Air Quality and Health Risk Assessments Technical Study for the I-710 Corridor Environmental Impact Report / Environmental Impact Statement

Addendum 1
Air Quality and Health Risk Technical Study for the Zero Emission Extension Design Option

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1 Introduction

A design option for the I-710 Corridor Project Alternatives 6B and 6C, known as the Zero Emission Extension (ZEE), was developed so that the air quality benefits seen along the zero-emission freight corridor would extend beyond its northern terminus, up to the SR-60. All 2035 I-710 Corridor Project Alternatives show reduced cancer risk impacts compared to the 2008 base year for all residential areas along the I-710; 2035 Build Alternatives 6B and 6C have lower incremental cancer risk and other impacts compared to the 2035 No-Build Alternative where the zero-emission freight corridor exists. The ZEE Design Option extends the zero emission infrastructure beyond the freight corridor. For purposes of the environmental impact analyses, an electric wayside power distribution system, such as an Overhead Catenary System (OCS), is assumed to be extended between the north end of the freight corridor and SR-60. The OCS would be above the two right-hand lanes (both northbound and southbound) on the I-710 mainline. Zero emission-capable trucks will utilize these two right lanes of the I-710 mainline, and this will have an impact on air quality. This study is a summary of the air quality results of the ZEE Design Option.

This report is an addendum to the February 2012 Final Air Quality and Health Risk Assessments Technical Study for the I-710 Corridor Environmental Impact Report / Environmental Impact Statement (referred to hereinafter as the AQ/HRA Technical Study or the AQ/HRA main report). This addendum briefly describes the methodologies used to analyze the ZEE Design Option and presents the air emissions, air quality impacts, and health risk assessment results comparing the ZEE Design Option with original AQ/HRA Technical Study analyses of Alternatives 6B and 6C (the Original Analysis).

Summary of results: Similar to the methodology in the AQ/HRA Technical Study, the ZEE Design Option compares the 2035 Build Alternatives 6B and 6C to the 2008 baseline. The results are similar in that there is not an appreciable effect on the incremental emissions, air quality impacts, or health risk impacts. However, when the 2035 Build Alternatives 6B and 6C are compared to 2035 Alternative 1 (No-Build), the results of the ZEE Design Option appreciably reduce the emissions, improve air quality, and reduce health risk impacts compared to the Original Analysis in the vicinity of the zero emission freight corridor northern terminus and SR-60. Thus, the original 2035 Build Alternatives 6B and 6C evaluated in the AQ/HRA Technical Study and the ZEE Design Option are comparable and generally positive, but the results of the ZEE Design Option analysis show air quality benefits north of the railyards. For example, incremental cancer risk (compared to the 2035 No-Build Alternative) decreases both north and south of the railyards for the ZEE Design Option, in contrast to increases in incremental cancer risk north of the railyards when the zero emission extension was not present in the Original Analysis.

1.1 Project Description

The ZEE Design Option applies only to Alternatives 6B and 6C. The ZEE Design Option will provide the ability for zero-emission trucks to operate in zero-emission mode via an extension of an overhead catenary electric power distribution system onto the I-710 in both northbound and southbound directions between the northern terminus of the freight corridor connector ramps

to/from the I-710 general purpose lanes (located south of the Bandini Boulevard / I-710 interchange) and the I-710/SR-60 mainline overcrossing. Exhibit A (in the Figures section) presents a schematic of key traffic links analyzed in this study:

- Freight corridor (red in Exhibit A)
  - Original Analysis and ZEE Design Option: zero emissions
- Freight corridor ramps (orange in Exhibit A)
  - Original Analysis: 2035 emissions
  - ZEE Option truck analyses: zero emissions
- General purpose lanes south of railyards (yellow in Exhibit A)
  - Original Analysis and ZEE Design Option: 2035 emissions
- General purpose lanes north of railyards to SR-60 (green in Exhibit A)
  - Original Analysis: 2035 emission
  - ZEE Design Option:
    - Zero emissions for trucks in the two right-hand lanes (both northbound and southbound)
    - 2035 emissions for trucks in other general purpose lanes

In the ZEE Design Option, zero-emission electric trucks are assumed to receive electric power while traveling along the two outermost (right-hand) general purpose lanes (in each direction) such as via an overhead catenary electric power distribution system (road-connected power). The zero-emission trucks exiting (northbound) or entering (southbound) the freight corridor would be operating in a zero-emission mode under this design option along this segment of I-710 (railyard to SR-60).

2 Emissions Methodology for ZEE Design Option

The February 2012 AQ/HRA Technical Study describes the methodologies used in the I-710 Corridor Project AQ/HRA. This section briefly describes specific variations on the emissions methodologies used to analyze the air quality and health risk impacts for the ZEE Design Option. Unless described below, ENVIRON used the same AQ/HRA analysis methodologies for the ZEE Design Option as in the original February 2012 AQ/HRA Technical Study.

The two main steps in quantifying emissions from freeway/roadway traffic are:

- **Vehicle Activity Data:** This step involves calculating the vehicle activity for various vehicle types in terms of speed and vehicle miles traveled (VMT); and
- **Emission Factors:** This step involves identifying emission factors for the various vehicle types.

2.1 Vehicle Activity Data

Vehicle activity data consists of three major components that are used in the emission calculations: traffic link length, average vehicle speed on each traffic link, and traffic volumes for different vehicle classes on each traffic link[1] in the I-710 Traffic Model. The ZEE Design Option does not alter any of these parameters. The only change that occurs in the ZEE Design Option is the conversion of a certain percentage of the truck traffic on I-710 to zero emission vehicles between the north end of the freight corridor and the SR-60, as described in the project description above. Tables 1a and 1b show the percentage of trucks in the ZEE Design Option that would operate in a zero-emission mode, such as by connecting to an extended OCS for Alternatives 6B and 6C, respectively. This percentage varies with

- Time of the day (AM, midday, PM, and nighttime)
- Location on the I-710 freeway

The number of electric powered, zero emission trucks forecast to utilize the I-710 ZEE Design Option north of the proposed freight corridor termini in Alternatives 6B and 6C is projected based on the I-710 Corridor Project EIR/EIS traffic forecasting model forecasts. Specifically, the forecast distribution of port trucks and non-port trucks traveling on the I-710 general purpose lanes versus the freight corridor in the northern portion of I-710 is the basis for estimating the number of trucks that would be zero emission trucks on the I-710 between the north end of the freight corridor and SR-60 that would use the ZEE to operate in a zero-emissions mode.

The key assumption for the ZEE Design Option is that all heavy duty trucks (port trucks and non-port trucks) traveling on the I-710 freight corridor south of I-5 in Alternatives 6B and 6C are assumed to be zero emission trucks. In addition, all port trucks traveling on the I-710 general purpose lanes in these two alternatives are assumed to be zero emission-capable trucks as

[1] ENVIRON. Appendix C - Operational Emissions. Air Quality and Health Risk Assessments (AQ/HRA) Technical Study for the I-710 Corridor Environmental Impact Report/Environmental Impact Statement. February 2012.

well. These assumptions derive from the underlying assumption of Alternatives 6B and 6C that all trucks traveling on the freight corridor are zero emission trucks and that a future element of the Ports' Clean Trucks Program will restrict port access to only zero emission trucks.

The non-port trucks forecast to be traveling on the I-710 general purpose lanes north of I-5 were then further analyzed based on their trip origins/destinations and associated distribution among the I-5, SR-60 and I-10 interchanges with I-710. It was estimated from this analysis that approximately twenty (20) percent of these non-port trucks would be zero emission capable trucks as well. Finally, the total projected number of zero emission trucks derived from the above methodology was reduced as necessary so as not to exceed the capacity of the two northbound and two southbound lanes on I-710 that are defined to have the overhead electric power distribution system in this design option.

2.2 Emission Factors

ENVIRON used the 2035 emission factors as derived in the main AQ/HRA report[2,3] to develop the emission estimates. For trucks using the OCS north of the freight corridor terminus, ENVIRON adjusted the exhaust emissions for the appropriate percentage of truck traffic (see 2.1.1 above) to zero. Emissions from all other trucks and vehicles were the same as in the original February 2012 AQ/HRA Technical Study.

[2] ENVIRON. Appendix C - Operational Emissions. Air Quality and Health Risk Assessments (AQ/HRA) Technical Study for the I-710 Corridor Environmental Impact Report/Environmental Impact Statement. February 2012.

[3] ENVIRON. Appendix F – Traffic Greenhouse Gas Emissions. Air Quality and Health Risk Assessments (AQ/HRA) Technical Study for the I-710 Corridor Environmental Impact Report/Environmental Impact Statement. February 2012.

3 Emissions

3.1 Criteria Pollutant Emissions

Table 2a presents the incremental emissions of the criteria pollutants from the I-710 freeway for the ZEE Design Option and the AQ/HRA Technical Study as compared to 2008 baseline. There was no significant change in incremental emissions for the I-710 freeway between the ZEE Design Option and the Original Analysis for both Alternatives 6B and 6C, although emissions decrease 10% to 88% on the I-710 mainline north of the northern terminus of the freight corridor compared to the Original Analysis. Table 2b presents the incremental emissions of the criteria pollutants from the I-710 freeway for the ZEE Design Option and the Original Analysis as compared to Alternative 1 (the 2035 No-Build Alternative). The incremental criteria pollutant exhaust emissions (compared to Alternative 1) from the entire I-710 freeway decreased by 2% to 15% in the ZEE Design Option; the largest decreases of 11% to 15% were observed in the NO_X emissions.

Figures 1 through 4 present a comparison of the incremental emission impacts for the ZEE Design Option and the Original Analysis. Figures 1 and 2 present the incremental (vs. 2008 and vs. Alternative 1) gridded mass emission figures of NO_X emissions for Alternatives 6B and 6C , respectively. Figures 3 (3A and 3B) and 4 (4A and 4B) present similar gridded mass emission figures for PM_{10} (total and exhaust) and $PM_{2.5}$ (total and exhaust) emissions. Exhaust emissions decrease for the ZEE Design Option as compared to the Original Analysis.

> **NOTE**: 2035 entrained road dust emissions were calculated using future year VMT multiplied by the January 2011 EPA AP-42 emission factors. In previous air quality management plans, the South Coast Air Quality Management District (SCAQMD) have NOT calculated future year entrained road dust emissions based on growth in future VMT. As discussed in the AQ/HRA Technical Study, the SCAQMD has stated that it is proposing using the recently revised California Air Resources Board (CARB) methodology that holds future year entrained road dust to the base year levels. The methodology proposed by CARB and SCAQMD would suggest that PM emissions along the I-710 general purpose lanes north of the northern terminus of the freight corridor should be the exhaust-only emissions (which also include brake and tire wear emissions) rather than total emissions (adding the VMT-dependent future entrained road dust emissions).

The decrease in the total PM emissions is not as great as the decrease in other exhaust emissions. This is because a significant portion of the total PM emissions is entrained PM, which does not change for the ZEE Design Option as compared to the Original Analysis. (See AQ/HRA Technical Study for a complete discussion of entrained road dust emissions and recent changes in methodologies.) As discussed above, incremental exhaust-only PM emissions impacts (which include brake and tire wear emissions) are most representative of expected incremental PM emission impacts.

3.2 Mobile Source Air Toxics Emissions

The diesel particulate matter (DPM) emissions on the I-710 general purpose lanes north of the northern terminus of the freight corridor to SR-60 decrease by 66% to 86% due to the extension of the OCS in the ZEE Design Option. DPM is commonly used as a surrogate for evaluating the health risk (cancer and chronic) impacts from the trucks. DPM emissions on the I-710 freeway decrease by 7% to 11% in the ZEE Design Option as compared to the Original Analysis. Tables 3a and 3b present the differences in mobile source air toxics (MSAT) emissions from the I-710 freeway for the ZEE Design Option and the Original Analysis as compared to 2008 baseline and Alternative 1 (No Build) calculated using the I-710 traffic model and post-processed traffic data, respectively. The ZEE Design Option offers greater reduction in DPM emissions when compared with the Alternatives presented in the AQ/HRA Technical Study. No change is observed in emissions of the other MSATs because they are only emitted by gasoline-powered automobiles.

Figures 5 and 6 present the incremental gridded emission maps for DPM emissions for Alternative 6B and Alternative 6C, respectively; reductions in incremental DPM emissions for the ZEE Design Option can be seen north of the northern terminus of the freight corridor.

3.3 Greenhouse Gas Emissions

Methane (CH_4) and nitrous oxide (N_2O) do not change appreciably in the ZEE Design Option (compared to the original Alternatives 6B and 6C evaluated in the original AQ/HRA Technical Study) because trucks are an insignificant source of these emissions[4]. The total GHG emissions decrease by 46,000 tons CO_2 eq (tons of CO_2 equivalents) and 36,000 tons CO_2 eq for Alternatives 6B and 6C, respectively in the ZEE Design Option as compared to the original Alternatives 6B and 6C evaluated in the original AQ/HRA Technical Study. This change is negligible (< 0.5% change in emissions with the ZEE Design Option).

3.4 I-710 Freeway Air Dispersion Modeling Emissions

Tables 4 and 5 present the incremental criteria and air toxic pollutants along the I-710 freeway using the post-processed traffic data, which is the basis of the I-710 freeway air dispersion modeling analyses. The February 2012 AQ/HRA Technical Study describes the development and use of post-processed emissions for I-710 freeway modeling.

[4] Tables F.1-1F and F.1-1G Appendix F – Traffic Greenhouse Gas Emissions. Air Quality and Health Risk Assessments (AQ/HRA) Technical Study for the I-710 Corridor Environmental Impact Report/Environmental Impact Statement, prepared by ENVIRON International Corporation, February 2012.

4 Comparison of Ambient Air Quality Impacts

Table 6 shows that there was no change in maximum incremental impacts (compared to 2008) for total PM_{10} and $PM_{2.5}$ concentrations for the ZEE Design Option compared to the Original Analysis. However, the exhaust only PM_{10} and $PM_{2.5}$ incremental impacts (compared to 2008) are lower for the ZEE Design Option as compared to the Original Analysis. (As discussed previously, the exhaust-only PM concentration impacts are the most consistent with CARB/SCAQMD methodologies for paved road dust and are the most likely impacts.) Figures 7 through 10 show the maximum 24-hr PM_{10} concentration impacts in Meteorological Zone 4 for the ZEE Design Option and the results of Alternatives 6B/6C in the AQ/HRA Technical Study as compared to 2008 baseline and Alternative 1 (No Build). The figures include total (infinite road dust reservoir) and the exhaust-only incremental PM impact results. Figures 11 through 14 present similar plots for the maximum 24-hr $PM_{2.5}$ concentration impacts. Figures 15 through 22 present the maximum annual PM_{10} and $PM_{2.5}$ concentration impacts in Meteorological Zone 4 compared to the 2008 baseline and Alternative 1 (for exhaust-only and total emissions). An appreciable decrease in the exhaust PM_{10} and $PM_{2.5}$ impacts can be seen in these figures for the ZEE Design Option (Alternative 6B/6C vs. Alternative 1) as compared to the AQ/HRA Technical Study in the area north of the northern terminus of the freight corridor.

As stated earlier in this report, entrained PM emissions, which form a major portion of the total PM emissions, do not change for the ZEE Design Option as compared to the AQ/HRA Technical Study. Therefore, the total PM_{10} and $PM_{2.5}$ impacts do not show an appreciable decrease for the ZEE Design Option. As discussed above, impacts from exhaust-only PM emissions (which include brake and tire wear emissions) are likely the most representative of expected incremental PM concentration impacts.

In general, the air quality impacts (relative to the 2035 No-Build Alternative) north and south of the railyards are relatively similar for the ZEE Design Option, in contrast to the greater adverse impacts seen north of the railyards in the analysis of the AQ/HRA Technical Study.

Table 7 shows the maximum NO_2 and CO impacts from I-710 freeway emissions for the ZEE Design Option and the AQ/HRA Technical Study of Alternatives 6B/6C as compared to 2008 baseline. As in the Original Analysis, all maximum incremental impacts (compared to 2008) were less than zero. With the exception of 1-hour NO_x (where the ZEE Design Option had a lower maximum impact), there were no appreciable changes observed in the maximum impacts between ZEE Design Option and the Original Analysis.

5 Comparison of Health Risk Impacts

Incremental health risks (i.e., cancer risk, chronic and acute non-cancer hazard indices) were assessed using the methodology in the February 2012 AQ/HRA Technical Study. Figures 23 and 24 show comparisons of the incremental cancer risks (residential risk scenario for all areas, which is conservative) for the ZEE Design Option and the Original Analysis for Alternatives 6B/6C as compared to 2008 baseline and Alternative 1 in Meteorological Zone 4.

Compared to 2008, there is little difference in incremental cancer risk between the ZEE Design Option and the Original Analysis (see the left-hand sides of Figures 23 and 24). Table 8 shows the maximum incremental health risk impacts for Alternatives 6B/6C as compared to 2008 baseline. These show either no change or no appreciable change in maximum impacts for the ZEE Design Option compared to the Original Analysis.

Compared to 2035 Alternative 1 (No-build), the incremental cancer risks for Alternatives 6B/6C decrease at all of the modeling grid points in the area of the ZEE Design Option OCS when compared with the Original Analysis. Incremental cancer risk (compared to the 2035 No-Build Alternative) decreases both north and south of the railyards for the ZEE Design Option, in contrast to increases in incremental cancer risk (compared to 2035 No-Build) north of the railyards when the zero emission extension was not present (as in the original AQ/HRA Technical Study).

6 Conclusions

The ZEE Design Option does not cause any appreciable changes in the total incremental criteria pollutant or MSAT emissions from the total length of I-710 freeway (including the proposed freight corridor). However, zero-emission truck traffic on the I-710 general purpose lanes north of the railyard (such as through the extensions of the OCS in the ZEE Design Option) reduces criteria pollutant emissions by 10% to 88% and the DPM emissions by 66% to 86% in those areas (compared to the Original Analysis). (The Original Analysis assumed that trucks were only zero emission on the freight corridor. Trucks in the two right-hand general-purpose lanes north of the railyard [northbound and southbound] would be zero-emission in the ZEE Design Option.) This leads to considerable localized reductions in both criteria pollutant and MSAT impacts in that area.

In conclusion, the ZEE Design Option reduces air quality and health risk impacts in the area between the northern terminus of the freight corridor and the SR-60, as compared to the original AQ/HRA Technical Study. The emissions, air quality impacts, and health risks (relative to the 2035 No-Build Alternative) north and south of the railyards are relatively similar for the ZEE Design Option, in contrast to the greater adverse impacts seen north of the railyards in the Original Analysis. For example, incremental cancer risk (compared to the 2035 No-Build Alternative) decreases both north and south of the railyards for the ZEE Design Option, in contrast to increases in incremental cancer risk north of the railyards when the zero emission extension was not present in the Original Analysis.

Tables

Table 1a. Percentage of Trucks Electrified in the Alternative 6B ZEE Design Option

Link ID [1]	Segment Description	Length [2] (mi)	AM (6:00 AM to 9:00 AM)			Mid Day (9:00 AM to 3:00 PM)			PM (3:00 PM to 7:00 PM)			Night Time (7:00 PM to 6:00 AM)		
			Speed (mph)	Non Port Trucks	Port Trucks	Speed (mph)	Non Port Trucks	Port Trucks	Speed (mph)	Non Port Trucks	Port Trucks	Speed (mph)	Non Port Trucks	Port Trucks
14729	NB ML	0.18	48	34%	100%	56	21%	100%	37	21%	100%	65	22%	100%
14740	SB ML North of I-5	0.65	35	62%	100%	48	55%	100%	27	76%	100%	65	16%	100%
14748	NB ML	0.11	14	34%	100%	24	21%	100%	9	21%	100%	65	22%	100%
14761	NB ML	0.20	14	34%	100%	24	21%	100%	9	21%	100%	65	22%	100%
14768	NB ML	0.17	19	34%	100%	32	21%	100%	12	21%	100%	65	22%	100%
14775	SB ML North of I-5	0.17	32	62%	100%	46	55%	100%	24	76%	100%	65	16%	100%
14776	NB ML	0.46	23	34%	100%	34	21%	100%	14	21%	100%	65	22%	100%
14784	NB ML	0.19	32	34%	100%	45	21%	100%	25	21%	100%	65	22%	100%
14790	SB ML South of I-5	0.36	34	68%	100%	43	60%	100%	24	83%	100%	65	21%	100%
14791	NB ML	0.17	24	34%	100%	35	21%	100%	16	21%	100%	65	22%	100%
14794	SB ML North of I-5	0.20	38	62%	100%	49	55%	100%	29	76%	100%	65	16%	100%
14799	SB ML North of I-5	0.06	29	62%	100%	43	55%	100%	22	76%	100%	65	16%	100%
14828	SB ML South of I-5	0.17	38	68%	100%	46	60%	100%	27	83%	100%	65	21%	100%
14858	NB ML	0.37	32	34%	100%	45	21%	100%	25	21%	100%	65	22%	100%
14864	NB ML	0.10	37	34%	100%	50	21%	100%	31	21%	100%	65	22%	100%
2669564	SB ML South of I-5	0.28	34	68%	100%	43	60%	100%	24	83%	100%	65	21%	100%
2669687	SB ML North of I-5	0.20	38	62%	100%	49	55%	100%	29	76%	100%	65	16%	100%
2669704	NB ML	0.38	34	34%	100%	47	21%	100%	26	21%	100%	65	22%	100%
2669718	SB Frt Corr Off	0.60	48	100%	100%	55	100%	100%	51	100%	100%	65	100%	100%
2669749	NB ML	0.11	37	34%	100%	50	21%	100%	31	21%	100%	65	22%	100%
2669750	Frt Corr NB On	0.66	55	100%	100%	56	100%	100%	56	100%	100%	65	100%	100%
2669788	SB ML North of I-5	0.30	36	62%	100%	48	55%	100%	29	76%	100%	65	16%	100%

Notes:

Links not shown in the table are not affected by the ZEE Design

NB ML - Northbound Mainline, SB ML - Southbound Mainline

[1] Link ID is a descriptor used in the Southern California Association of Governments (SCAG) traffic model

[2] Link length is calculated based on the URS freeway design. The beginning and end of the links were transcribed based on the SCAG network.

P:\I\I710 South\East LA Analyses\Technical Work\Emissions Estimates\Post_Processed_Traffic\Alt6B\[Alt6b_PP_E_LA.xlsx]Electrified_Trucks (rpt)

Table 1b. Percentage of Trucks Electrified in the Alternative 6C ZEE Design Option

Link ID [1]	Segment Description	Length [2] (mi)	AM (6:00 AM to 9:00 AM)			Mid Day (9:00 AM to 3:00 PM)			PM (3:00 PM to 7:00 PM)			Night Time (7:00 PM to 6:00 AM)		
			Speed (mph)	Non Port Trucks	Port Trucks	Speed (mph)	Non Port Trucks	Port Trucks	Speed (mph)	Non Port Trucks	Port Trucks	Speed (mph)	Non Port Trucks	Port Trucks
14729	NB ML	0.18	48	53%	100%	56	21%	100%	37	20%	100%	65	20%	100%
14740	SB ML North of I-5	0.65	36	43%	100%	49	49%	100%	27	24%	100%	65	16%	100%
14748	NB ML	0.11	15	53%	100%	26	21%	100%	9	20%	100%	65	20%	100%
14761	NB ML	0.20	15	53%	100%	26	21%	100%	9	20%	100%	65	20%	100%
14768	NB ML	0.17	20	53%	100%	33	21%	100%	12	20%	100%	65	20%	100%
14775	SB ML North of I-5	0.17	33	43%	100%	47	49%	100%	24	24%	100%	65	16%	100%
14776	NB ML	0.46	24	53%	100%	34	21%	100%	15	20%	100%	65	20%	100%
14784	NB ML	0.19	33	53%	100%	46	21%	100%	25	20%	100%	65	20%	100%
14790	SB ML South of I-5	0.36	36	45%	100%	45	51%	100%	25	26%	100%	65	20%	100%
14791	NB ML	0.17	25	53%	100%	36	21%	100%	16	20%	100%	65	20%	100%
14794	SB ML North of I-5	0.20	39	43%	100%	50	49%	100%	30	24%	100%	65	16%	100%
14799	SB ML North of I-5	0.06	30	43%	100%	43	49%	100%	23	24%	100%	65	16%	100%
14828	SB ML South of I-5	0.17	40	45%	100%	48	51%	100%	28	26%	100%	65	20%	100%
14858	NB ML	0.37	33	53%	100%	46	21%	100%	25	20%	100%	65	20%	100%
14864	NB ML	0.10	39	53%	100%	51	21%	100%	32	20%	100%	65	20%	100%
2669564	SB ML South of I-5	0.28	36	45%	100%	45	51%	100%	25	26%	100%	65	20%	100%
2669687	SB ML North of I-5	0.20	39	43%	100%	50	49%	100%	30	24%	100%	65	16%	100%
2669704	NB ML	0.38	35	53%	100%	49	21%	100%	26	20%	100%	65	20%	100%
2669718	SB Frt Corr Off	0.60	59	100%	100%	63	100%	100%	57	100%	100%	65	100%	100%
2669749	NB ML	0.11	39	53%	100%	51	21%	100%	32	20%	100%	65	20%	100%
2669750	Frt Corr NB On	0.66	62	100%	100%	61	100%	100%	59	100%	100%	65	100%	100%
2669788	SB ML North of I-5	0.30	37	43%	100%	49	49%	100%	29	24%	100%	65	16%	100%

Notes:

Links not shown in the table are not affected by the ZEE Design

NB ML - Northbound Mainline, SB ML - Southbound Mainline

[1] Link ID is a descriptor used in the Southern California Association of Governments (SCAG) traffic model

[2] Link length is calculated based on the URS freeway design. The beginning and end of the links were transcribed based on the SCAG network.

P:\I\I710 South\East LA Analyses\Technical Work\Emissions Estimates\Post_Processed_Traffic\Alt6C\[Alt6c_PP_E_LA.xlsx]Electrified_Trucks (rpt)

Table 2a. Incremental Criteria Pollutant Mass Emissions for the I-710 Freeway as Compared to 2008 Baseline

Pollutant	Alt. 6B Original Analysis versus 2008 Baseline		Alt. 6B ZEE Design Option versus 2008 Baseline		Alt. 6C Original Analysis versus 2008 Baseline		Alt. 6C ZEE Design Option versus 2008 Baseline	
	lb/day	% Change	lb/day	% Change	lb/day	% Change	lb/day	% Change
NO_X	-15000	-83%	-15000	-85%	-14000	-80%	-15000	-82%
CO	-18000	-69%	-18000	-70%	-18000	-68%	-18000	-68%
PM_{10} (Total)	1000	54%	1000	53%	920	49%	900	48%
PM_{10} (Exhaust)	*-330*	*-39%*	*-360*	*-41%*	*-290*	*-33%*	*-310*	*-36%*
PM_{10} (Entrained)	*1400*	*132%*	*1400*	*132%*	*1200*	*118%*	*1200*	*118%*
PM_{25} (Total)	-4.4	0%	-22	-2%	-6.1	-1%	-21	-2%
PM_{25} (Exhaust)	*-340*	*-49%*	*-350*	*-51%*	*-300*	*-44%*	*-320*	*-46%*
PM_{25} (Entrained)	*330*	*132%*	*330*	*132%*	*300*	*118%*	*300*	*118%*
ROG	-1600	-74%	-1700	-76%	-1600	-73%	-1600	-74%
SO_2	13	33%	10	26%	15	40%	13	34%

Notes:

Emissions based on the I-710 Traffic Model data.

All numbers rounded to two significant figures.

P:\I\I710 South\East LA Analyses\Technical Work\Emissions Estimates\[Summary Table_E_LA_v2.xls]Table ELA_rounded (2)

Table 2b. Incremental Criteria Pollutant Mass Emissions for the I-710 Freeway as Compared to 2035 Alternative 1 (No Build)

Pollutant	Alt. 6B Original Analysis versus Alt. 1		Alt. 6B ZEE Design Option versus Alt. 1		Alt. 6C Original Analysis versus Alt. 1		Alt. 6C ZEE Design Option versus Alt. 1	
	lb/day	% Change	lb/day	% Change	lb/day	% Change	lb/day	% Change
NO_X	-2000	-40%	-2500	-49%	-1500	-30%	-1900	-37%
CO	650	9%	420	6%	930	12%	750	10%
PM_{10} (Total)	790	37%	770	36%	690	33%	670	32%
PM_{10} (Exhaust)	*-35*	*-6%*	*-59*	*-10%*	*9.3*	*2%*	*-11*	*-2%*
PM_{10} (Entrained)	*830*	*53%*	*830*	*53%*	*680*	*44%*	*680*	*44%*
PM_{25} (Total)	170	22%	150	19%	160	21%	150	19%
PM_{25} (Exhaust)	*-37*	*-9%*	*-55*	*-14%*	*-3.3*	*-1%*	*-18*	*-5%*
PM_{25} (Entrained)	*200*	*53%*	*200*	*53%*	*170*	*44%*	*170*	*44%*
ROG	-110	-16%	-160	-23%	-82	-12%	-120	-18%
SO_2	-2.0	-4%	-4.6	-9%	0.59	1%	-1.5	-3%

Notes:

Emissions based on the I-710 Traffic Model data.

All numbers rounded to two significant figures.

P:\I\I710 South\East LA Analyses\Technical Work\Emissions Estimates\[Summary Table_E_LA_v2.xls]Table ELA_rounded

Table 3a. Incremental MSAT Mass Emissions for the I-710 Freeway as Compared to 2008 Baseline

Mobile Source Air Toxic (MSAT)	Alt. 6B Original Analysis versus 2008 Baseline		Alt. 6B ZEE Design Option versus 2008 Baseline		Alt. 6C Original Analysis versus 2008 Baseline		Alt. 6C ZEE Design Option versus 2008 Baseline	
	lb/day	% Change	lb/day	% Change	lb/day	% Change	lb/day	% Change
Diesel particulate matter	-460	-76%	-480	-79%	-430	-71%	-440	-73%
Benzene (Exhaust)	-21	-87%	-21	-87%	-21	-87%	-21	-87%
Acetaldehyde	-4.4	-93%	-4.4	-93%	-4.4	-93%	-4.4	-93%
Formaldehyde	-16	-89%	-16	-89%	-16	-89%	-16	-89%
1,3- butadiene	-4.9	-88%	-4.9	-88%	-4.9	-88%	-4.9	-88%
Acrolein	-1.1	-87%	-1.1	-87%	-1.1	-87%	-1.1	-87%

Notes:

Emissions based on the I-710 Traffic Model data.

All numbers rounded to two significant figures.

P:\I\I710 South\East LA Analyses\Technical Work\Emissions Estimates\[MSAT Mass Emissions_E_LA_v2.xls]Table E_LA_rounded (2)

Table 3b. Incremental MSAT Mass Emissions for the I-710 Freeway as Compared to 2035 Alternative 1 (No Build)

Mobile Source Air Toxic (MSAT)	Alt. 6B Original Analysis versus Alt. 1		Alt. 6B ZEE Design Option versus Alt. 1		Alt. 6C Original Analysis versus Alt. 1		Alt. 6C ZEE Design Option versus Alt. 1	
	lb/day	% Change	lb/day	% Change	lb/day	% Change	lb/day	% Change
Diesel particulate matter	-71	-33%	-86	-40%	-38	-18%	-51	-24%
Benzene (Exhaust)	0.57	22%	0.57	22%	0.56	22%	0.56	22%
Acetaldehyde	0.064	22%	0.064	22%	0.063	22%	0.063	22%
Formaldehyde	0.36	22%	0.36	22%	0.35	22%	0.35	22%
1,3- butadiene	0.12	22%	0.12	22%	0.12	22%	0.12	22%
Acrolein	0.030	22%	0.030	22%	0.030	22%	0.030	22%

Notes:

Emissions based on the I-710 Traffic Model data.

All numbers rounded to two significant figures.

P:\I\I710 South\East LA Analyses\Technical Work\Emissions Estimates\[MSAT Mass Emissions_E_LA_v2.xls]Table E_LA_rounded

Table 4. Incremental Criteria Pollutant Mass Emissions for the I-710 Freeway as Compared to 2008 Baseline and Alternative 1 (No Build) using Post-Processed Traffic Data

Pollutant	Alt. 6B Original Analysis versus 2008 Baseline	Alt. 6B ZEE Design Option versus 2008 Baseline	Alt. 6C Original Analysis versus 2008 Baseline	Alt. 6C ZEE Design Option versus 2008 Baseline	Alt. 6B Original Analysis versus Alt. 1	Alt 6B ZEE Design Option versus Alt. 1	Alt. 6C Original Analysis versus Alt. 1	Alt. 6C ZEE Design Option versus Alt. 1
	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day
NO_X	-20,000	-21,000	-20,000	-20,000	-2,700	-3,300	-2,300	-2,800
CO	-18,000	-19,000	-18,000	-18,000	550	230	790	530
PM_{10} (Total)	810	770	680	650	680	650	560	530
PM_{10} (Exhaust)	*-540*	*-570*	*-500*	*-530*	*-66*	*-100*	*-25*	*-55*
PM_{10} (Entrained)	*1,300*	*1,300*	*1,200*	*1,200*	*750*	*750*	*580*	*580*
$PM_{2.5}$ (Total)	-190	-220	-200	-220	130	99	120	94
$PM_{2.5}$ (Exhaust)	*-520*	*-550*	*-490*	*-510*	*-59*	*-85*	*-27*	*-50*
$PM_{2.5}$ (Entrained)	*330*	*330*	*290*	*290*	*180*	*180*	*140*	*140*
ROG	-1,800	-1,900	-1,800	-1,900	-100	-170	-110	-170
SO_2	12	8.5	14	11	-4.4	-8.1	-2.3	-5.3

Notes:

Emissions based on I-710 Traffic Model data, post-processed to incorporate traffic count information and detailed I-710 geometrics information.

All numbers rounded to two significant figures.

P:\I\I710 South\East LA Analyses\Technical Work\Emissions Estimates\[I710 PP Mass Ems Summary_ELA.xls]E_LA_CP_Rounded

Table 5. Incremental MSAT Mass Emissions for the I-710 Freeway as Compared to 2008 Baseline and Alternative 1 (No Build) using Post-Processed Traffic Data

Mobile Source Air Toxic (MSAT)	Alt. 6B Original Analysis versus 2008 Baseline	Alt. 6B ZEE Design Option versus 2008 Baseline	Alt. 6C Original Analysis versus 2008 Baseline	Alt. 6C ZEE Design Option versus 2008 Baseline	Alt 6B Original Analysis versus Alt.1	Alt. 6B ZEE Design Option versus Alt.1	Alt. 6C Original Analysis versus Alt.1	Alt. 6C ZEE Design Option versus Alt.1
	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day	lb/day
Diesel Particulate Matter	-660	-690	-630	-650	-92	-120	-63	-83
Benzene (Exhaust)	-18	-18	-18	-18	0.58	0.58	0.60	0.60
Acetaldehyde	-3.9	-3.9	-3.9	-3.9	0.066	0.066	0.067	0.067
Formaldehyde	-14	-14	-14	-14	0.37	0.37	0.38	0.38
1,3- butadiene	-4.3	-4.3	-4.3	-4.3	0.13	0.13	0.13	0.13
Acrolein	-1.0	-1.0	-1.0	-1.0	0.031	0.031	0.032	0.032

Notes:

Emissions based on I-710 Traffic Model data, post-processed to incorporate traffic count information and detailed I-710 geometrics information.

All numbers rounded to two significant figures.

P:\I\I710 South\East LA Analyses\Technical Work\Emissions Estimates\[I710 PP Mass Ems Summary_ELA.xls]E_LA_MSAT_Rounded

Table 6. Peak Incremental Particulate Concentration Impacts of the I-710 Freeway for Alternative 6 Design Variations as Compared to 2008 Baseline

Pollutant	Averaging Time	Delta Scenario	Maximum Incremental Impact ($\mu g/m^3$)		Comments
			Original Analysis	ZEE Design Option	
PM_{10} (Total)	24-hour	Alt. 6B - 2008	74.4	74.4	No Change
		Alt. 6C - 2008	64.2	64.2	
	Annual	Alt. 6B - 2008	42.5	42.5	No Change
		Alt. 6C - 2008	34.9	34.9	
$PM_{2.5}$ (Total)	24-hour	Alt. 6B - 2008	15.3	15.3	No Change
		Alt. 6C - 2008	13.1	13.1	
PM_{10} (Exhaust)	24-hour	Alt. 6B - 2008	2.3	0.6	Reduces
		Alt. 6C - 2008	2.2	0.6	
	Annual	Alt. 6B - 2008	1.8	1.0	Reduces
		Alt. 6C - 2008	1.7	1.1	
$PM_{2.5}$ (Exhaust)	24-hour	Alt. 6B - 2008	1.2	0.2	Reduces
		Alt. 6C - 2008	1.0	-0.04	

P:\I\I710 South\East LA Analyses\Technical Work\Post Processing\Incremental Analysis\[Summary of Impacts.xls]East LA Table

Table 7. Incremental and Maximum (Incremental plus Background Level) Gaseous Concentration Impacts of the I-710 Freeway for Alternative 6 Design Variations as Compared to 2008 Baseline [a]

Pollutant	Averaging Time	Delta Scenario	Incremental Impact ($\mu g/m^3$)		Maximum (Incremental + Background) Concentration Impact ($\mu g/m^3$)		Comments
			Original Analysis	ZEE Design Option	Original Analysis	ZEE Design Option	
NOx	1-hour	Alt. 6B - 2008	-84.5	-95.5	141.3	130.3	No Appreciable Change
		Alt. 6C - 2008	-83.9	-94.0	141.8	131.8	
	Annual	Alt. 6B - 2008	-0.70	-0.73	55.6	55.5	No Appreciable Change
		Alt. 6C - 2008	-0.69	-0.71	55.6	55.5	
CO	1-hour	Alt. 6B - 2008	-254	-254	8911	8910	No Appreciable Change
		Alt. 6C - 2008	-254	-254	8911	8911	
	8-hour	Alt. 6B - 2008	-40	-40	7292	7292	No Appreciable Change
		Alt. 6C - 2008	-39	-40	7293	7292	

Notes:

[a] NO_2 and CO are attainment pollutants and, therefore, incremental impacts from the project plus background pollutant concentration levels are presented.

P:\I\I710 South\East LA Analyses\Technical Work\Post Processing\Incremental Analysis\[Summary of Impacts.xls]East LA Table

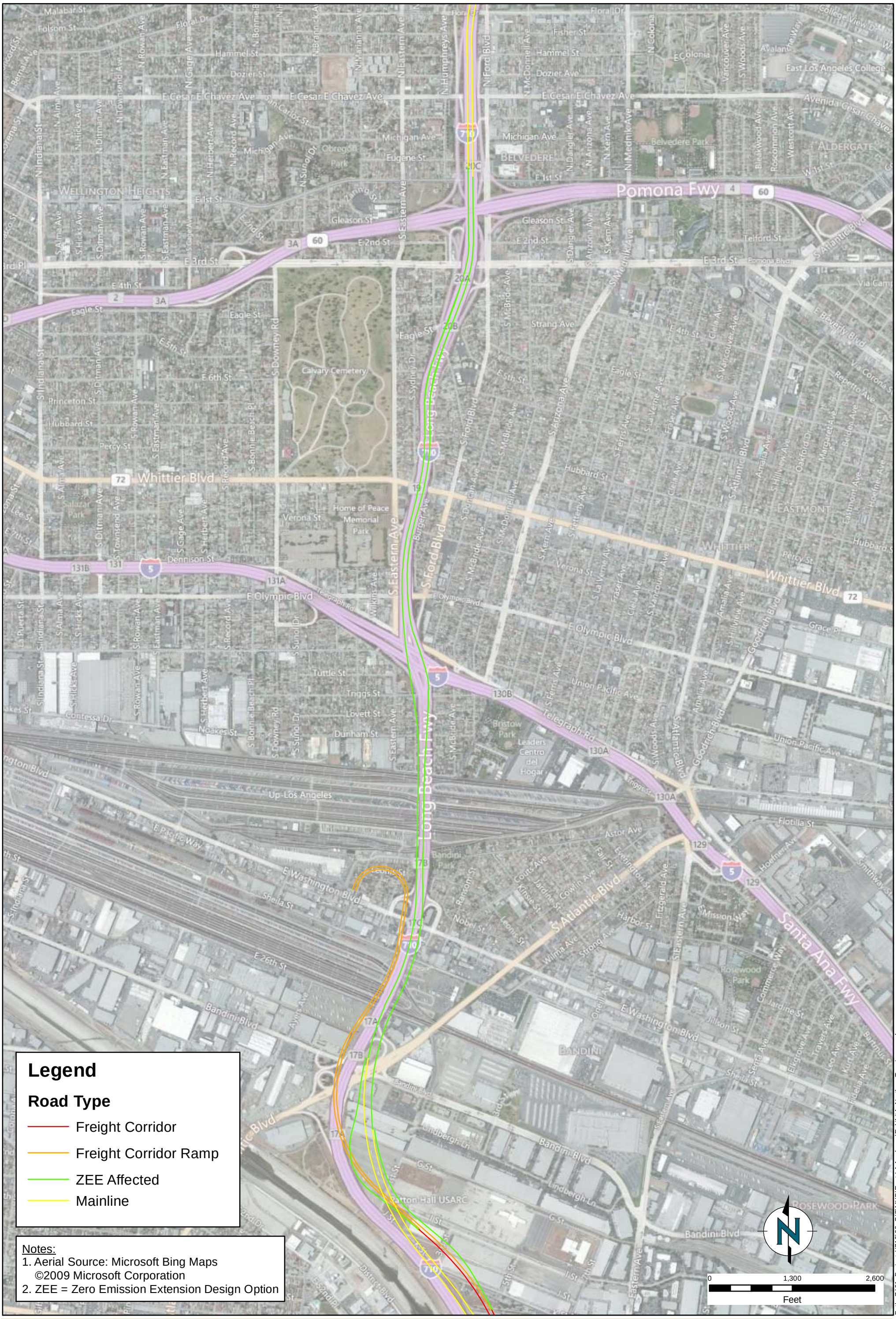
Table 8. Maximum Health Impacts Associated with MSAT Emissions from the I-710 Mainline and Freight Corridor for 2035 Alternative 6 Design Variations Compared to 2008 Baseline

Health Impact	Receptor Type/Exposure Scenario	Delta Scenario	Maximum Incremental Risk Impact from Project Emissions (Risk in 1 million)		Comments
			Original Analysis	ZEE Design Option	
Cancer risk	Residential	Alt6B. - 2008	-7.1	-7.5	No Appreciable Change
		Alt6C. - 2008	-6.9	-7.2	
			Hazard Index (Unitless)		
			Original Analysis	ZEE Design Option	
Chronic Noncancer Hazard Index	Residential	Alt6B. - 2008	-0.005	-0.005	No Change
		Alt6C. - 2008	-0.005	-0.005	
Acute Noncancer Hazard Index	Residential	Alt6B. - 2008	0.102	0.102	
		Alt6C. - 2008	-0.0001	-0.0004	No Appreciable Change

P:\I\I710 South\East LA Analyses\Technical Work\Post Processing\Incremental Risk\[Health_Impact_Results.xlsx]ZEE Table

Exhibit A

Northern Terminus Area



ENVIRON

Northern Terminus Area

Exhibit
A

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Date: 6/1/2012

PROJECT: 05-18574F4

Figures

Legend

— Freeways of Interest

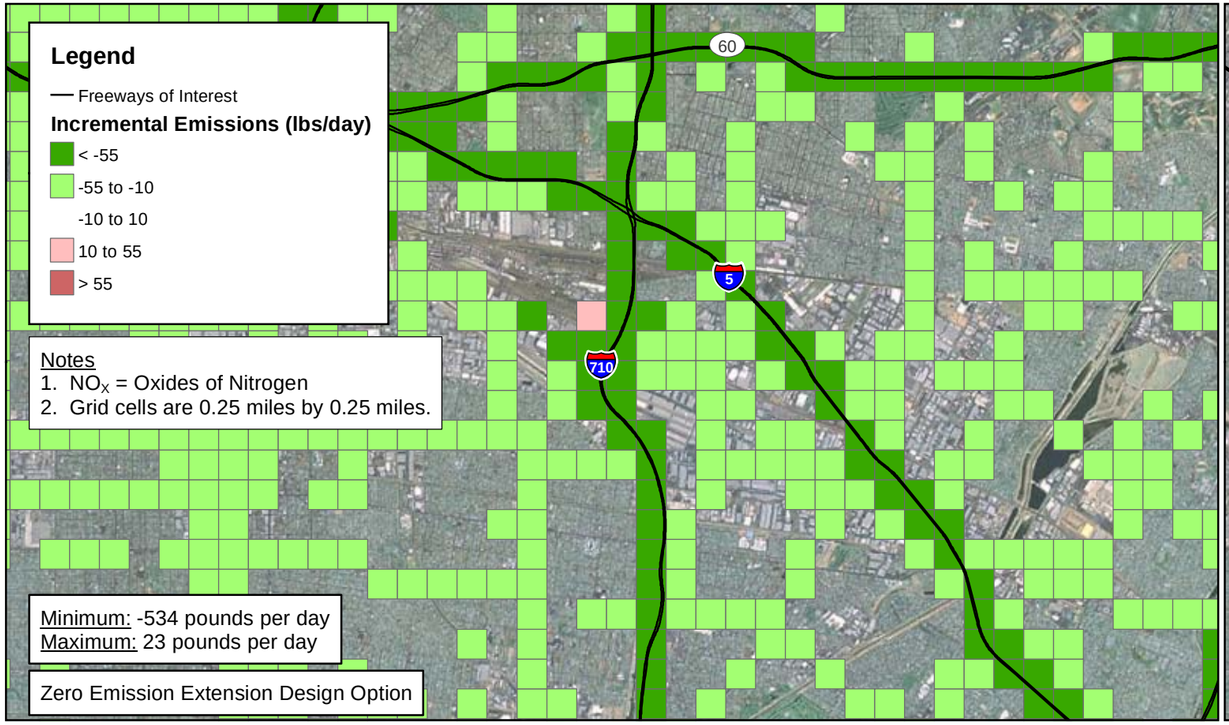
Incremental Emissions (lbs/day)

- < -55
- -55 to -10
- -10 to 10
- 10 to 55
- > 55

Notes
1. NO_X = Oxides of Nitrogen
2. Grid cells are 0.25 miles by 0.25 miles.

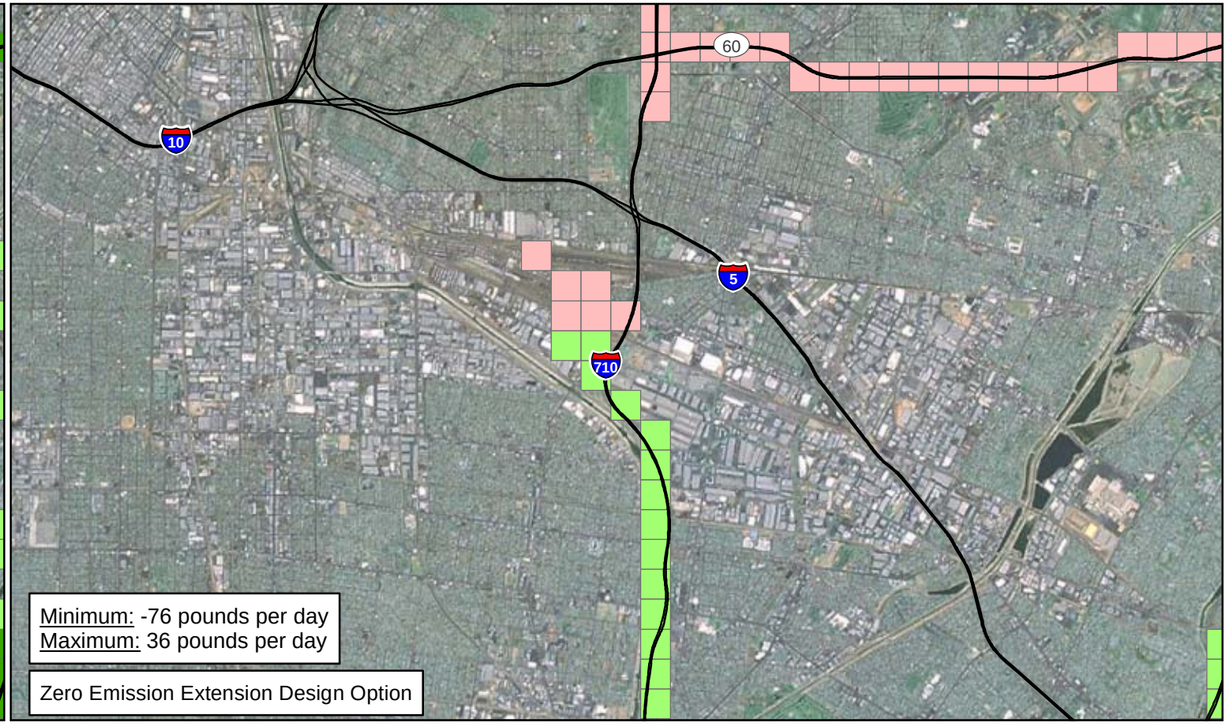
Minimum: -534 pounds per day
Maximum: 23 pounds per day

Zero Emission Extension Design Option



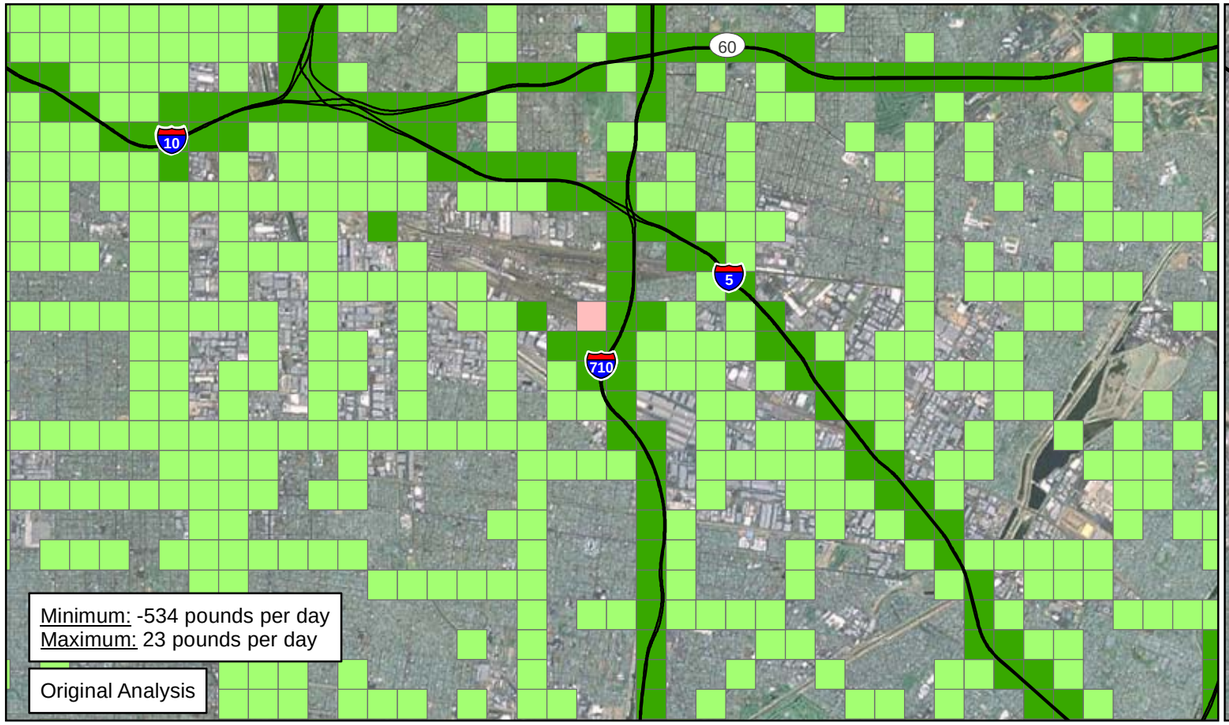
Minimum: -76 pounds per day
Maximum: 36 pounds per day

Zero Emission Extension Design Option



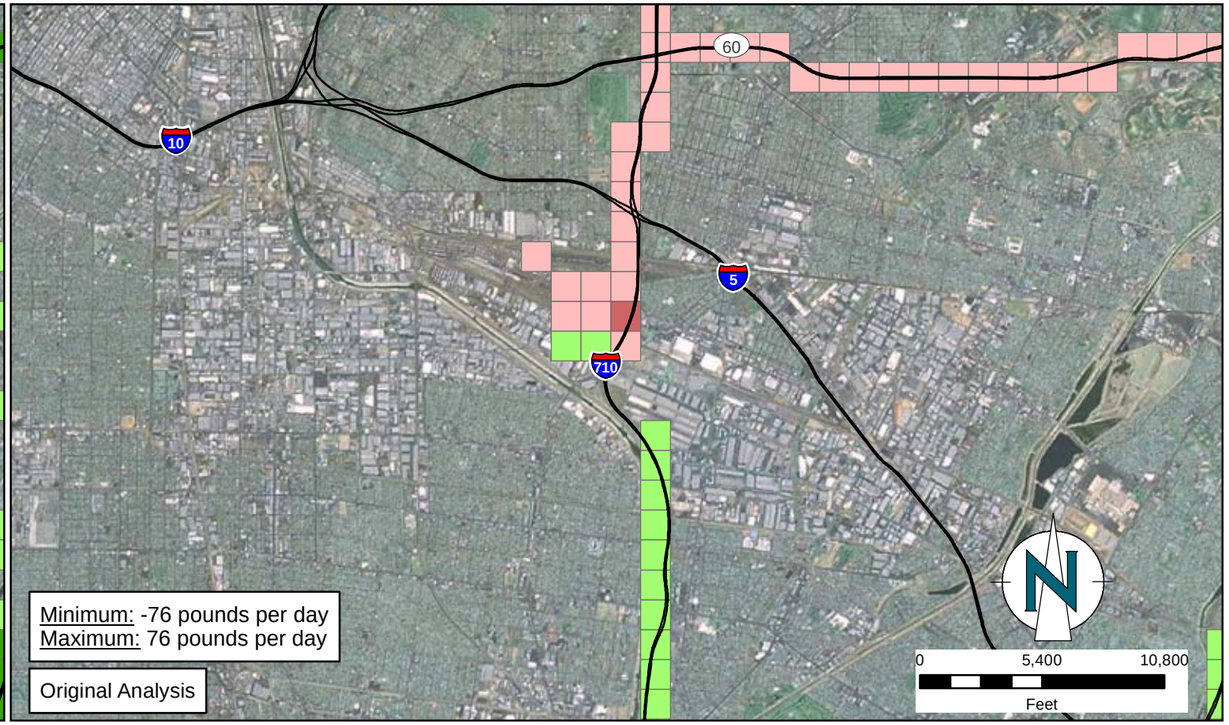
Minimum: -534 pounds per day
Maximum: 23 pounds per day

Original Analysis



Minimum: -76 pounds per day
Maximum: 76 pounds per day

Original Analysis



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ENVIRON

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Comparison of 2035 Alternative 6B to 2008 Baseline NO_X Emissions

Comparison of 2035 Alternative 6B to 2035 Alternative 1 NO_X Emissions

Figure
1

PROJECT: 0518574F4

Legend

— Freeways of Interest

Incremental Emissions (lbs/day)

- < -55
- -55 to -10
- -10 to 10
- 10 to 55
- > 55

Notes
1. NO_X = Oxides of Nitrogen
2. Grid cells are 0.25 miles by 0.25 miles.

Minimum: -518 pounds per day
Maximum: 23 pounds per day

Zero Emission Extension Design Option

Minimum: -61 pounds per day
Maximum: 27 pounds per day

Zero Emission Extension Design Option

Minimum: -518 pounds per day
Maximum: 23 pounds per day

Original Analysis

Minimum: -61 pounds per day
Maximum: 60 pounds per day

Original Analysis

0 5,400 10,800
Feet

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ENVIRON

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Comparison of
2035 Alternative 6C to 2008 Baseline
NO_X Emissions

Comparison of
2035 Alternative 6C to 2035 Alternative 1
NO_X Emissions

Figure
2

PROJECT: 0518574F4

Legend

— Freeways of Interest

Incremental Emissions (lbs/day)

- < -55
- -55 to -1
- -1 to 1
- 1 to 55
- > 55

Notes
1. $PM_{2.5}$ = Particulate matter less than 2.5 micrometers in diameter.
2. Grid cells are 0.25 miles by 0.25 miles.

Minimum: -11 pounds per day
Maximum: 14 pounds per day

Zero Emission Extension Design Option

Minimum: -4.6 pounds per day
Maximum: 9.7 pounds per day

Zero Emission Extension Design Option

Minimum: -11 pounds per day
Maximum: 14 pounds per day

Original Analysis

Minimum: -4.6 pounds per day
Maximum: 12 pounds per day

Original Analysis

0 5,400 10,800
Feet

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ENVIRON

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Comparison of
2035 Alternative 6B to 2008 Baseline
Total $PM_{2.5}$ Emissions

Comparison of
2035 Alternative 6B to 2035 Alternative 1
Total $PM_{2.5}$ Emissions

Figure
3A

PROJECT: 0518574F4

Legend

— Freeways of Interest

Incremental Emissions (lbs/day)

- < -55
- -55 to -1
- -1 to 1
- 1 to 55
- > 55

Notes
1. $PM_{2.5}$ = Particulate matter less than 2.5 micrometers in diameter.
2. Grid cells are 0.25 miles by 0.25 miles.

Minimum: -13 pounds per day
Maximum: 1.6 pounds per day

Zero Emission Extension Design Option

Minimum: -2.1 pounds per day
Maximum: 1.9 pounds per day

Zero Emission Extension Design Option

Minimum: -13 pounds per day
Maximum: 1.6 pounds per day

Original Analysis

Minimum: -2.1 pounds per day
Maximum: 3.8 pounds per day

Original Analysis

0 5,400 10,800
Feet

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ENVIRON

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Comparison of 2035 Alternative 6B to 2008 Baseline Exhaust $PM_{2.5}$ Emissions

Comparison of 2035 Alternative 6B to 2035 Alternative 1 Exhaust $PM_{2.5}$ Emissions

Figure
3B

PROJECT: 0518574F4

Legend

— Freeways of Interest

Incremental Emissions (lbs/day)

- < -55
- -55 to -1
- -1 to 1
- 1 to 55
- > 55

Notes

1. $PM_{2.5}$ = Particulate matter less than 2.5 micrometers in diameter.
2. Grid cells are 0.25 miles by 0.25 miles.

Minimum: -11 pounds per day
Maximum: 15 pounds per day

Zero Emission Extension Design Option

Minimum: -3.6 pounds per day
Maximum: 8.0 pounds per day

Zero Emission Extension Design Option

Minimum: -11 pounds per day
Maximum: 15 pounds per day

Original Analysis

Minimum: -3.6 pounds per day
Maximum: 9.3 pounds per day

Original Analysis

0 5,400 10,800
Feet

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ENVIRON

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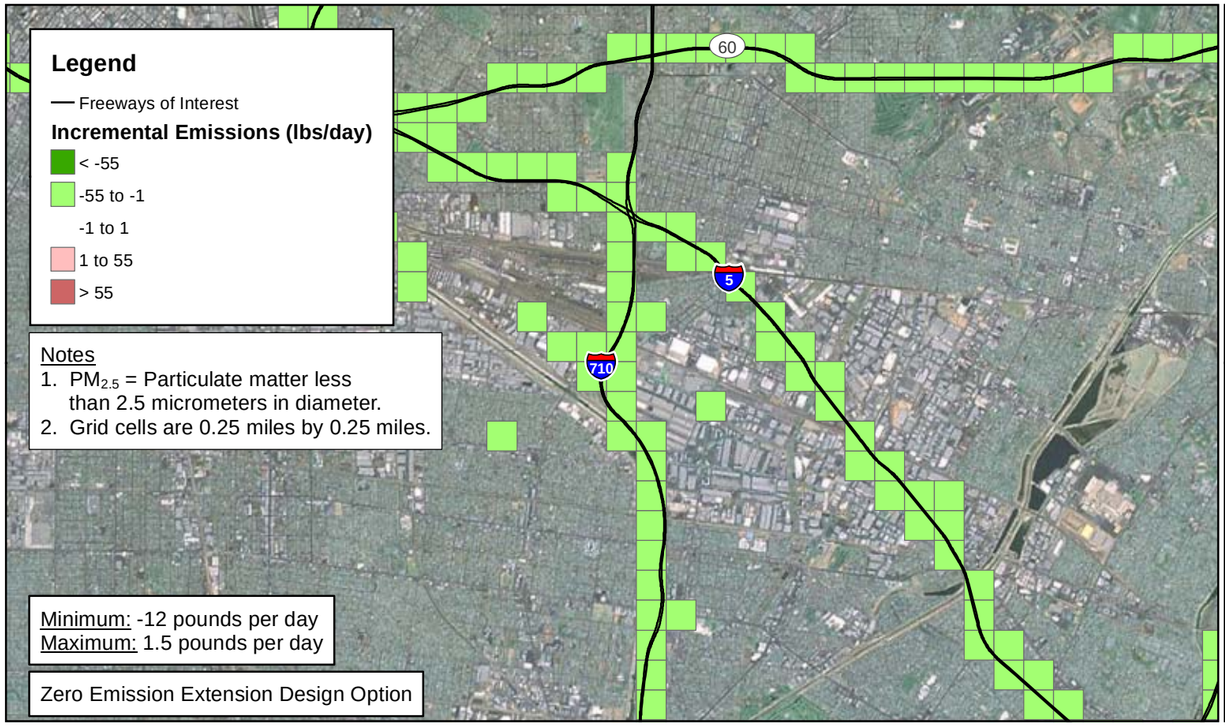
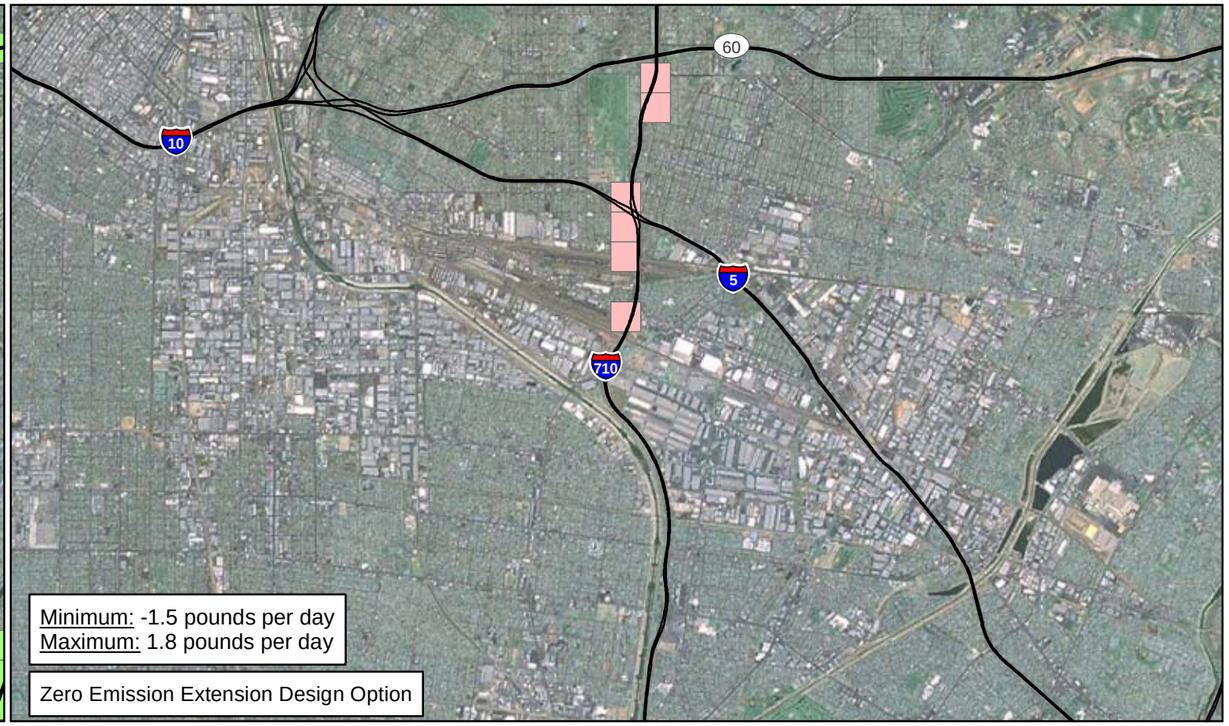
Comparison of
2035 Alternative 6C to 2008 Baseline
Total $PM_{2.5}$ Emissions

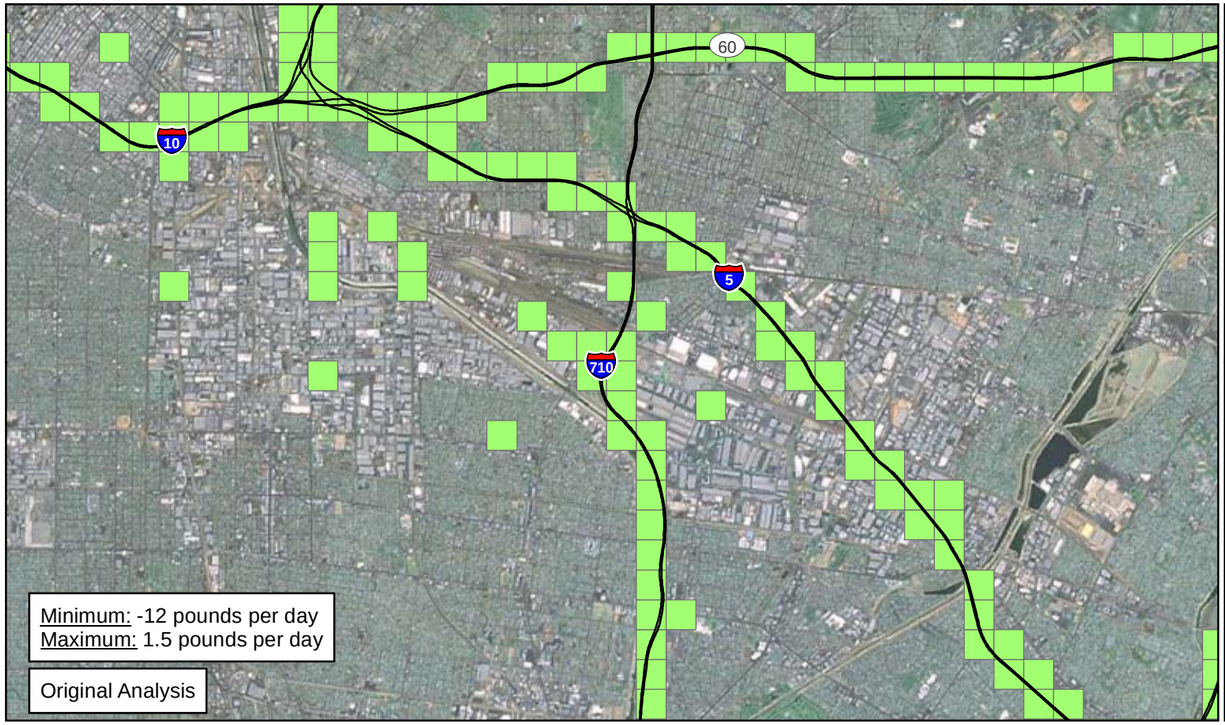
Comparison of
2035 Alternative 6C to 2035 Alternative 1
Total $PM_{2.5}$ Emissions

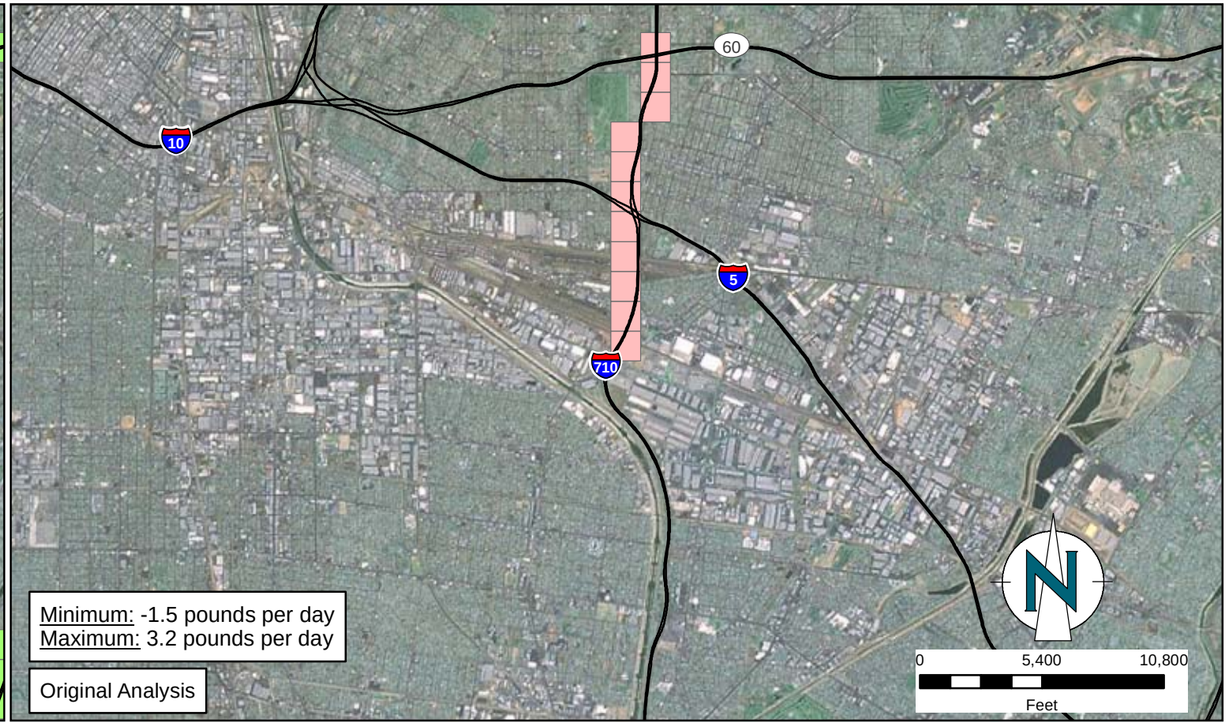
Figure
4A

PROJECT: 0518574F4









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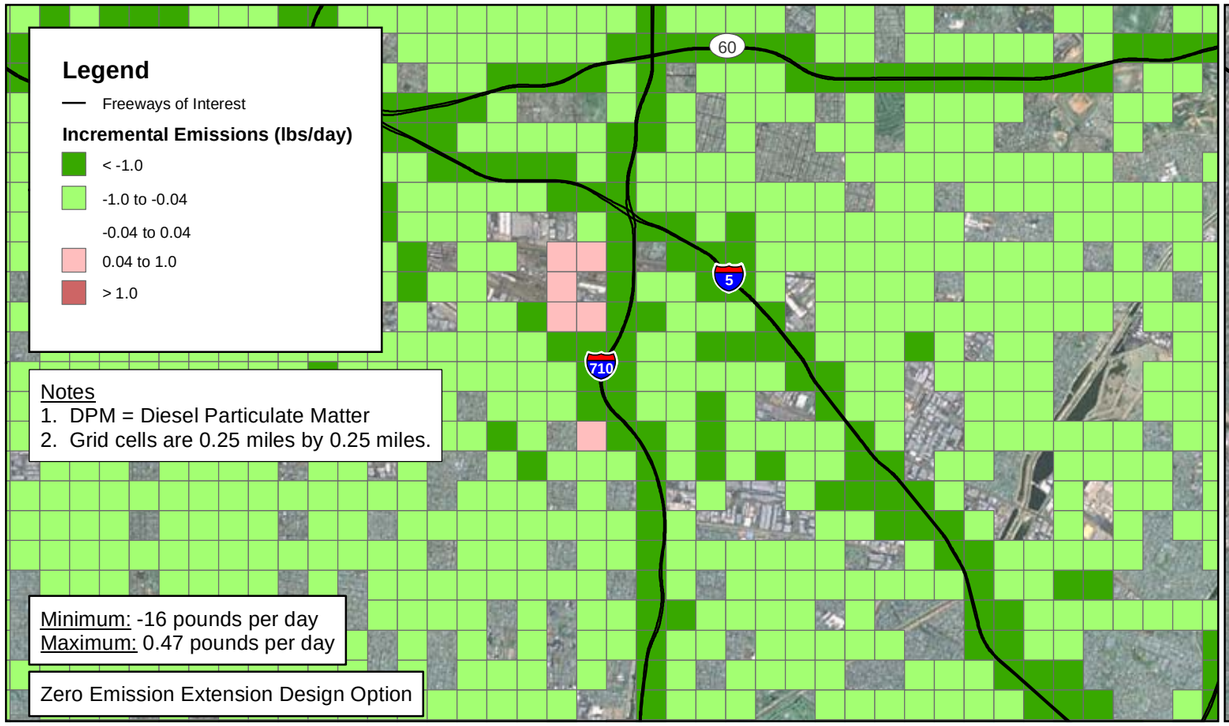
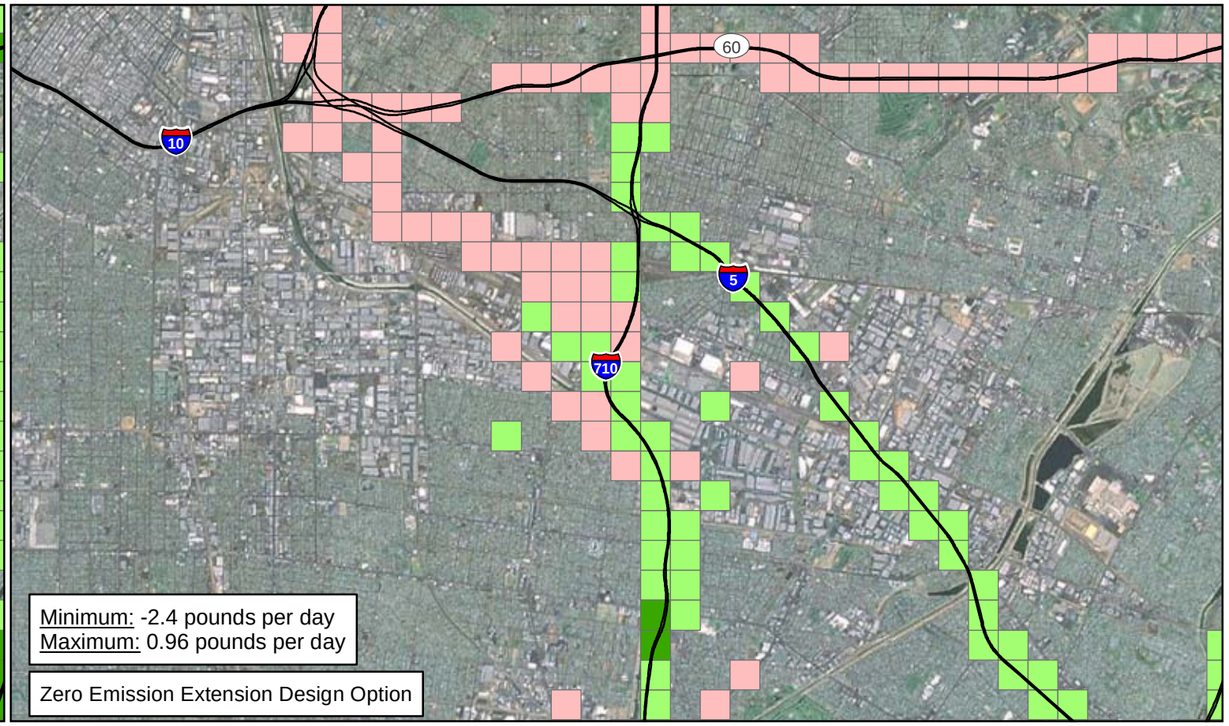
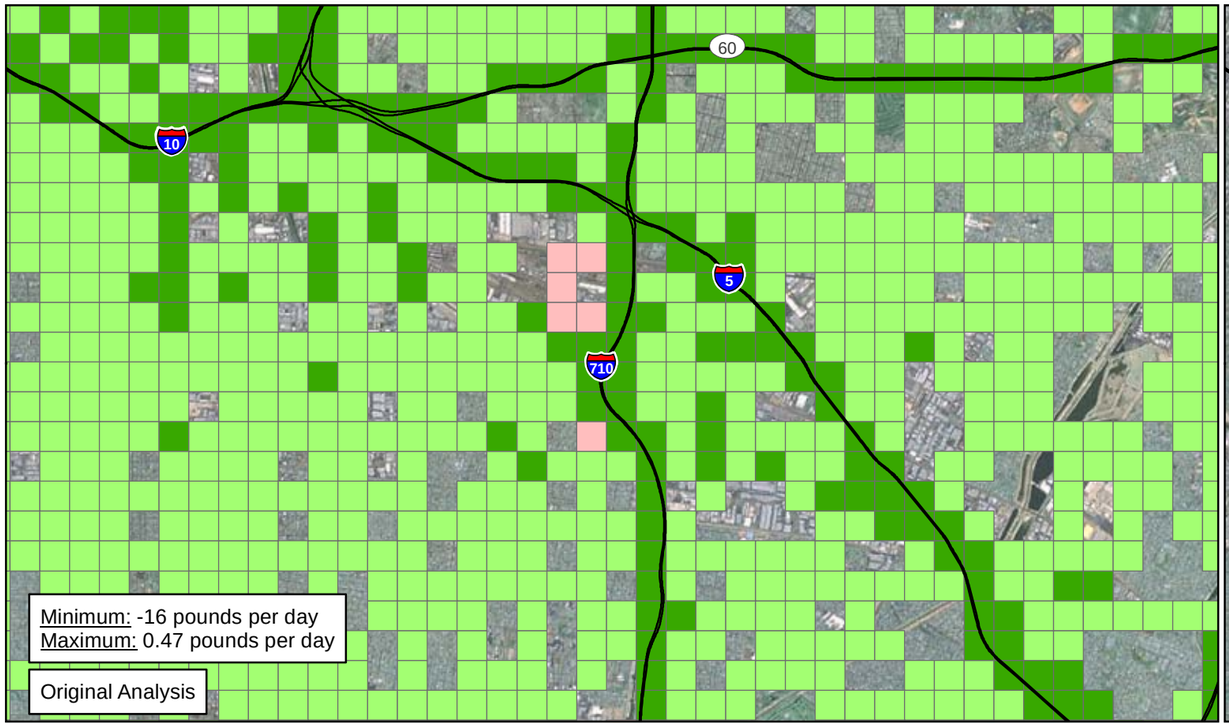
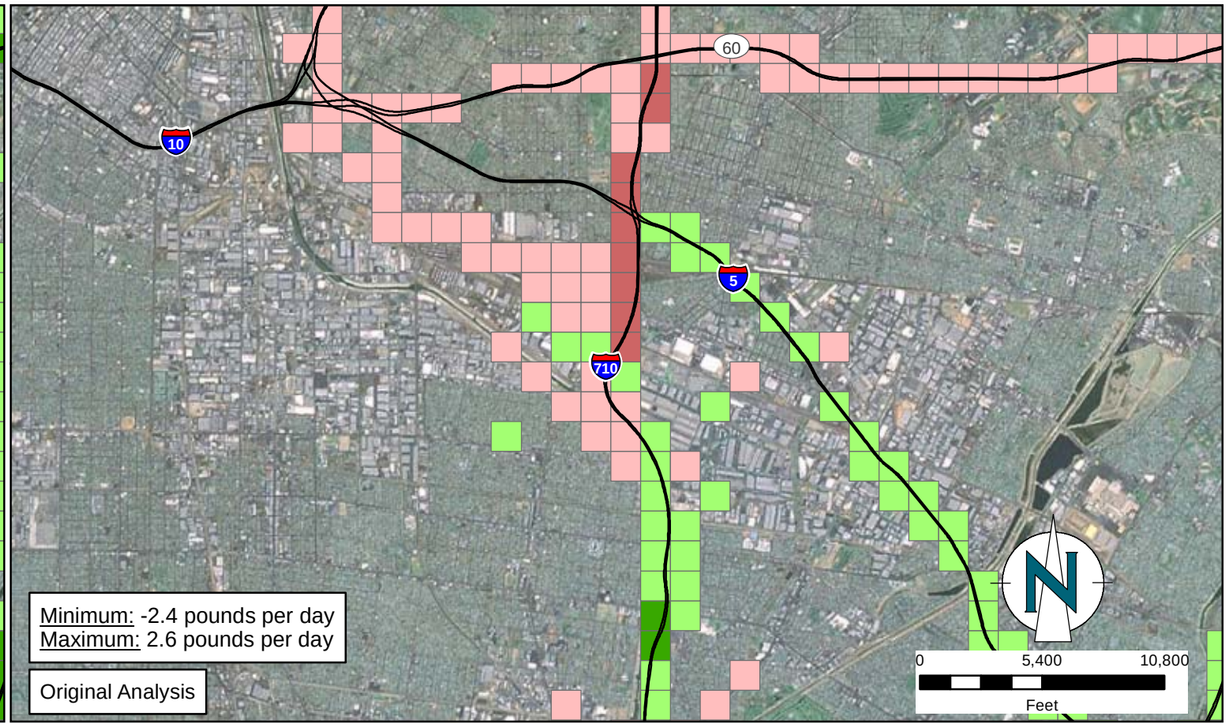
ENVIRON DRAFTED BY: MMM Date: 6/1/2012	Comparison of 2035 Alternative 6C to 2008 Baseline Exhaust $PM_{2.5}$ Emissions	Comparison of 2035 Alternative 6C to 2035 Alternative 1 Exhaust $PM_{2.5}$ Emissions	Figure 4B PROJECT: 0518574F4









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ENVIRON

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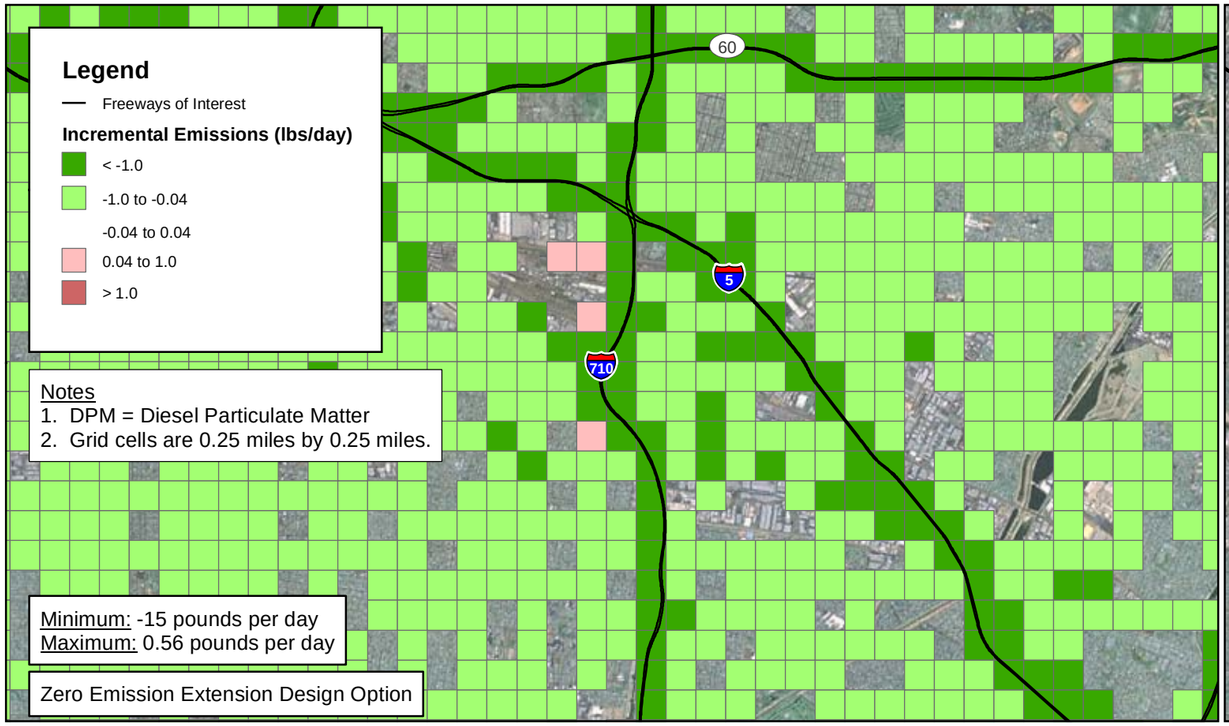
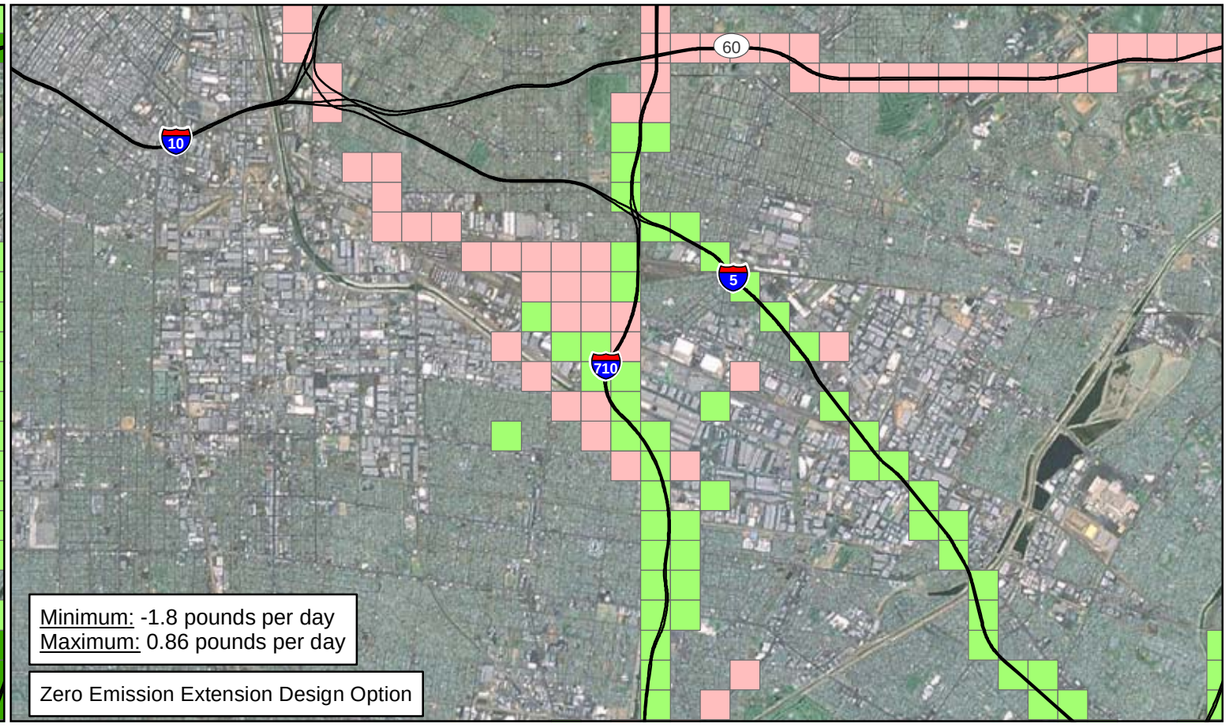
Comparison of
2035 Alternative 6B to 2008 Baseline
DPM Emissions

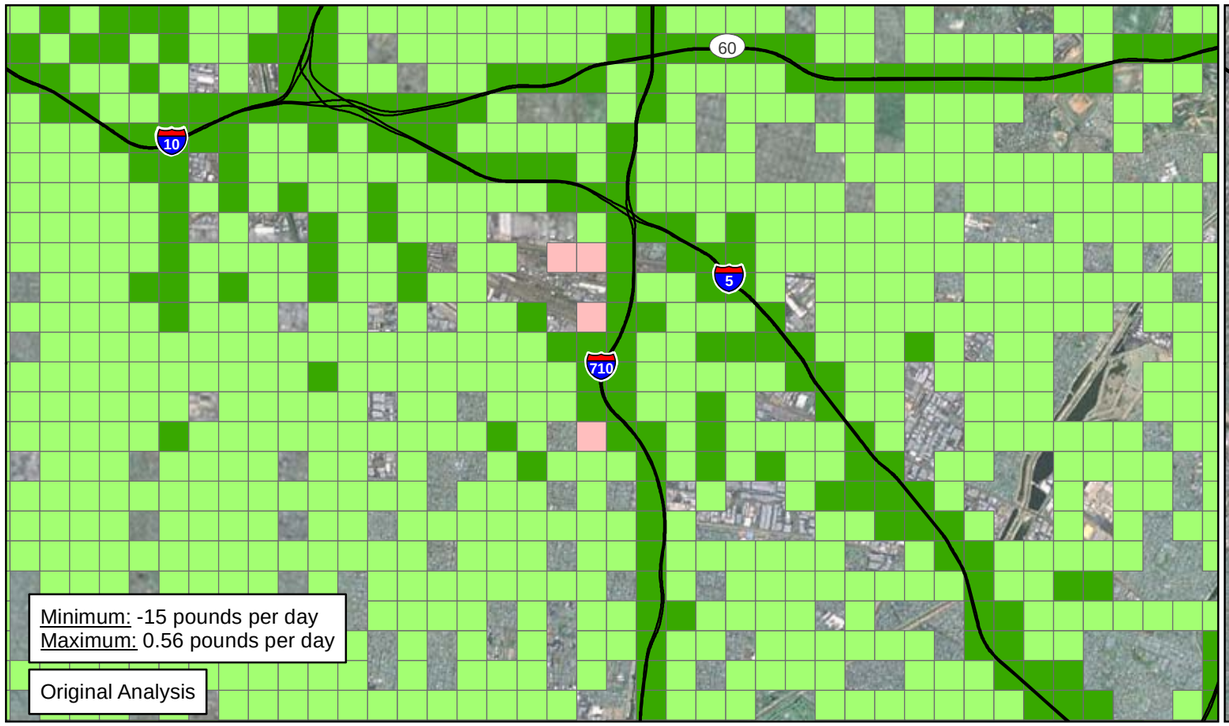
Comparison of
2035 Alternative 6B to 2035 Alternative 1
DPM Emissions

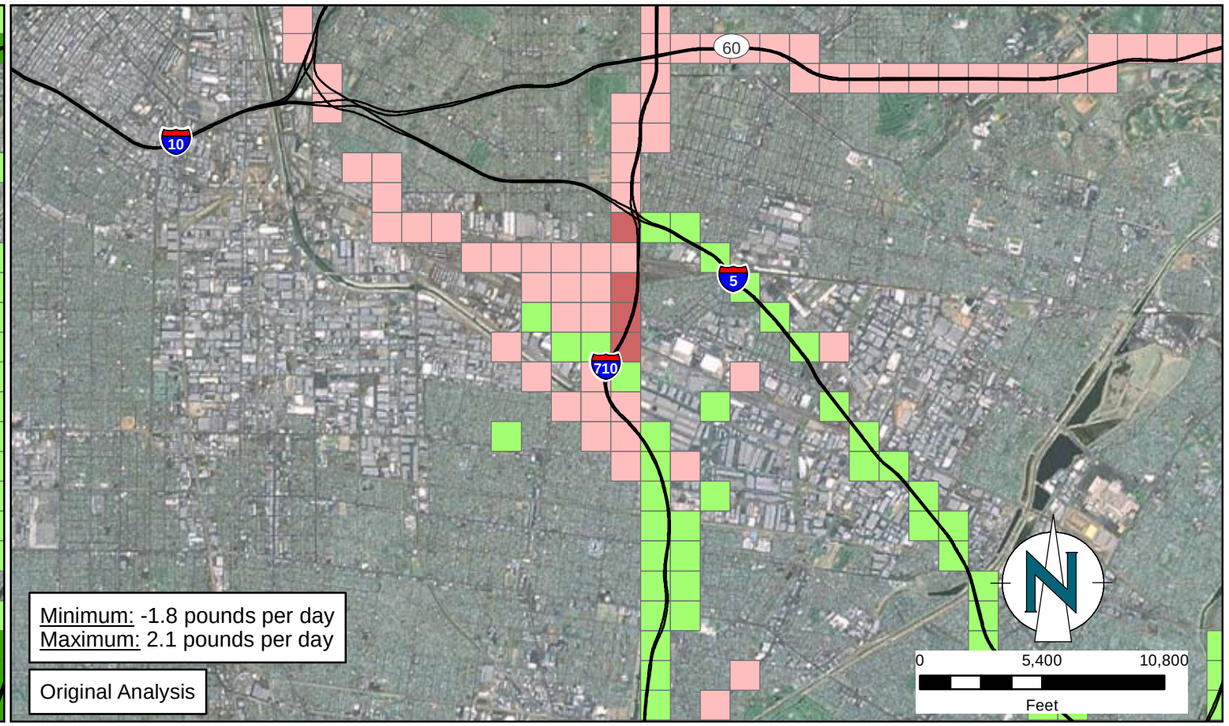
Figure
5

PROJECT: 0518574F4









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ENVIRON

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Comparison of
2035 Alternative 6C to 2008 Baseline
DPM Emissions

Comparison of
2035 Alternative 6C to 2035 Alternative 1
DPM Emissions

Figure
6

PROJECT: 0518574F4

Legend

Maximum Incremental 24-Hour PM_{10} Impact ($\mu g/m^3$)

- < -2.5
- -2.5 to 2.5
- > 2.5

Land Use (TBM 2007)

- Not Categorized
- Agriculture, Open Space and Recreation
- Industrial, Commercial and Services
- Residential
- Transportation, Water, and Utilities

Zero Emission Extension Design Option
Exhaust PM_{10} Impacts

Zero Emission Extension Design Option
Total PM_{10} Impacts
(Assuming Infinite Dust on Roads)

Original Analysis
Exhaust PM_{10} Impacts

Original Analysis
Total PM_{10} Impacts
(Assuming Infinite Dust on Roads)

0 2,500 5,000
Feet

Path: Z:\01_Projects\I710\03_GIS\MXD\East LA Analyses\Fig7_24HR_Total_PM10Impacts_Alt6B1-2008-ELA.mxd

ENVIRON

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Comparison of 2035 Alternative 6B to 2008 Baseline Maximum Incremental 24-Hour PM_{10} Impacts

Figure 7

PROJECT: 05-18574F4

Legend
Maximum Incremental 24-Hour PM_{10} Impact ($\mu g/m^3$)

- < -2.5
- -2.5 to 2.5
- > 2.5

Land Use (TBM 2007)

- Not Categorized
- Agriculture, Open Space and Recreation
- Industrial, Commercial and Services
- Residential
- Transportation, Water, and Utilities

Zero Emission Extension Design Option
Exhaust PM_{10} Impacts

Zero Emission Extension Design Option
Total PM_{10} Impacts
(Assuming Infinite Dust on Roads)

Original Analysis
Exhaust PM_{10} Impacts

Original Analysis
Total PM_{10} Impacts
(Assuming Infinite Dust on Roads)

0 2,500 5,000
Feet

Path: Z:\01_Projects\I710\03_GIS\MXD\East LA Analyses\Fig8_24HR_Total_PM10Impacts_Alt6C1-2008-ELA.mxd

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Comparison of 2035 Alternative 6C to 2008 Baseline Maximum Incremental 24-Hour PM_{10} Impacts

Figure
8

PROJECT: 05-18574F4

Legend

Maximum Incremental 24-Hour PM_{10} Impact ($\mu g/m^3$)

- < -2.5
- -2.5 to 2.5
- > 2.5

Land Use (TBM 2007)

- Not Categorized
- Agriculture, Open Space and Recreation
- Industrial, Commercial and Services
- Residential
- Transportation, Water, and Utilities

Zero Emission Extension Design Option
Exhaust PM_{10} Impacts

Zero Emission Extension Design Option
Total PM_{10} Impacts
(Assuming Infinite Dust on Roads)

Original Analysis
Exhaust PM_{10} Impacts

Original Analysis
Total PM_{10} Impacts
(Assuming Infinite Dust on Roads)

0 2,500 5,000
Feet

Path: Z:\01_Projects\I710\03_GIS\MXD\East LA Analyses\Fig9_24HR_Total_PM10Impacts_Alt6B1-Alt1-ELA.mxd

ENVIRON

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Comparison of 2035 Alternative 6B to 2035 Alternative 1 Maximum Incremental 24-Hour PM_{10} Impacts

Figure 9

PROJECT: 05-18574F4

Legend

Maximum Incremental 24-Hour PM_{10} Impact ($\mu g/m^3$)

- < -2.5
- -2.5 to 2.5
- > 2.5

Land Use (TBM 2007)

- Not Categorized
- Agriculture, Open Space and Recreation
- Industrial, Commercial and Services
- Residential
- Transportation, Water, and Utilities

Zero Emission Extension Design Option
Exhaust PM_{10} Impacts

Zero Emission Extension Design Option
Total PM_{10} Impacts
(Assuming Infinite Dust on Roads)

Original Analysis
Exhaust PM_{10} Impacts

Original Analysis
Total PM_{10} Impacts
(Assuming Infinite Dust on Roads)

0 2,500 5,000
Feet

Path: Z:\01_Projects\I710\03_GIS\MXD\East LA Analyses\Fig10_24HR_Total_PM10Impacts_Alt6C1-Alt1-ELA.mxd

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Comparison of 2035 Alternative 6C to 2035 Alternative 1 Maximum Incremental 24-Hour PM_{10} Impacts

Figure 10

PROJECT: 05-18574F4

Legend

Maximum Incremental 24-Hour $PM_{2.5}$ Impact ($\mu g/m^3$)

- < -2.5
- -2.5 to 2.5
- > 2.5

Land Use (TBM 2007)

- Not Categorized
- Agriculture, Open Space and Recreation
- Industrial, Commercial and Services
- Residential
- Transportation, Water, and Utilities

Zero Emission Extension Design Option
Exhaust $PM_{2.5}$ Impacts

Zero Emission Extension Design Option
Total $PM_{2.5}$ Impacts
(Assuming Infinite Dust on Roads)

Original Analysis
Exhaust $PM_{2.5}$ Impacts

Original Analysis
Total $PM_{2.5}$ Impacts
(Assuming Infinite Dust on Roads)

0 2,500 5,000
Feet

Path: Z:\01_Projects\I710\03_GIS\MXD\East LA Analyses\Fig11_24HR_Total_PM2.5Impacts_Alt6B1-2008-ELA.mxd

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Comparison of 2035 Alternative 6B to 2008 Baseline Maximum Incremental 24-Hour $PM_{2.5}$ Impacts

Figure 11

PROJECT: 05-18574F4

Legend

Maximum Incremental 24-Hour $PM_{2.5}$ Impact ($\mu g/m^3$)

- < -2.5
- -2.5 to 2.5
- > 2.5

Land Use (TBM 2007)

- Not Categorized
- Agriculture, Open Space and Recreation
- Industrial, Commercial and Services
- Residential
- Transportation, Water, and Utilities

Zero Emission Extension Design Option
Exhaust $PM_{2.5}$ Impacts

Zero Emission Extension Design Option
Total $PM_{2.5}$ Impacts
(Assuming Infinite Dust on Roads)

Original Analysis
Exhaust $PM_{2.5}$ Impacts

Original Analysis
Total $PM_{2.5}$ Impacts
(Assuming Infinite Dust on Roads)

0 2,500 5,000
Feet

Path: Z:\01_Projects\I710\03_GIS\MXD\East LA Analyses\Fig12_24HR_Total_PM2.5Impacts_Alt6C-2008-ELA.mxd

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Comparison of 2035 Alternative 6C to 2008 Baseline Maximum Incremental 24-Hour $PM_{2.5}$ Impacts

Figure 12

PROJECT: 05-18574F4

Legend

Maximum Incremental 24-Hour $PM_{2.5}$ Impact ($\mu g/m^3$)

- < -2.5
- -2.5 to 2.5
- > 2.5

Land Use (TBM 2007)

- Not Categorized
- Agriculture, Open Space and Recreation
- Industrial, Commercial and Services
- Residential
- Transportation, Water, and Utilities

Zero Emission Extension Design Option
Exhaust $PM_{2.5}$ Impacts

Zero Emission Extension Design Option
Total $PM_{2.5}$ Impacts
(Assuming Infinite Dust on Roads)

Original Analysis
Exhaust $PM_{2.5}$ Impacts

Original Analysis
Total $PM_{2.5}$ Impacts
(Assuming Infinite Dust on Roads)

0 2,500 5,000
Feet

Path: Z:\01_Projects\I710\03_GIS\MXD\East LA Analyses\Fig13_24HR_Total_PM2.5Impacts_Alt6B-Alt1-ELA.mxd

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Comparison of 2035 Alternative 6B to 2035 Alternative 1 Maximum Incremental 24-Hour $PM_{2.5}$ Impacts

Figure 13

PROJECT: 05-18574F4

Legend

Maximum Incremental 24-Hour $PM_{2.5}$ Impact ($\mu g/m^3$)

- < -2.5
- -2.5 to 2.5
- > 2.5

Land Use (TBM 2007)

- Not Categorized
- Agriculture, Open Space and Recreation
- Industrial, Commercial and Services
- Residential
- Transportation, Water, and Utilities

Zero Emission Extension Design Option
Exhaust $PM_{2.5}$ Impacts

Zero Emission Extension Design Option
Total $PM_{2.5}$ Impacts
(Assuming Infinite Dust on Roads)

Original Analysis
Exhaust $PM_{2.5}$ Impacts

Original Analysis
Total $PM_{2.5}$ Impacts
(Assuming Infinite Dust on Roads)

0 2,500 5,000
Feet

Path: Z:\01_Projects\I710\03_GIS\MXD\East LA Analyses\Fig14_24HR_Total_PM2.5Impacts_Alt6C-Alt1-ELA.mxd

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Comparison of 2035 Alternative 6C to 2035 Alternative 1 Maximum Incremental 24-Hour $PM_{2.5}$ Impacts

Figure 14

PROJECT: 05-18574F4

Legend

Maximum Incremental Annual PM_{10} Impact ($\mu g/m^3$)

- -5.0
- -1.0
- 1.0
- 5.0

Land Use (TBM 2007)

- Not Categorized
- Agriculture, Open Space and Recreation
- Industrial, Commercial and Services
- Residential
- Transportation, Water, and Utilities

Zero Emission Extension Design Option
Exhaust PM_{10} Impacts

Zero Emission Extension Design Option
Total PM_{10} Impacts
(Assuming Infinite Dust on Roads)

Original Analysis
Exhaust PM_{10} Impacts

Original Analysis
Total PM_{10} Impacts
(Assuming Infinite Dust on Roads)

0 2,500 5,000
Feet

Path: Z:\01_Projects\710\03_GIS\MXD\East LA Analyses\Fig15_Annual PM10_Alt6B-2008-ELA.mxd

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Comparison of 2035 Alternative 6B to 2008 Baseline Annual PM_{10} Impacts

Figure 15

PROJECT: 05-18574F4

Legend

Maximum Incremental Annual PM_{10} Impact ($\mu g/m^3$)

- -5.0
- -1.0
- 1.0
- 5.0

Land Use (TBM 2007)

- Not Categorized
- Agriculture, Open Space and Recreation
- Industrial, Commercial and Services
- Residential
- Transportation, Water, and Utilities

Zero Emission Extension Design Option
Exhaust PM_{10} Impacts

Zero Emission Extension Design Option
Total PM_{10} Impacts
(Assuming Infinite Dust on Roads)

Original Analysis
Exhaust PM_{10} Impacts

Original Analysis
Total PM_{10} Impacts
(Assuming Infinite Dust on Roads)

0 2,500 5,000
Feet

Path: Z:\01_Projects\I710\03_GIS\MXD\East LA Analyses\Fig16_Annual PM10_Alt6C-2008-ELA.mxd

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Comparison of 2035 Alternative 6C to 2008 Baseline Annual PM_{10} Impacts

Figure 16

PROJECT: 05-18574F4

Legend

Maximum Incremental Annual PM_{10} Impact ($\mu g/m^3$)

- -5.0
- -1.0
- 1.0
- 5.0

Land Use (TBM 2007)

- Not Categorized
- Agriculture, Open Space and Recreation
- Industrial, Commercial and Services
- Residential
- Transportation, Water, and Utilities

Zero Emission Extension Design Option
Exhaust PM_{10} Impacts

Zero Emission Extension Design Option
Total PM_{10} Impacts
(Assuming Infinite Dust on Roads)

Original Analysis
Exhaust PM_{10} Impacts

Original Analysis
Total PM_{10} Impacts
(Assuming Infinite Dust on Roads)

0 2,500 5,000
Feet

Path: Z:\01_Projects\I710\03_GIS\MXD\East LA Analyses\Fig17_Annual PM10_Alt6B-Alt1-ELA.mxd

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Comparison of 2035 Alternative 6B to 2035 Alternative 1 Annual PM_{10} Impacts

Figure 17

PROJECT: 05-18574F4

Legend

Maximum Incremental Annual PM_{10} Impact ($\mu g/m^3$)

- -5.0
- -1.0
- 1.0
- 5.0

Land Use (TBM 2007)

- Not Categorized
- Agriculture, Open Space and Recreation
- Industrial, Commercial and Services
- Residential
- Transportation, Water, and Utilities

Zero Emission Extension Design Option
Exhaust PM_{10} Impacts

Zero Emission Extension Design Option
Total PM_{10} Impacts
(Assuming Infinite Dust on Roads)

Original Analysis
Exhaust PM_{10} Impacts

Original Analysis
Total PM_{10} Impacts
(Assuming Infinite Dust on Roads)

0 2,500 5,000
Feet

Path: Z:\01_Projects\I710\03_GIS\MXD\East LA Analyses\Fig18_Annual PM10_Alt6C-Alt1-ELA.mxd

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Comparison of 2035 Alternative 6C to 2035 Alternative 1 Annual PM_{10} Impacts

Figure 18

PROJECT: 05-18574F4

Legend

Maximum Incremental Annual $PM_{2.5}$ Impact ($\mu g/m^3$)

- -5.0
- -1.0
- 1.0
- 5.0

Land Use (TBM 2007)

- Not Categorized
- Agriculture, Open Space and Recreation
- Industrial, Commercial and Services
- Residential
- Transportation, Water, and Utilities

Zero Emission Extension Design Option
Exhaust $PM_{2.5}$ Impacts

Zero Emission Extension Design Option
Total $PM_{2.5}$ Impacts
(Assuming Infinite Dust on Roads)

Original Analysis
Exhaust $PM_{2.5}$ Impacts

Original Analysis
Total $PM_{2.5}$ Impacts
(Assuming Infinite Dust on Roads)

0 2,500 5,000
Feet

Path: Z:\01_Projects\I710\03_GIS\MXD\East LA Analyses\Fig19_Annual PM2.5_Alt6B-2008-ELA.mxd

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Comparison of 2035 Alternative 6B to 2008 Baseline Annual $PM_{2.5}$ Impacts

Figure 19

PROJECT: 05-18574F4

Legend

Maximum Incremental Annual $PM_{2.5}$ Impact ($\mu g/m^3$)

- -5.0
- -1.0
- 1.0
- 5.0

Land Use (TBM 2007)

- Not Categorized
- Agriculture, Open Space and Recreation
- Industrial, Commercial and Services
- Residential
- Transportation, Water, and Utilities

Zero Emission Extension Design Option
Exhaust $PM_{2.5}$ Impacts

Zero Emission Extension Design Option
Total $PM_{2.5}$ Impacts
(Assuming Infinite Dust on Roads)

Original Analysis
Exhaust $PM_{2.5}$ Impacts

Original Analysis
Total $PM_{2.5}$ Impacts
(Assuming Infinite Dust on Roads)

0 2,500 5,000
Feet

Path: Z:\01_Projects\I710\03_GIS\MXD\East LA Analyses\Fig20_Annual PM2.5_Alt6C-2008-ELA.mxd

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Comparison of 2035 Alternative 6C to 2008 Baseline Annual $PM_{2.5}$ Impacts

Figure 20

PROJECT: 05-18574F4

Legend

Maximum Incremental Annual $PM_{2.5}$ Impact ($\mu g/m^3$)

- -5.0
- -1.0
- 1.0
- 5.0

Land Use (TBM 2007)

- Not Categorized
- Agriculture, Open Space and Recreation
- Industrial, Commercial and Services
- Residential
- Transportation, Water, and Utilities

Zero Emission Extension Design Option
Exhaust $PM_{2.5}$ Impacts

Zero Emission Extension Design Option
Total $PM_{2.5}$ Impacts
(Assuming Infinite Dust on Roads)

Original Analysis
Exhaust $PM_{2.5}$ Impacts

Original Analysis
Total $PM_{2.5}$ Impacts
(Assuming Infinite Dust on Roads)

0 2,500 5,000
Feet

Path: Z:\01_Projects\I710\03_GIS\MXD\East LA Analyses\Fig21_Annual PM2.5_Alt6B-Alt1-ELA.mxd

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Comparison of 2035 Alternative 6B to 2035 Alternative 1 Annual $PM_{2.5}$ Impacts

Figure 21

PROJECT: 05-18574F4

Legend

Maximum Incremental Annual $PM_{2.5}$ Impact ($\mu g/m^3$)

- -5.0
- -1.0
- 1.0
- 5.0

Land Use (TBM 2007)

- Not Categorized
- Agriculture, Open Space and Recreation
- Industrial, Commercial and Services
- Residential
- Transportation, Water, and Utilities

Zero Emission Extension Design Option
Exhaust $PM_{2.5}$ Impacts

Zero Emission Extension Design Option
Total $PM_{2.5}$ Impacts
(Assuming Infinite Dust on Roads)

Original Analysis
Exhaust $PM_{2.5}$ Impacts

Original Analysis
Total $PM_{2.5}$ Impacts
(Assuming Infinite Dust on Roads)

0 2,500 5,000
Feet

Path: Z:\01_Projects\I710\03_GIS\MXD\East LA Analyses\Fig22_Annual PM2.5_Alt6C-Alt1-ELA.mxd

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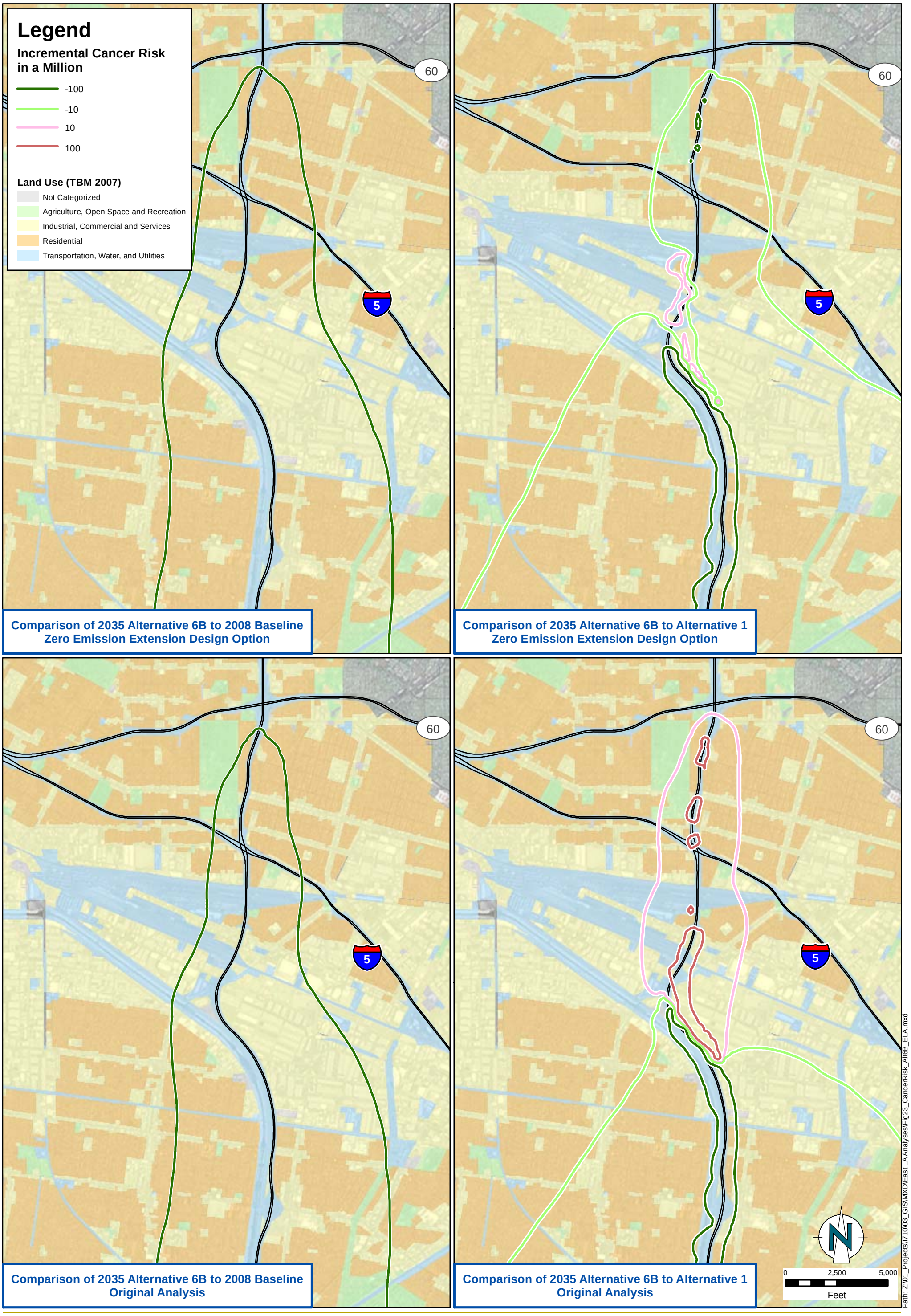
Comparison of 2035 Alternative 6C to 2035 Alternative 1 Annual $PM_{2.5}$ Impacts

Figure 22

PROJECT: 05-18574F4



Path: Z:\01_Projects\I710\03_GIS\MXD\East LA Analyses\Fig23_CancerRisk_Alt6B_ELA.mxd

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Comparison of 2035 Alternative 6B Incremental Cancer Risk in a Million (Residential Scenarios)

Figure 23

PROJECT: 05-18574F4

Legend

Incremental Cancer Risk in a Million

- -100
- -10
- 10
- 100

Land Use (TBM 2007)

- Not Categorized
- Agriculture, Open Space and Recreation
- Industrial, Commercial and Services
- Residential
- Transportation, Water, and Utilities

60

5

Comparison of 2035 Alternative 6C to 2008 Baseline Zero Emission Extension Design Option

Comparison of 2035 Alternative 6C to Alternative 1 Zero Emission Extension Design Option

Comparison of 2035 Alternative 6C to 2008 Baseline Original Analysis

Comparison of 2035 Alternative 6C to Alternative 1 Original Analysis

0 2,500 5,000

Feet

Path: Z:\01_Projects\I710\03_GIS\MXD\East LA Analyses\Fig24_CancerRisk_Alt6C_ELA.mxd

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Comparison of 2035 Alternative 6C Incremental Cancer Risk in a Million (Residential Scenarios)

Figure 24

PROJECT: 05-18574F4