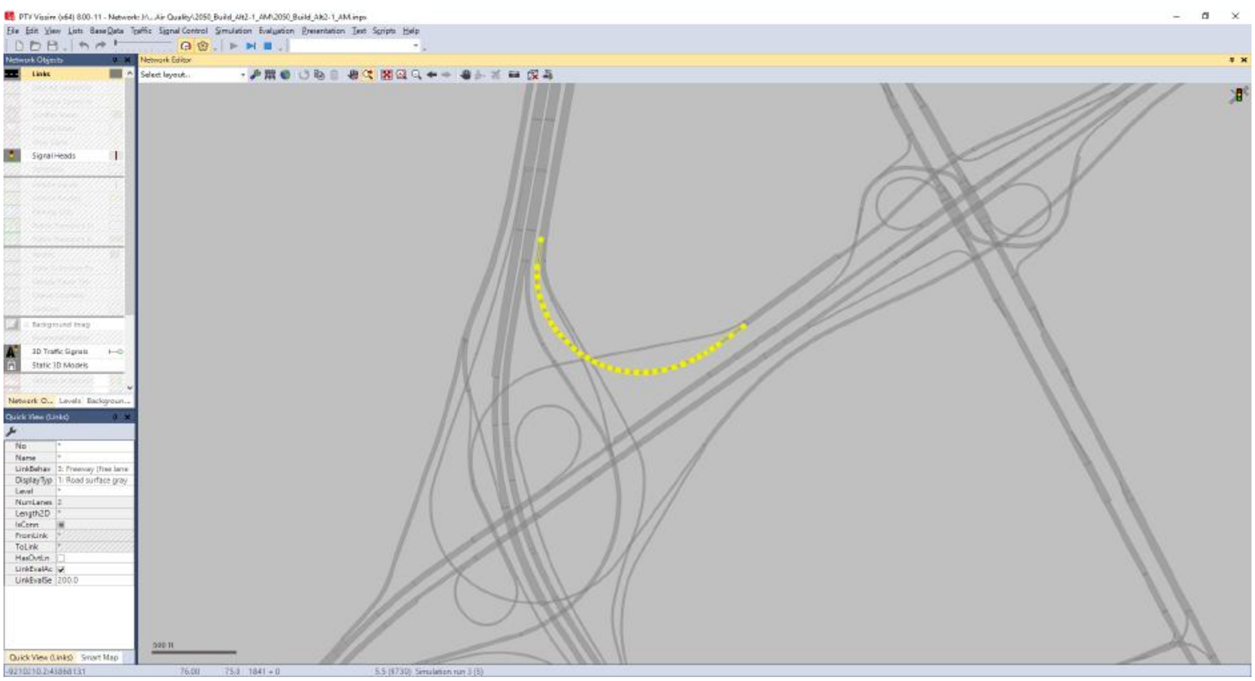
Build 526-26 R5	2050 Build	1302	1381	53.1



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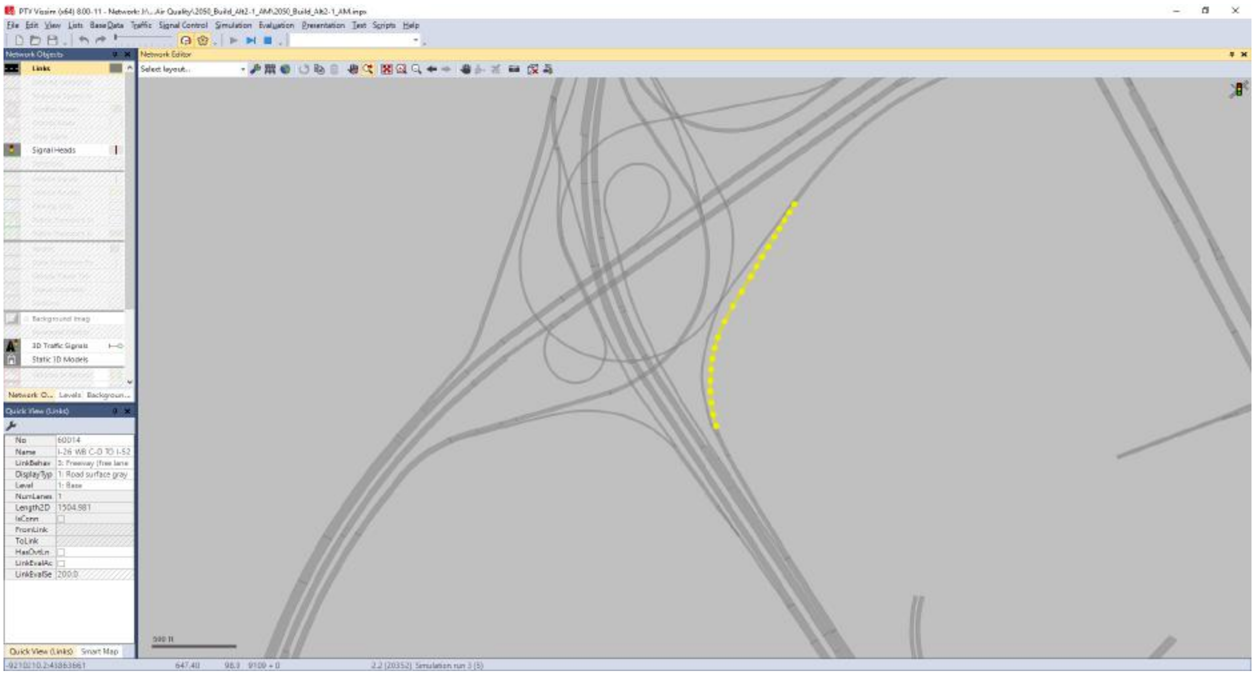
Build 526-26 R6	2050 Build	1865	1838	43.8



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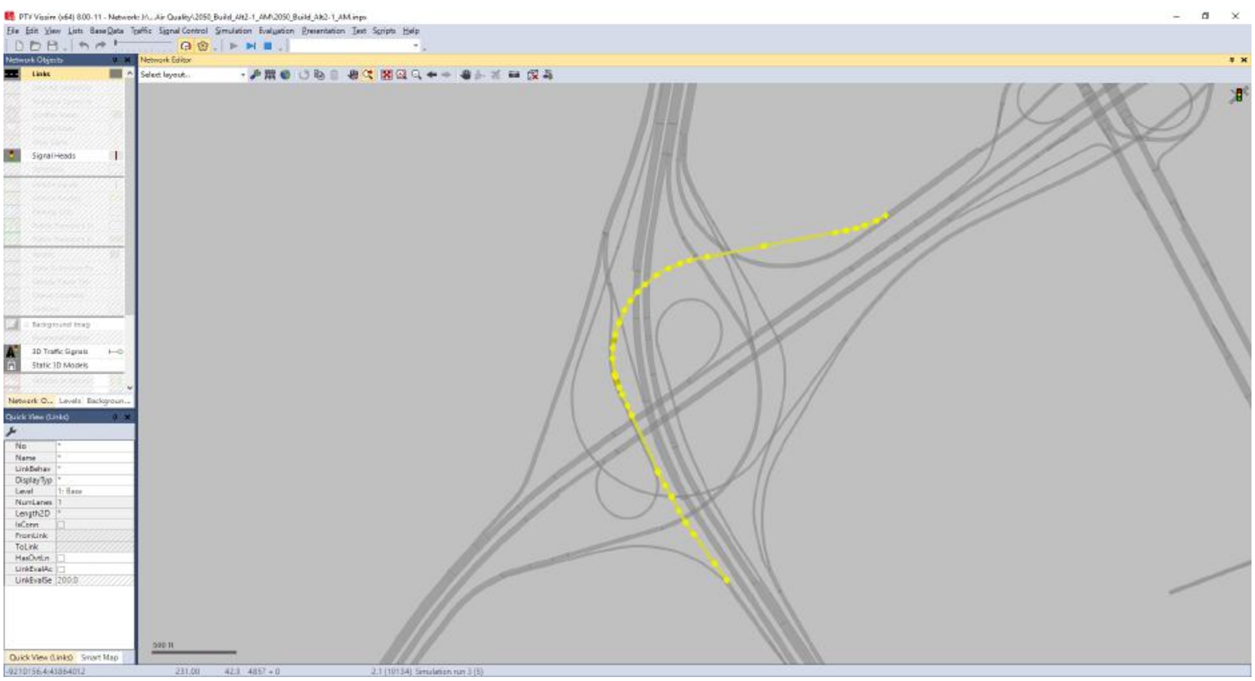
Build 526-26 R7	2050 Build	1505	1036	40.8



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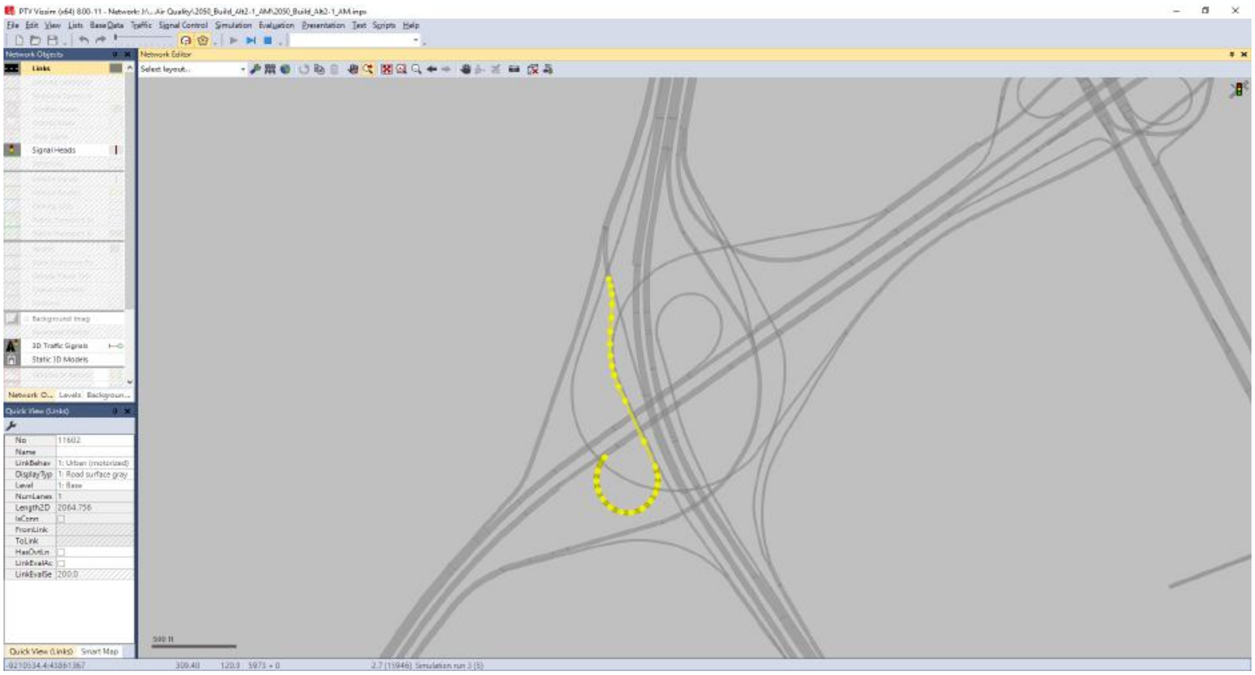
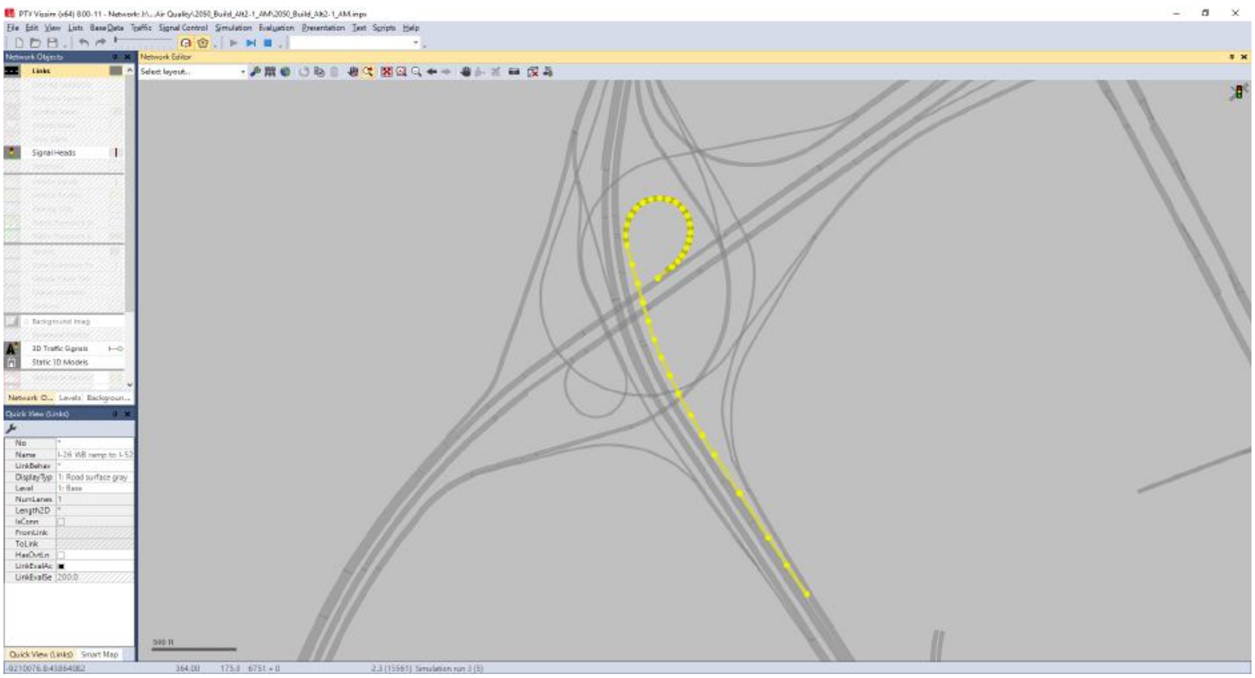
Build 526-26 L1	2050 Build	3538	973	9.9



Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build 526-26 L2	2050 Build	2065	710	36.4



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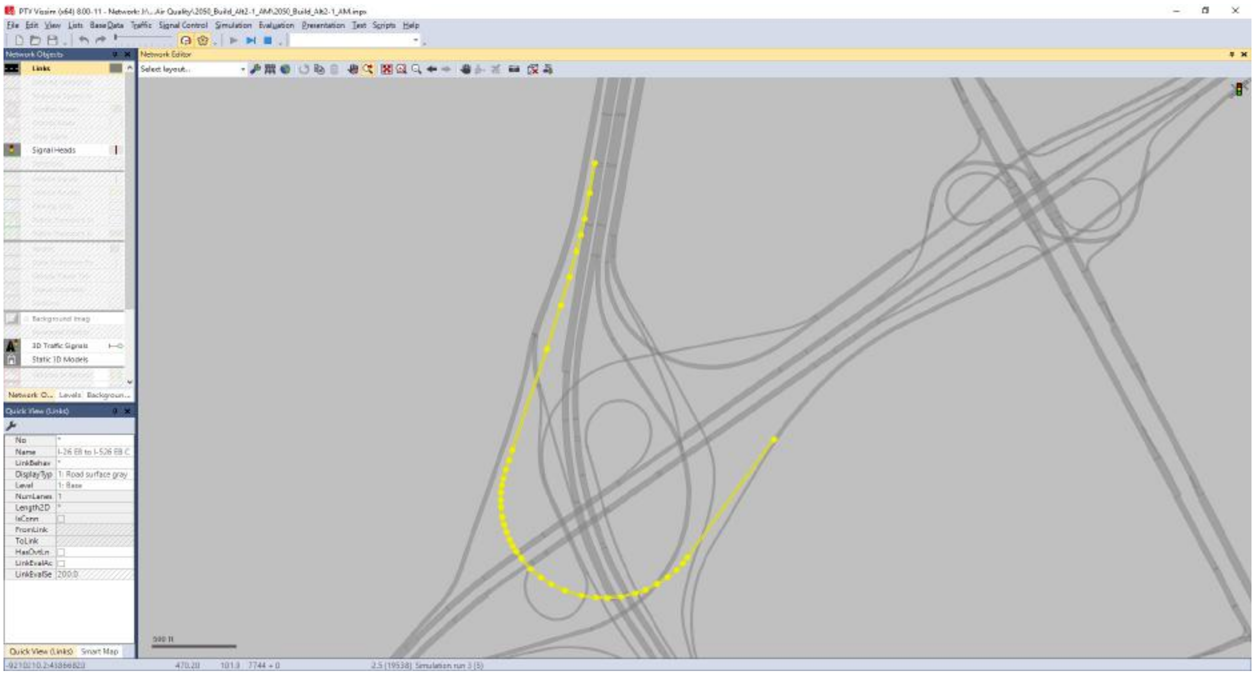
Build 526-26 L3	2050 Build	3495	381	47.1



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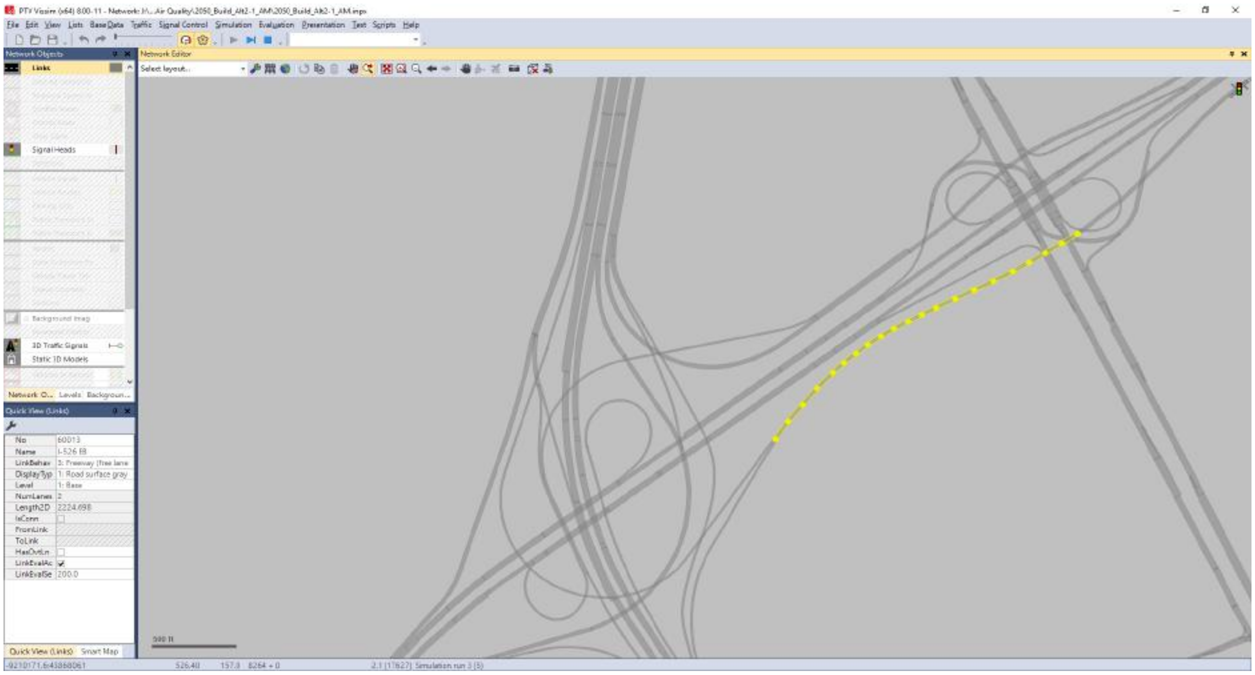
Build 526-26 L4	2050 Build	4590	632	43.8



Link ID	Model Scenario	Link Length (ft)	Link Volume (veh/hr)	Link Average Speed (mph)
Build 526-26 L5	2050 Build	2225	1670	56.4

5.3 MOVES Run Specification Files

5.3.1 2015 Existing Conditions – 12 MSAT Species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processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="43"
pollutantname="Propionaldehyde" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="43"
pollutantname="Propionaldehyde" processkey="15" processname="Crankcase
Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="44"
pollutantname="Styrene" processkey="1" processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="44"
pollutantname="Styrene" processkey="15" processname="Crankcase Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="45"
pollutantname="Toluene" processkey="1" processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="45"
pollutantname="Toluene" processkey="15" processname="Crankcase Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="1"
pollutantname="Total Gaseous Hydrocarbons" processkey="1"
processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="87"
pollutantname="Volatile Organic Compounds" processkey="1"
processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="46"
pollutantname="Xylene" processkey="1" processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="46"
pollutantname="Xylene" processkey="15" processname="Crankcase Running
Exhaust"/>
      </pollutantprocessassociations>
      <databaseselections>
      </databaseselections>
      <internalcontrolstrategies>
<internalcontrolstrategy
classname="gov.epa.otaq.moves.master.implementation.ghg.internalcontrolstr
ategies.rateofprogress.RateOfProgressStrategy"><![CDATA[
useParameters    No
```

```
]]></internalcontrolstrategy>
      </internalcontrolstrategies>
      <inputdatabase servername="" databasename="" description=""/>
      <uncertaintyparameters uncertaintymodeenabled="false"
numberofrunspersimulation="0" numberofsimulations="0"/>
      <geographicoutputdetail description="LINK"/>
      <outputemissionsbreakdownselection>
            <modelyear selected="false"/>
            <fueltype selected="true"/>
            <fuelsubtype selected="false"/>
            <emissionprocess selected="true"/>
            <onroadoffroad selected="true"/>
            <roadtype selected="true"/>
            <sourceusetype selected="true"/>
            <movesvehicletype selected="false"/>
            <onroadscc selected="false"/>
            <estimateuncertainty selected="false" numberOfIterations="2"
keepSampledData="false" keepIterations="false"/>
            <sector selected="false"/>
            <engtechid selected="false"/>
            <hpclass selected="false"/>
            <regclassid selected="false"/>
      </outputemissionsbreakdownselection>
      <outputdatabase servername="" databasename="2015_ex_ef_out"
description=""/>
      <outputtimestep value="Hour"/>
      <outputvmtdata value="true"/>
      <outputsho value="false"/>
      <outputsh value="false"/>
      <outputshp value="false"/>
      <outputshidling value="false"/>
      <outputstarts value="false"/>
      <outputpopulation value="true"/>
      <scaleinputdatabase servername="localhost"
databasename="2015_ex_ef_in" description=""/>
      <pmsize value="0"/>
      <outputfactors>
            <timefactors selected="true" units="Hours"/>
            <distancefactors selected="true" units="Miles"/>
            <massfactors selected="true" units="Grams"
energyunits="Joules"/>
      </outputfactors>
      <savedata>

      </savedata>

      <donotexecute>

      </donotexecute>

      <generatordatabase shouldsave="false" servername="" databasename=""
description=""/>
            <donotperformfinalaggregation selected="false"/>
      <lookuptableflags scenarioid="2015_Existing" truncateoutput="true"
truncateactivity="true" truncatebaserates="true"/>
</runspec>
```

5.3.2 2015 Existing Conditions – Diesel PM


```
<runspec version="MOVES2014b-20181203">
	<description><![CDATA[2015 Existing - Emission Factor g/hr Run
Fine Diesel PM]]></description>
	<models>
		<model value="ONROAD"/>
	</models>
	<modelscale value="Inv"/>
	<modeldomain value="PROJECT"/>
	<geographicselections>
		<geographicselection type="COUNTY" key="45019"
description="SOUTH CAROLINA - Charleston County"/>
	</geographicselections>
	<timespan>
		<year key="2015"/>
		<month id="1"/>
		<day id="5"/>
		<beginhour id="8"/>
		<endhour id="8"/>
		<aggregateBy key="Hour"/>
	</timespan>
	<onroadvehicleselections>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="62" sourcetypename="Combination Long-haul Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="61" sourcetypename="Combination Short-haul Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="41" sourcetypename="Intercity Bus"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="32" sourcetypename="Light Commercial Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="54" sourcetypename="Motor Home"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="21" sourcetypename="Passenger Car"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="31" sourcetypename="Passenger Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="51" sourcetypename="Refuse Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="43" sourcetypename="School Bus"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="53" sourcetypename="Single Unit Long-haul Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="52" sourcetypename="Single Unit Short-haul Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="42" sourcetypename="Transit Bus"/>
	</onroadvehicleselections>
	<offroadvehicleselections>
	</offroadvehicleselections>
	<offroadvehiclesccs>
	</offroadvehiclesccs>
	<roadtypes separateramps="false">
		<roadtype roadtypeid="4" roadtypename="Urban Restricted
Access" modelCombination="M1"/>
```

```
      </roadtypes>
      <pollutantprocessassociations>
            <pollutantprocessassociation pollutantkey="118"
pollutantname="Composite - NonECPM" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="118"
pollutantname="Composite - NonECPM" processkey="15" processname="Crankcase
Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="112"
pollutantname="Elemental Carbon" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="112"
pollutantname="Elemental Carbon" processkey="15" processname="Crankcase
Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="119"
pollutantname="H2O (aerosol)" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="119"
pollutantname="H2O (aerosol)" processkey="15" processname="Crankcase
Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="110"
pollutantname="Primary Exhaust PM2.5 - Total" processkey="1"
processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="110"
pollutantname="Primary Exhaust PM2.5 - Total" processkey="15"
processname="Crankcase Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="115"
pollutantname="Sulfate Particulate" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="115"
pollutantname="Sulfate Particulate" processkey="15" processname="Crankcase
Running Exhaust"/>
      </pollutantprocessassociations>
      <databaseselections>
      </databaseselections>
      <internalcontrolstrategies>
<internalcontrolstrategy
classname="gov.epa.otaq.moves.master.implementation.ghg.internalcontrolstr
ategies.rateofprogress.RateOfProgressStrategy"><![CDATA[
useParameters    No

]]></internalcontrolstrategy>
      </internalcontrolstrategies>
      <inputdatabase servername="" databasename="" description=""/>
      <uncertaintyparameters uncertaintymodeenabled="false"
numberofrunspersimulation="0" numberofsimulations="0"/>
      <geographicoutputdetail description="LINK"/>
      <outputemissionsbreakdownselection>
            <modelyear selected="false"/>
            <fueltype selected="false"/>
            <fuelsubtype selected="false"/>
            <emissionprocess selected="false"/>
            <onroadoffroad selected="true"/>
            <roadtype selected="true"/>
            <sourceusetype selected="true"/>
            <movesvehicletype selected="false"/>
```

```
            <onroadscc selected="false"/>
            <estimateuncertainty selected="false" numberOfIterations="2"
keepSampledData="false" keepIterations="false"/>
            <sector selected="false"/>
            <engtechid selected="false"/>
            <hpclass selected="false"/>
            <regclassid selected="false"/>
      </outputemissionsbreakdownselection>
      <outputdatabase servername="" databasename="2015_diesel_pm_out"
description=""/>
      <outputtimestep value="Hour"/>
      <outputvmtdata value="true"/>
      <outputsho value="false"/>
      <outputsh value="false"/>
      <outputshp value="false"/>
      <outputshidling value="false"/>
      <outputstarts value="false"/>
      <outputpopulation value="true"/>
      <scaleinputdatabase servername="localhost"
databasename="2015_diesel_pm_in" description=""/>
      <pmsize value="0"/>
      <outputfactors>
            <timefactors selected="true" units="Hours"/>
            <distancefactors selected="true" units="Miles"/>
            <massfactors selected="true" units="Grams"
energyunits="Joules"/>
      </outputfactors>
      <savedata>

      </savedata>

      <donotexecute>

      </donotexecute>

      <generatordatabase shouldsave="false" servername="" databasename=""
description=""/>
            <donotperformfinalaggregation selected="false"/>
      <lookuptableflags scenarioid="2015_Existing" truncateoutput="true"
truncateactivity="true" truncatebaserates="true"/>
</runspec>
```

5.3.3 2050 No-build Alternative – 12 MSAT Species


```
<runspec version="MOVES2014b-20181203">
	<description><![CDATA[2050 No Build
16 Toxic Species (Entire Contract Scope)]]></description>
	<models>
		<model value="ONROAD"/>
	</models>
	<modelscale value="Rates"/>
	<modeldomain value="PROJECT"/>
	<geographicselections>
		<geographicselection type="COUNTY" key="45019"
description="SOUTH CAROLINA - Charleston County"/>
	</geographicselections>
	<timespan>
		<year key="2050"/>
		<month id="1"/>
		<day id="5"/>
		<beginhour id="8"/>
		<endhour id="8"/>
		<aggregateBy key="Hour"/>
	</timespan>
	<onroadvehicleselections>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="62" sourcetypename="Combination Long-haul Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="61" sourcetypename="Combination Short-haul Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="41" sourcetypename="Intercity Bus"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="32" sourcetypename="Light Commercial Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="54" sourcetypename="Motor Home"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="21" sourcetypename="Passenger Car"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="31" sourcetypename="Passenger Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="51" sourcetypename="Refuse Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="43" sourcetypename="School Bus"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="53" sourcetypename="Single Unit Long-haul Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="52" sourcetypename="Single Unit Short-haul Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="42" sourcetypename="Transit Bus"/>
		<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="61" sourcetypename="Combination Short-haul Truck"/>
		<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="32" sourcetypename="Light Commercial Truck"/>
		<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="54" sourcetypename="Motor Home"/>
		<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="11" sourcetypename="Motorcycle"/>
```

```
            <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="21" sourcetypename="Passenger Car"/>
            <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="31" sourcetypename="Passenger Truck"/>
            <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="51" sourcetypename="Refuse Truck"/>
            <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="43" sourcetypename="School Bus"/>
            <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="53" sourcetypename="Single Unit Long-haul Truck"/>
            <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="52" sourcetypename="Single Unit Short-haul Truck"/>
            <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="42" sourcetypename="Transit Bus"/>
      </onroadvehicleselections>
      <offroadvehicleselections>
      </offroadvehicleselections>
      <offroadvehiclesccs>
      </offroadvehiclesccs>
      <roadtypes separateramps="false">
            <roadtype roadtypeid="4" roadtypename="Urban Restricted
Access" modelCombination="M1"/>
      </roadtypes>
      <pollutantprocessassociations>
            <pollutantprocessassociation pollutantkey="24"
pollutantname="1,3-Butadiene" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="24"
pollutantname="1,3-Butadiene" processkey="15" processname="Crankcase
Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="40"
pollutantname="2,2,4-Trimethylpentane" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="40"
pollutantname="2,2,4-Trimethylpentane" processkey="15"
processname="Crankcase Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="26"
pollutantname="Acetaldehyde" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="26"
pollutantname="Acetaldehyde" processkey="15" processname="Crankcase
Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="27"
pollutantname="Acrolein" processkey="1" processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="27"
pollutantname="Acrolein" processkey="15" processname="Crankcase Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="20"
pollutantname="Benzene" processkey="1" processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="20"
pollutantname="Benzene" processkey="15" processname="Crankcase Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="21"
pollutantname="Ethanol" processkey="1" processname="Running Exhaust"/>
```

```
            <pollutantprocessassociation pollutantkey="21"
pollutantname="Ethanol" processkey="15" processname="Crankcase Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="41"
pollutantname="Ethyl Benzene" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="41"
pollutantname="Ethyl Benzene" processkey="15" processname="Crankcase
Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="25"
pollutantname="Formaldehyde" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="25"
pollutantname="Formaldehyde" processkey="15" processname="Crankcase
Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="42"
pollutantname="Hexane" processkey="1" processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="42"
pollutantname="Hexane" processkey="15" processname="Crankcase Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="79"
pollutantname="Non-Methane Hydrocarbons" processkey="1"
processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="43"
pollutantname="Propionaldehyde" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="43"
pollutantname="Propionaldehyde" processkey="15" processname="Crankcase
Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="44"
pollutantname="Styrene" processkey="1" processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="44"
pollutantname="Styrene" processkey="15" processname="Crankcase Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="45"
pollutantname="Toluene" processkey="1" processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="45"
pollutantname="Toluene" processkey="15" processname="Crankcase Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="1"
pollutantname="Total Gaseous Hydrocarbons" processkey="1"
processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="87"
pollutantname="Volatile Organic Compounds" processkey="1"
processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="46"
pollutantname="Xylene" processkey="1" processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="46"
pollutantname="Xylene" processkey="15" processname="Crankcase Running
Exhaust"/>
      </pollutantprocessassociations>
      <databaseselections>
      </databaseselections>
      <internalcontrolstrategies>
```

```
<internalcontrolstrategy
classname="gov.epa.otaq.moves.master.implementation.ghg.internalcontrolstr
ategies.rateofprogress.RateOfProgressStrategy"><![CDATA[
useParameters    No

]]></internalcontrolstrategy>
      </internalcontrolstrategies>
      <inputdatabase servername="" databasename="" description=""/>
      <uncertaintyparameters uncertaintymodeenabled="false"
numberofrunspersimulation="0" numberofsimulations="0"/>
      <geographicoutputdetail description="LINK"/>
      <outputemissionsbreakdownselection>
            <modelyear selected="false"/>
            <fueltype selected="true"/>
            <fuelsubtype selected="false"/>
            <emissionprocess selected="true"/>
            <onroadoffroad selected="true"/>
            <roadtype selected="true"/>
            <sourceusetype selected="true"/>
            <movesvehicletype selected="false"/>
            <onroadscc selected="false"/>
            <estimateuncertainty selected="false" numberOfIterations="2"
keepSampledData="false" keepIterations="false"/>
            <sector selected="false"/>
            <engtechid selected="false"/>
            <hpclass selected="false"/>
            <regclassid selected="false"/>
      </outputemissionsbreakdownselection>
      <outputdatabase servername="" databasename="2050_NB_out"
description=""/>
      <outputtimestep value="Hour"/>
      <outputvmtdata value="false"/>
      <outputsho value="false"/>
      <outputsh value="false"/>
      <outputshp value="false"/>
      <outputshidling value="true"/>
      <outputstarts value="true"/>
      <outputpopulation value="true"/>
      <scaleinputdatabase servername="localhost" databasename="2050_nb_in"
description=""/>
      <pmsize value="0"/>
      <outputfactors>
            <timefactors selected="true" units="Hours"/>
            <distancefactors selected="true" units="Miles"/>
            <massfactors selected="true" units="Grams"
energyunits="Joules"/>
      </outputfactors>
      <savedata>

      </savedata>

      <donotexecute>

      </donotexecute>
```

```
      <generatordatabase shouldsave="false" servername="" databasename=""
description=""/>
            <donotperformfinalaggregation selected="false"/>
      <lookuptableflags scenarioid="2050_NB" truncateoutput="true"
truncateactivity="true" truncatebaserates="true"/>
</runspec>
```

5.3.4 2050 No-build Alternative – Diesel PM


```
<runspec version="MOVES2014b-20181203">
	<description><![CDATA[2050 No-Build - Emission Factor g/hr Run Fine Diesel PM]]></description>
	<models>
		<model value="ONROAD"/>
	</models>
	<modelscale value="Inv"/>
	<modeldomain value="PROJECT"/>
	<geographicselections>
		<geographicselection type="COUNTY" key="45019" description="SOUTH CAROLINA - Charleston County"/>
	</geographicselections>
	<timespan>
		<year key="2050"/>
		<month id="1"/>
		<day id="5"/>
		<beginhour id="8"/>
		<endhour id="8"/>
		<aggregateBy key="Hour"/>
	</timespan>
	<onroadvehicleselections>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="62" sourcetypename="Combination Long-haul Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="61" sourcetypename="Combination Short-haul Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="41" sourcetypename="Intercity Bus"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="32" sourcetypename="Light Commercial Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="54" sourcetypename="Motor Home"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="21" sourcetypename="Passenger Car"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="31" sourcetypename="Passenger Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="51" sourcetypename="Refuse Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="43" sourcetypename="School Bus"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="53" sourcetypename="Single Unit Long-haul Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="52" sourcetypename="Single Unit Short-haul Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel Fuel" sourcetypeid="42" sourcetypename="Transit Bus"/>
	</onroadvehicleselections>
	<offroadvehicleselections>
	</offroadvehicleselections>
	<offroadvehiclesccs>
	</offroadvehiclesccs>
	<roadtypes separateramps="false">
		<roadtype roadtypeid="4" roadtypename="Urban Restricted Access" modelCombination="M1"/>
```

```
      &lt;/roadtypes&gt;
      &lt;pollutantprocessassociations&gt;
            <pollutantprocessassociation pollutantkey="118"
pollutantname="Composite - NonECPM" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="118"
pollutantname="Composite - NonECPM" processkey="15" processname="Crankcase
Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="112"
pollutantname="Elemental Carbon" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="112"
pollutantname="Elemental Carbon" processkey="15" processname="Crankcase
Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="119"
pollutantname="H2O (aerosol)" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="119"
pollutantname="H2O (aerosol)" processkey="15" processname="Crankcase
Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="110"
pollutantname="Primary Exhaust PM2.5 - Total" processkey="1"
processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="110"
pollutantname="Primary Exhaust PM2.5 - Total" processkey="15"
processname="Crankcase Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="115"
pollutantname="Sulfate Particulate" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="115"
pollutantname="Sulfate Particulate" processkey="15" processname="Crankcase
Running Exhaust"/>
      &lt;/pollutantprocessassociations&gt;
      &lt;databaseselections&gt;
      &lt;/databaseselections&gt;
      &lt;internalcontrolstrategies&gt;
<internalcontrolstrategy
classname="gov.epa.otaq.moves.master.implementation.ghg.internalcontrolstr
ategies.rateofprogress.RateOfProgressStrategy"><![CDATA[
useParameters    No

]]>&lt;/internalcontrolstrategy&gt;
      &lt;/internalcontrolstrategies&gt;
      &lt;inputdatabase servername="" databasename="" description=""/&gt;
      <uncertaintyparameters uncertaintymodeenabled="false"
numberofrunspersimulation="0" numberofsimulations="0"/>
      &lt;geographicoutputdetail description="LINK"/&gt;
      &lt;outputemissionsbreakdownselection&gt;
            &lt;modelyear selected="false"/&gt;
            &lt;fueltype selected="false"/&gt;
            &lt;fuelsubtype selected="false"/&gt;
            &lt;emissionprocess selected="false"/&gt;
            &lt;onroadoffroad selected="true"/&gt;
            &lt;roadtype selected="true"/&gt;
            &lt;sourceusetype selected="true"/&gt;
            &lt;movesvehicletype selected="false"/&gt;
```

```
			<onroadscc selected="false"/>
			<estimateuncertainty selected="false" numberOfIterations="2"
keepSampledData="false" keepIterations="false"/>
			<sector selected="false"/>
			<engtechid selected="false"/>
			<hpclass selected="false"/>
			<regclassid selected="false"/>
		</outputemissionsbreakdownselection>
		<outputdatabase servername="" databasename="2050_nb_diesel_pm_out"
description=""/>
		<outputtimestep value="Hour"/>
		<outputvmtdata value="true"/>
		<outputsho value="false"/>
		<outputsh value="false"/>
		<outputshp value="false"/>
		<outputshidling value="false"/>
		<outputstarts value="false"/>
		<outputpopulation value="true"/>
		<scaleinputdatabase servername="localhost"
databasename="2050_nb_diesel_pm_in" description=""/>
		<pmsize value="0"/>
		<outputfactors>
			<timefactors selected="true" units="Hours"/>
			<distancefactors selected="true" units="Miles"/>
			<massfactors selected="true" units="Grams"
energyunits="Joules"/>
		</outputfactors>
		<savedata>

		</savedata>

		<donotexecute>

		</donotexecute>

		<generatordatabase shouldsave="false" servername="" databasename=""
description=""/>
			<donotperformfinalaggregation selected="false"/>
		<lookuptableflags scenarioid="2015_Existing" truncateoutput="true"
truncateactivity="true" truncatebaserates="true"/>
</runspec>
```

5.3.5 2050 Build Alternative – 12 MSAT Species


```
<runspec version="MOVES2014b-20181203">
	<description><![CDATA[2050 B - Emission Factor g/hr Run
Toxic Species (Entire Contract Scope)]]></description>
	<models>
		<model value="ONROAD"/>
	</models>
	<modelscale value="Inv"/>
	<modeldomain value="PROJECT"/>
	<geographicselections>
		<geographicselection type="COUNTY" key="45019"
description="SOUTH CAROLINA - Charleston County"/>
	</geographicselections>
	<timespan>
		<year key="2050"/>
		<month id="1"/>
		<day id="5"/>
		<beginhour id="8"/>
		<endhour id="8"/>
		<aggregateBy key="Hour"/>
	</timespan>
	<onroadvehicleselections>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="62" sourcetypename="Combination Long-haul Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="61" sourcetypename="Combination Short-haul Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="41" sourcetypename="Intercity Bus"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="32" sourcetypename="Light Commercial Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="54" sourcetypename="Motor Home"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="21" sourcetypename="Passenger Car"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="31" sourcetypename="Passenger Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="51" sourcetypename="Refuse Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="43" sourcetypename="School Bus"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="53" sourcetypename="Single Unit Long-haul Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="52" sourcetypename="Single Unit Short-haul Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="42" sourcetypename="Transit Bus"/>
		<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="61" sourcetypename="Combination Short-haul Truck"/>
		<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="32" sourcetypename="Light Commercial Truck"/>
		<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="54" sourcetypename="Motor Home"/>
		<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="11" sourcetypename="Motorcycle"/>
```

```
            <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="21" sourcetypename="Passenger Car"/>
            <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="31" sourcetypename="Passenger Truck"/>
            <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="51" sourcetypename="Refuse Truck"/>
            <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="43" sourcetypename="School Bus"/>
            <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="53" sourcetypename="Single Unit Long-haul Truck"/>
            <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="52" sourcetypename="Single Unit Short-haul Truck"/>
            <onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline"
sourcetypeid="42" sourcetypename="Transit Bus"/>
      </onroadvehicleselections>
      <offroadvehicleselections>
      </offroadvehicleselections>
      <offroadvehiclesccs>
      </offroadvehiclesccs>
      <roadtypes separateramps="false">
            <roadtype roadtypeid="4" roadtypename="Urban Restricted
Access" modelCombination="M1"/>
      </roadtypes>
      <pollutantprocessassociations>
            <pollutantprocessassociation pollutantkey="24"
pollutantname="1,3-Butadiene" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="24"
pollutantname="1,3-Butadiene" processkey="15" processname="Crankcase
Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="40"
pollutantname="2,2,4-Trimethylpentane" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="40"
pollutantname="2,2,4-Trimethylpentane" processkey="15"
processname="Crankcase Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="26"
pollutantname="Acetaldehyde" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="26"
pollutantname="Acetaldehyde" processkey="15" processname="Crankcase
Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="27"
pollutantname="Acrolein" processkey="1" processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="27"
pollutantname="Acrolein" processkey="15" processname="Crankcase Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="20"
pollutantname="Benzene" processkey="1" processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="20"
pollutantname="Benzene" processkey="15" processname="Crankcase Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="41"
pollutantname="Ethyl Benzene" processkey="1" processname="Running
Exhaust"/>
```

```
            <pollutantprocessassociation pollutantkey="41"
pollutantname="Ethyl Benzene" processkey="15" processname="Crankcase
Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="25"
pollutantname="Formaldehyde" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="25"
pollutantname="Formaldehyde" processkey="15" processname="Crankcase
Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="42"
pollutantname="Hexane" processkey="1" processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="42"
pollutantname="Hexane" processkey="15" processname="Crankcase Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="79"
pollutantname="Non-Methane Hydrocarbons" processkey="1"
processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="43"
pollutantname="Propionaldehyde" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="43"
pollutantname="Propionaldehyde" processkey="15" processname="Crankcase
Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="44"
pollutantname="Styrene" processkey="1" processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="44"
pollutantname="Styrene" processkey="15" processname="Crankcase Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="45"
pollutantname="Toluene" processkey="1" processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="45"
pollutantname="Toluene" processkey="15" processname="Crankcase Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="1"
pollutantname="Total Gaseous Hydrocarbons" processkey="1"
processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="87"
pollutantname="Volatile Organic Compounds" processkey="1"
processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="46"
pollutantname="Xylene" processkey="1" processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="46"
pollutantname="Xylene" processkey="15" processname="Crankcase Running
Exhaust"/>
      </pollutantprocessassociations>
      <databaseselections>
      </databaseselections>
      <internalcontrolstrategies>
<internalcontrolstrategy
classname="gov.epa.otaq.moves.master.implementation.ghg.internalcontrolstr
ategies.rateofprogress.RateOfProgressStrategy"><![CDATA[
useParameters    No

]]></internalcontrolstrategy>
      </internalcontrolstrategies>
      <inputdatabase servername="" databasename="" description=""/>
```

```
	<uncertaintyparameters uncertaintymodeenabled="false"
numberofrunspersimulation="0" numberofsimulations="0"/>
	<geographicoutputdetail description="LINK"/>
	<outputemissionsbreakdownselection>
		<modelyear selected="false"/>
		<fueltype selected="true"/>
		<fuelsubtype selected="false"/>
		<emissionprocess selected="true"/>
		<onroadoffroad selected="true"/>
		<roadtype selected="true"/>
		<sourceusetype selected="true"/>
		<movesvehicletype selected="false"/>
		<onroadscc selected="false"/>
		<estimateuncertainty selected="false" numberOfIterations="2"
keepSampledData="false" keepIterations="false"/>
		<sector selected="false"/>
		<engtechid selected="false"/>
		<hpclass selected="false"/>
		<regclassid selected="false"/>
	</outputemissionsbreakdownselection>
	<outputdatabase servername="" databasename="2050_b_ef_out"
description=""/>
	<outputtimestep value="Hour"/>
	<outputvmtdata value="true"/>
	<outputsho value="false"/>
	<outputsh value="false"/>
	<outputshp value="false"/>
	<outputshidling value="false"/>
	<outputstarts value="false"/>
	<outputpopulation value="true"/>
	<scaleinputdatabase servername="localhost"
databasename="2050_b_ef_in" description=""/>
	<pmsize value="0"/>
	<outputfactors>
		<timefactors selected="true" units="Hours"/>
		<distancefactors selected="true" units="Miles"/>
		<massfactors selected="true" units="Grams"
energyunits="Joules"/>
	</outputfactors>
	<savedata>

	</savedata>

	<donotexecute>

	</donotexecute>

	<generatordatabase shouldsave="false" servername="" databasename=""
description=""/>
		<donotperformfinalaggregation selected="false"/>
	<lookuptableflags scenarioid="2015_Existing" truncateoutput="true"
truncateactivity="true" truncatebaserates="true"/>
</runspec>
```

5.3.6 2050 Build Alternative – Diesel PM


```
<runspec version="MOVES2014b-20181203">
	<description><![CDATA[2050 Build - Emission Factor g/hr Run
Fine Diesel PM]]></description>
	<models>
		<model value="ONROAD"/>
	</models>
	<modelscale value="Inv"/>
	<modeldomain value="PROJECT"/>
	<geographicselections>
		<geographicselection type="COUNTY" key="45019"
description="SOUTH CAROLINA - Charleston County"/>
	</geographicselections>
	<timespan>
		<year key="2050"/>
		<month id="1"/>
		<day id="5"/>
		<beginhour id="8"/>
		<endhour id="8"/>
		<aggregateBy key="Hour"/>
	</timespan>
	<onroadvehicleselections>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="62" sourcetypename="Combination Long-haul Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="61" sourcetypename="Combination Short-haul Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="41" sourcetypename="Intercity Bus"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="32" sourcetypename="Light Commercial Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="54" sourcetypename="Motor Home"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="21" sourcetypename="Passenger Car"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="31" sourcetypename="Passenger Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="51" sourcetypename="Refuse Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="43" sourcetypename="School Bus"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="53" sourcetypename="Single Unit Long-haul Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="52" sourcetypename="Single Unit Short-haul Truck"/>
		<onroadvehicleselection fueltypeid="2" fueltypedesc="Diesel
Fuel" sourcetypeid="42" sourcetypename="Transit Bus"/>
	</onroadvehicleselections>
	<offroadvehicleselections>
	</offroadvehicleselections>
	<offroadvehiclesccs>
	</offroadvehiclesccs>
	<roadtypes separateramps="false">
```

```
            <roadtype roadtypeid="4" roadtypename="Urban Restricted
Access" modelCombination="M1"/>
      </roadtypes>
      <pollutantprocessassociations>
            <pollutantprocessassociation pollutantkey="118"
pollutantname="Composite - NonECPM" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="118"
pollutantname="Composite - NonECPM" processkey="15" processname="Crankcase
Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="112"
pollutantname="Elemental Carbon" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="112"
pollutantname="Elemental Carbon" processkey="15" processname="Crankcase
Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="119"
pollutantname="H2O (aerosol)" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="119"
pollutantname="H2O (aerosol)" processkey="15" processname="Crankcase
Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="110"
pollutantname="Primary Exhaust PM2.5 - Total" processkey="1"
processname="Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="110"
pollutantname="Primary Exhaust PM2.5 - Total" processkey="15"
processname="Crankcase Running Exhaust"/>
            <pollutantprocessassociation pollutantkey="115"
pollutantname="Sulfate Particulate" processkey="1" processname="Running
Exhaust"/>
            <pollutantprocessassociation pollutantkey="115"
pollutantname="Sulfate Particulate" processkey="15" processname="Crankcase
Running Exhaust"/>
      </pollutantprocessassociations>
      <databaseselections>
      </databaseselections>
      <internalcontrolstrategies>
<internalcontrolstrategy
classname="gov.epa.otaq.moves.master.implementation.ghg.internalcontrolstr
ategies.rateofprogress.RateOfProgressStrategy"><![CDATA[
useParameters    No

]]></internalcontrolstrategy>
      </internalcontrolstrategies>
      <inputdatabase servername="" databasename="" description=""/>
      <uncertaintyparameters uncertaintymodeenabled="false"
numberofrunspersimulation="0" numberofsimulations="0"/>
      <geographicoutputdetail description="LINK"/>
      <outputemissionsbreakdownselection>
            <modelyear selected="false"/>
            <fueltype selected="false"/>
            <fuelsubtype selected="false"/>
            <emissionprocess selected="false"/>
            <onroadoffroad selected="true"/>
            <roadtype selected="true"/>
```

```
            <sourceusetype selected="true"/>
            <movesvehicletype selected="false"/>
            <onroadscc selected="false"/>
            <estimateuncertainty selected="false" numberOfIterations="2"
keepSampledData="false" keepIterations="false"/>
            <sector selected="false"/>
            <engtechid selected="false"/>
            <hpclass selected="false"/>
            <regclassid selected="false"/>
      </outputemissionsbreakdownselection>
      <outputdatabase servername="" databasename="2050_bld_diesel_pm_out"
description=""/>
      <outputtimestep value="Hour"/>
      <outputvmtdata value="true"/>
      <outputsho value="false"/>
      <outputsh value="false"/>
      <outputshp value="false"/>
      <outputshidling value="false"/>
      <outputstarts value="false"/>
      <outputpopulation value="true"/>
      <scaleinputdatabase servername="localhost"
databasename="2050_bld_diesel_pm_in" description=""/>
      <pmsize value="0"/>
      <outputfactors>
            <timefactors selected="true" units="Hours"/>
            <distancefactors selected="true" units="Miles"/>
            <massfactors selected="true" units="Grams"
energyunits="Joules"/>
      </outputfactors>
      <savedata>

      </savedata>

      <donotexecute>

      </donotexecute>

      <generatordatabase shouldsave="false" servername="" databasename=""
description=""/>
            <donotperformfinalaggregation selected="false"/>
      <lookuptableflags scenarioid="2015_Existing" truncateoutput="true"
truncateactivity="true" truncatebaserates="true"/>
</runspec>
```