APPENDIX G

Air Quality and Greenhouse Gas Supporting Information

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- **Air Quality Memo**
- Air Quality Summary Calculations for Proposed Project
- Air Quality Detailed Calculations for Proposed Project (See Excel Files)

TECHNICAL MEMORANDUM

TO: Caitlin Gilleran, Panorama Environmental

FROM: Michael Ratte, RCH Group

DATE: March 6, 2018

SUBJECT: CPUC Riverside Air Quality Impacts

Project Overview

Southern California Edison (SCE) and the City of Riverside's Municipal Utility Department (known as Riverside Public Utilities [RPU]) jointly planned the Riverside Transmission Reliability Project (RTRP). The RTRP, which consists of the RPU project components and the "previously proposed SCE project", was analyzed in the 2013 RTRP EIR. The previously proposed SCE project consisted of a double-circuit 230 kV overhead transmission line extending from a new 230kV substation to a tie-in at the existing Mira Loma Substation.

SCE has since filed an application, revising several components compared to the previously proposed SCE project. The currently proposed SCE project is referred to as the "Proposed Project" and would consist of the construction, operation, and maintenance of a new approximately 10-mile double-circuit 230 kV transmission line and a new 230 kV substation (Wildlife Substation).

Construction would involve twenty three elements: Survey, Marshalling Yard, Roads & Landing Work, Guard Structure Installation, Install LST Foundations, LST Steel Haul, LST Steel Assembly, LST Erection, TSP Foundation Installation, TSP Haul, TSP Assembly, TSP Erection, Modify Existing LST, Conductor & OPGW Installation, Guard Structure Removal, Vault Installation, Duct Bank Installation, Underground Cable Installation, Cable Splicing, Jack and Bore, Riser Pole Preparation, Cable Terminating, Trench Restoration/Paving, and Restoration. Construction activities are expected to commence in March of 2021 and be completed in March of 2023.

Analysis Approach

The significance thresholds adopted by South Coast Air Quality Management District (SCAQMD), shown in **Table 1 Air Quality Significance Thresholds**, assist lead agencies in evaluating when potential air quality impacts from a Proposed Project would be considered significant under CEQA. Calculations of criteria air pollutant emissions were conducted for the RTRP, which included the previously Proposed Project and the RPU components, and analyzed in the 2013 RTRP EIR. The Proposed Project would change the quantity of criteria air pollutant and GHG emissions generated by the Proposed Project. The change in emissions could result in a new significant impact that was not previously analyzed in the 2013 RTRP EIR. It is not adequate to identify the emissions from the Proposed Project in isolation as these components are a part of the larger Proposed Project. Any exceedances of the significance thresholds due to construction or operation of the Proposed Project as a whole should be identified. As such, the following analysis details the criteria air pollutant emissions calculated for the Proposed Project. A new

significant air quality impact not previously analyzed in the 2013 RTRP EIR could occur due to substantial changes in methodology, background concentrations of pollutants, location of construction, and type of construction activities.

Air Quality Emissions

Intermittent (short-term) construction emissions that occur from activities, such as site-grading, paving and long-term impacts related to the operation of the Proposed Project were evaluated. The air quality analysis focuses on daily emissions from construction and operational (mobile, area, stationary, and fugitive sources) activities and compares the emission estimates to thresholds of significance. The air quality analysis was consistent with the methods described in the SCAQMD *CEQA Air Quality Handbook.*[1]

Air quality calculations were made for combustion sources such as on-road vehicles from employees and haul trucks as well as onsite combustion equipment such as loaders and excavators. Fugitive dust emissions from grading, loading/unloading, and vehicle movement on unpaved surfaces was also calculated. Emissions were determined for United States Environmental Protection Agency (USEPA) criteria pollutants[2] such as carbon monoxide (CO),[3] nitrogen oxides (NO_x), sulfur dioxide (SO_2), volatile organic compounds (VOC) as reactive organic gases (ROG),[4] particulate matter less than 10 micrometers (coarse or PM_{10}), and particulate matter less than 2.5 micrometers (fine or $PM_{2.5}$).[5] Other issues related to air emissions covered in this air quality analysis include greenhouse gas (GHG) emissions and the qualitative assessment of TAC emissions related to health risks affecting sensitive receptors from diesel particulate matter (DPM).

Construction-related emissions are expected to be short-term, but may still cause adverse effects on air quality. Construction-related fugitive dust emissions would vary from day to day, depending on the level and type of activity, silt content of the soil, and the weather. High winds (greater than 25 miles per hour) occur infrequently in the area, less than two percent of the time. In the absence of mitigation, construction activities may result in significant quantities of dust, and as a result, local visibility and PM_{10} concentrations may be adversely affected on a temporary and intermittent basis during construction. In addition, the fugitive dust generated by construction would include not only PM_{10}, but also larger particles, which would fall out of

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[1] South Coast Air Quality Management District, SCAQMD Air Quality Significance Thresholds, http://www.aqmd.gov/ceqa/hdbk.html

[2] Criteria air pollutants refer to those air pollutants for which the United States Environmental Protection Agency (USEPA) and California Air Resources Board (CARB) has established National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) under the Federal Clean Air Act (CAA).

[3] CO is a non–reactive pollutant that is a product of incomplete combustion of organic material, and is mostly associated with motor vehicle traffic, and in wintertime, with wood–burning stoves and fireplaces.

[4] VOC means any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions and thus, a precursor of ozone formation. ROG are any reactive compounds of carbon, excluding methane, CO, CO_2 carbonic acid, metallic carbides or carbonates, ammonium carbonate, and other exempt compounds. The terms VOC and ROG are often used interchangeably.

[5] PM_{10} and $PM_{2.5}$ consists of airborne particles that measure 10 microns or less in diameter and 2.5 microns or less in diameter, respectively. PM_{10} and $PM_{2.5}$ represent fractions of particulate matter that can be inhaled into the air passages and the lungs, causing adverse health effects.

the atmosphere within several hundred feet of the site and could result in nuisance-type impacts.

It is mandatory for all construction projects in the South Coast Air Basin to comply with SCAQMD Rule 402 and 403 for fugitive dust. Rule 402 and 403 control requirements include, but are not limited to, applying water in sufficient quantities to prevent the generation of visible dust plumes, applying soil binders to uncovered areas, reestablishing ground cover as quickly as possible, utilizing a wheel washing system to remove bulk material from tires and vehicle undercarriages before vehicles exit the project site, and maintaining effective cover over exposed areas.

The SCAQMD adopts rules and regulations to implement portions of the Air Quality Management Plan. For the Proposed Project, relevant rules and regulations include:

> Rule 402 (Nuisance): This rule states that a person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.
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> Rule 403 (Fugitive Dust): This rule requires fugitive dust sources to implement Best Available Control Measures for all sources, and all forms of visible particulate matter are prohibited from crossing any property line. SCAQMD Rule 403 is intended to reduce PM_{10} emissions from any transportation, handling, construction, or storage activity that has the potential to generate fugitive dust.

Regulatory models used to estimate air quality impacts include:

- California Air Resources Board's (CARB) EMFAC2014[6] emissions inventory model. EMFAC2014 is the latest emission inventory model that calculates emission inventories and emission rates for motor vehicles operating on roads in California. This model reflects CARB's current understanding of how vehicles travel and how much they emit. EMFAC2014 can be used to show how California motor vehicle emissions have changed over time and are projected to change in the future.
- CARB OFFROAD[7] emissions inventory model. OFFROAD is the latest emission inventory model that calculates emission inventories and emission rates for off-road equipment such as loaders, excavators, and off-road haul trucks operating in California. This model reflects CARB's current understanding of how equipment operates and how much they emit. OFFROAD can be used to show how California off-road equipment emissions have changed over time and are projected to change in the future.

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[6] California Air Resources Board, *EMFAC2014 User's Guide*, April 30, 2014, http://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol1-users-guide-052015.pdf

[7] California Air Resources Board, OFFROAD Instructions, http://www.arb.ca.gov/msprog/ordiesel/info_1085/oei_write_up.pdf

- USEPA's *AP 42 Compilation of Air Pollutant Emission Factors*[8] contains emission factors for stationary point and area emission sources such as those associated with vehicle travel on paved roads and unpaved surfaces, and material handling and storage.
- AERMOD (American Meteorological Society/USEPA Regulatory Model) is an atmospheric dispersion model which can simulate point, area, volume, and line emissions sources and has the capability to include simple, intermediate, and complex terrain along with meteorological conditions and multiple receptor locations.[9,10] AERMOD is commonly executed to yield 1-hour maximum and annual average concentrations (in micrograms per cubic meter or $\mu g/m^3$) at each receptor.

Thresholds of Significance

The significance of potential impacts was determined based on State CEQA Guidelines, Appendix G and the SCAQMD *Air Quality Significance Thresholds*. Using Appendix G evaluation thresholds, the Proposed Project would be considered to have significant air quality impacts if it were to:

A. Conflict with or obstruct implementation of the applicable air quality plan;

B. Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

C. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

D. Expose sensitive receptors to substantial pollutant concentrations;

E. Create objectionable odors affecting a substantial number of people;

F. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or

G. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The significance thresholds and analysis methodologies in the SCAQMD's *CEQA Air Quality Handbook* were used in evaluating the potential project impacts (as identified from Appendix G of the State CEQA Guidelines) for construction, operations, air toxics, and GHG emissions.

Construction Emissions.

The Proposed Project comprises a portion of the Proposed Project. As such, it is not representative to compare emissions generated by construction of the Proposed Project, only,

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[8] Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emission-factors

[9] United States Environmental Protection Agency, Preferred/Recommended Models, *AERMOD Modeling System*, https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models

[10] Title 40 CFR Part 51, *Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions; Final Rule,* http://www.epa.gov/ttn/scram/guidance/guide/appw_05.pdf

to the thresholds presented in **Table 1 Air Quality Significance Thresholds**. The air quality significance thresholds are used to compare maximum daily emissions of the Proposed Project.

The Proposed Project could result in a significant impact to an existing air quality violation if the overall emissions from construction of the project would exceed the SCAQMD significance thresholds.

Operations Emissions.

The Proposed Project could result in a significant impact to an existing air quality violation if the overall emissions from operation of the project would exceed the SCAQMD significance thresholds presented in **Table 1 Air Quality Significance Thresholds**.

Table 1: Air Quality Significance Thresholds

Pollutant	Construction	Operation
NOx	100 pounds/day	55 pounds/day
VOC (ROG)	75 pounds/day	55 pounds/day
PM_{10}	150 pounds/day	150 pounds/day
$PM_{2.5}$	55 pounds/day	55 pounds/day
SO_2	150 pounds/day	150 pounds/day
CO	550 pounds/day	550 pounds/day
Lead	3 pounds/day	3 pounds/day

Source: South Coast Air Quality Management District, SCAQMD Air Quality Significance Thresholds, http://www.aqmd.gov/ceqa/hdbk.html

Construction Ambient Concentrations.

Construction of the underground segment of the Proposed Project would generate localized emissions that could exceed ambient air quality thresholds. The 2013 RTRP EIR analyzed ambient air quality emissions from construction of a single pole; therefore, a comparative analysis is not appropriate due to substantial changes in methodology, background concentrations of pollutants, location of analysis, and type of construction activity. The Proposed Project would result in a significant ambient air quality impact if construction of the underground segment would generate ambient air pollutant emissions that exceed the significance concentration thresholds set forth in **Table 2 Ambient Air Quality Standards for Criteria Pollutants.**

Operations Ambient Concentrations.

Operation and maintenance of the Proposed Project would not generate noticeable increases in localized ambient air pollutants. A quantitative analysis is therefore not provided.

Toxic Air Contaminants.

The Proposed Project would result in a significant air quality impact if the carcinogenic or toxic air contaminants individually or cumulatively exceed the maximum individual cancer risk of 10 in one million or an acute or chronic hazard index of 1.0.

Table 2: Ambient Air Quality Standards for Criteria Pollutants

Pollutant	Averaging Period	Pollutant Concentration
CO	1-hour /8-hour	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the attainment standards of 20 ppm (1-hour) and 9 ppm (8-hour).
NO_2	1-hour	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standard 0.18 ppm.
	Annual	0.03 ppm (state) and 0.0534 ppm (federal)
PM_{10}	24-hour	10.4 µg/m^3 (Construction) and 2.5 µg/m^3 (operation)
	Annual	1.0 µg/m^3
$PM_{2.5}$	24-hour	10.4 µg/m^3 (Construction) and 2.5 µg/m^3 (operation)

Source: South Coast Air Quality Management District, SCAQMD Air Quality Significance Thresholds, http://www.aqmd.gov/ceqa/hdbk.html

GHG Emissions.

The Proposed Project could result in a significant impact to GHG emissions if the overall emissions from construction and operation of the project would exceed the SCAQMD construction and operation significance threshold of 10,000 metric tons of carbon dioxide-equivalent (CO_2e) per year.

Air Emissions Inventory.

Construction Emissions Inventory Results for the Proposed Project.

Table 3 Unmitigated Proposed Project Maximum Daily Construction Emissions shows the estimated unmitigated maximum daily emissions for all construction related emissions (including combustion engine and fugitive dust emissions) for the Proposed Project. The estimated unmitigated maximum daily emissions for NOx, PM_{10}, and $PM_{2.5}$ would exceed the SCAQMD significance thresholds.

The unmitigated maximum daily construction emissions are estimated to occur when the TSP Foundation Installation, TSP Erection, Conductor & OPGW Installation, Underground Vault Installation, Jack and Bore, and Wildlife Substation occur simultaneously. Per the SCE Project Schedule (dated July 25, 2017), these five construction elements are expected to occur simultaneously between October 20 through October 25 of 2021. During other portions of the two-year construction period, the maximum daily construction emissions would be lower. Notably, the unmitigated average daily construction emissions (total construction emissions divided by the number of construction days) for NOx, PM_{10}, and $PM_{2.5}$ during the two-year period would be 27 pounds (less than significant), 265 pounds (potentially significant), and 47 pounds (less than significant), respectively.

In conclusion, the unmitigated maximum daily construction emissions would occur during the specific five-day period and the average daily construction emissions would be substantially lower than the maximum daily construction emissions.

Table 3: Unmitigated Proposed Project Maximum Daily Construction Emissions (pounds)

Project Element	NOx	VOC	CO	PM10	PM2.5	SO2
Proposed Project						
TSP Foundation Installation	10.8	0.86	8.48	99.2	11.5	0.03
TSP Erection	10.4	0.89	8.89	53.6	6.27	0.02
Conductor and OPGW Installation	62.1	5.72	33.6	227	27.7	0.12
Underground Vault Installation	48.1	3.67	32.6	104	15.5	0.10
Wildlife Substation	5.61	0.39	5.40	110	12.5	0.02
Jack and Bore	30.4	2.08	17.1	27.6	4.09	0.06
Total for Proposed Project	**167**	13.6	106	**622**	**77.6**	0.35
SCAQMD Significance Threshold	100	75	550	150	55	150
Exceedance?	**Yes**	No	No	**Yes**	**Yes**	No

Source: RCH Group, 2017 compiled from Power Engineers, Riverside Transmission Reliability Project, Air Quality Technical Report, June 2011, Environmental Impact Report, October 2012, AECOM, Emissions and Air Quality Modeling Results Associated with the Underground Hybrid I-15 230-kV Route of the Riverside Transmission Reliability Project (RTRP); Riverside County, California, November 21, 2016

Table 4 Mitigated Proposed Project Maximum Daily Construction Emissions shows the estimated mitigated daily emissions for all construction related emissions (including combustion engine and fugitive dust emissions) for the Proposed Project, incorporating the 2013 RTRP EIR air quality mitigation measures, identified as **2013 RTRP EIR Mitigation Measures**. Consistent with the analysis for the previously proposed SCE project, a fugitive dust control efficiency of 50 percent was incorporated into the estimated mitigated maximum daily emissions for the Proposed Project.[11] The estimated mitigated maximum daily emissions of PM_{10} would be greater than the SCAQMD Significance Threshold of 150 pounds per day (when the TSP Foundation Installation, TSP Erection, Conductor & OPGW Installation, Underground Vault Installation, Jack and Bore, and Wildlife Substation occur simultaneously). Several other phases of construction would also exceed SCAQMD Significance Thresholds for PM_{10} due to overlapping construction activities.

Table 4: Mitigated Proposed Project Maximum Daily Construction Emissions (pounds)

Project Element	NOx	VOC	CO	PM10	PM2.5	SO2
Proposed Project						
TSP Foundation Installation	2.99	0.30	12.4	48.6	6.01	0.03
TSP Erection	2.13	0.23	8.32	26.5	3.25	0.02
Conductor and OPGW Installation	30.9	2.86	43.3	107	13.7	0.12
Underground Vault Installation	12.5	1.10	35.8	59.9	9.71	0.10
Wildlife Substation	2.97	0.19	4.90	53.8	6.69	0.02
Jack and Bore	4.57	0.81	31.1	14.7	2.20	0.07
Total for Proposed Project	56.0	5.50	136	**310**	41.6	0.35
SCAQMD Significance Threshold	100	75	550	150	55	150
Exceedance?	No	No	No	**Yes**	No	No

Source: RCH Group, 2017 compiled from Power Engineers, Riverside Transmission Reliability Project, Air Quality Technical Report, June 2011, Environmental Impact Report, October 2012, AECOM, Emissions and

[11] Notably, the fugitive dust emissions of PM10 and PM2.5 for the Proposed Project reflect updates to the unpaved and paved surface emission factors and material handling emission factors. Thus, the mitigated PM10 and PM2.5 emissions reflect differences between the previously Proposed Project and the Proposed Project as well as differences in emission calculation methodologies and emissions factors. The result is a daily PM10 emission rate for the Proposed Project which is greater than the PM10 emission rate for the previously Proposed Project.

Ozone precursors and $PM_{2.5}$ emissions would be reduced to below significance thresholds. Emissions of PM_{10} would still exceed SCAQMD significance thresholds after implementing the EPEs and the 2013 RTRP EIR mitigation measures. The impact conclusion is different from that of the 2013 RTRP EIR due to the types of construction activities proposed as part of the Proposed Project and the types of concurrent construction activities.

Notably, the mitigated average daily construction emissions (total construction emissions divided by the number of construction days) for PM_{10} during the two-year period would be 134 pounds, which would be less than the SCAQMD Significance Threshold.

2013 RTRP EIR Mitigation Measures.

EPE AQ-01 The construction activities shall comply with the South Coast Air Quality Management District requirements, as applicable to the project.

EPE AQ-02 Worker Environmental Awareness Program (WEAP) Design and Implementation– A general Air Quality WEAP would be prepared. All construction crews and contractors would be required to participate in this WEAP training prior to starting work on the project. The air quality WEAP may be combined with the general WEAP for sensitive species as described under mitigation measure BIO-05.

MM AQ-1 Use ultra-low sulfur diesel fuel (e.g., <15 ppm).

MM AQ-2 Use of clean burning on- and off-road diesel engines. Heavy duty diesel powered construction equipment manufactured after 1996 (with federally mandated “clean” diesel engines) would be utilized.

MM AQ-3 Construction workers shall carpool to construction sites.

MM AQ-4 Restrict construction vehicle idling time to less than 5 minutes.

MM AQ-5 Properly maintain mechanical equipment

MM AQ-6 Use particle traps and other appropriate controls to reduce diesel particulate matter (DPM). Other control equipment includes devices such as specialized catalytic converters (oxidation catalysts) control approximately 20 percent of DPM, 40 percent of carbon monoxide, and 50 percent of hydrocarbon emissions.

MM AQ-7 Limit vehicle speeds to 15 mph on unpaved surfaces.

MM AQ-8 On the last day of active operations prior to weekend or holiday, apply water or chemical stabilizer to maintain a stabilized surface.

MM AQ-9 Water excavated soil piles hourly or cover with temporary coverings.

MM AQ-10 Moisten excavated soil prior to loading on haul trucks.

MM AQ-11 Cover all loads of dirt leaving the site or leave at least two feet of freeboard capacity in haul truck to reduce fugitive dust emissions while in-route to disposal site.

MM AQ-12 Application of water to ground surfaces prior and during earthmoving activity.

MM AQ-13 Implement fugitive dust control measures as provided in SCAQMD Rule 403

MM AQ-14 Coordinate final construction schedules to prevent 230 kV transmission line conductor installation utilizing helicopter phase from overlapping with the 69 kV sub-transmission line and substation grading and foundation installation phases

MM AQ-15 Provide temporary traffic controls, such as a flag person, during all phases of construction to maintain smooth traffic flow.

MM AQ-16 Provide dedicated turn lanes for movement of construction trucks and equipment on- and off-site.

MM AQ-17 Reroute construction trucks away from congested streets or sensitive receptor areas.

MM AQ-18 Appoint a construction relations officer to act as a community liaison concerning on-site construction activity, including resolution of issues related to PM_{10} generation.

MM AQ-19 During Project construction, all internal combustion engines/construction equipment operating on the Proposed Project site shall meet EPA-Certified Tier 3 emissions standards or higher, according to the following:

- January 1, 2012 to December 31, 2014: All off-road diesel-powered construction equipment greater than 50 horsepower (hp) shall meet Tier 3 off-road emissions standards. In addition, all construction equipment shall be outfitted with BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations.
- Post January 1, 2015: All off-road diesel-powered construction equipment greater than 50 hp shall meet the Tier 4 emission standards, where available. In addition, all construction equipment shall be outfitted with BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations (i.e., if Project construction goes beyond the anticipated schedule).
- A copy of each unit's certified tier specification, BACT documentation, and CARB or SCAQMD operating permit shall be provided at the time of mobilization for each applicable unit of equipment.

Erosion control measures and water programs are typically undertaken to minimize these fugitive dust and particulate emissions. A fugitive dust control efficiency of 50 percent due to daily watering and other measures (e.g., limiting vehicle speed to 15 mph, management of stockpiles, screening process controls, etc.) was estimated for the **2013 RTRP EIR Mitigation Measures**. Application of water reduces fugitive dust emissions by a factor of approximately 34 to 68 percent (per SCAQMD *CEQA Air Quality Handbook*). It is assumed that one water application per day reduces fugitive dust by 34 percent, two water applications per day reduces fugitive dust by 50 percent, and three water applications per day reduces fugitive dust by 68 percent. Additional measures (e.g., more frequent watering, street sweepers, track out control,

soil stabilization, etc.) would allow for a fugitive dust control efficiency of 75 percent and compliance with SCAQMD Rule 402 and 403.[12] [13] [14]

The **2013 RTRP EIR Mitigation Measures** and enhanced fugitive dust measures were incorporated as **Enhanced 2013 RTRP EIR Mitigation Measures** to further reduction PM_{10} emissions of the Proposed Project. These mitigation measures result in a fugitive dust control efficiency of 75 percent for the Proposed Project. The additional measures included in the **Enhanced 2013 RTRP EIR Mitigation Measures** provide fugitive dust control measures beyond (or expansions of) the **2013 RTRP EIR Mitigation Measures** in an effort to achieve an increase in fugitive dust control efficiency from 50 percent to 75 percent per SCAQMD guidance.[15]

Table 5 Enhanced Mitigated Proposed Project Maximum Daily Construction Emissions with Enhanced Measures shows the estimated enhanced mitigated maximum daily emissions for all construction related emissions (including combustion engine and fugitive dust emissions) for the Proposed Project, incorporating the 2013 RTRP EIR air quality mitigation measures and new fugitive dust control measures, identified as **Enhanced 2013 RTRP EIR Mitigation Measures**. The estimated mitigated maximum daily emissions of PM_{10} would be greater than the SCAQMD Significance Threshold of 150 pounds per day with enhanced measures (when the TSP Foundation Installation, TSP Erection, Conductor & OPGW Installation, Underground Vault Installation, Jack and Bore, and Wildlife Substation occur simultaneously), and thus, a potential air quality impact. This simultaneous condition is only expected to occur between October 20 and October 25 of 2021 of the proposed construction schedule. With the enhanced mitigation, all other construction periods would be less than the SCAQMD Significance Threshold.

Notably, the enhanced mitigated average daily construction emissions (total construction emissions divided by the number of construction days) for PM_{10} during the two-year period would be 72 pounds, which would be less than the SCAQMD Significance Threshold.

Table 5: Mitigated Proposed Project Maximum Daily Construction Emissions with Enhanced Measures (pounds)

Project Element	NOx	VOC	CO	PM10	PM2.5	SO2
Proposed Project						
TSP Foundation Installation	2.99	0.30	12.4	27.3	3.76	0.03
TSP Erection	2.13	0.23	8.32	15.2	2.12	0.02
Conductor and OPGW Installation	30.9	2.86	43.3	60.3	8.68	0.12
Underground Vault Installation	12.5	1.10	35.8	41.6	7.79	0.10
Wildlife Substation	2.97	0.19	4.90	30.2	4.21	0.02
Jack and Bore	4.57	0.81	31.1	6.35	0.98	0.07
Total for Proposed Project	56.0	5.50	136	**181**	27.5	0.035

[12] SCAQMD, Fugitive Dust Mitigation Measures, April 2007, http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust

[13] SJVAPCD, Controlling Fugitive Dust Emissions, April 2007, http://www.valleyair.org/busind/comply/PM10/compliance_PM10.htm

[14] WRAP Fugitive Dust Handbook, September 7, 2006, https://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf

[15] SJVAPCD, Controlling Fugitive Dust Emissions, April 2007, http://www.valleyair.org/busind/comply/PM10/compliance_PM10.htm

SCAQMD Significance Threshold	100	75	550	150	55	150
Exceedance?	No	No	No	**Yes**	No	No

Source: RCH Group, 2017 compiled from Power Engineers, Riverside Transmission Reliability Project, Air Quality Technical Report, June 2011, Environmental Impact Report, October 2012, AECOM, Emissions and Air Quality Modeling Results Associated with the Underground Hybrid I-15 230-kV Route of the Riverside Transmission Reliability Project (RTRP); Riverside County, California, November 21, 2016

Enhanced 2013 RTRP EIR Mitigation Measures.

MM AQ-1: Fugitive Dust Control Plan

Prior to start of the initial on-site construction, a proposed Fugitive Dust Control Plan shall be prepared in compliance with SCAQMD Rule 403. Fugitive dust shall be controlled by the applicable best available control measures listed in Table 1 of Rule 403. A draft Fugitive Dust Control Plan shall be submitted to the CPUC for review and approval at least 30 days prior to the initiation of construction.

Under SCAQMD Rule 403 – Fugitive Dust, the following provisions apply:

- The project applicant shall submit a Rule 403 Large Operation Notification to the Executive Officer.
- A sign shall be posted near the entrance of the facility with a responsible individual's name and phone number in case there are any fugitive dust control issues at the site.
- Appoint a construction relations officer to act as a community liaison concerning on-site construction activity, including resolution of issues related to PM10 generation from combustion emissions and fugitive dust generation.
- An on-site supervisor with a current fugitive dust control class certification shall be present who is available within 30 minutes to respond to any fugitive dust control issue at the site during normal business hours.
- The operation shall keep on-site records of specific dust control actions taken.

At a minimum, the Fugitive Dust Control Plan shall include the following control measures that must be implemented during construction:

- Limit vehicle speeds to 15 mph on unpaved surfaces.
- Track-out shall not extend 25 feet or more from an active operation and track-out shall be removed at the conclusion of each workday. The contractor shall use a gravel apron, 25 feet long by road width, or a pipe-grid track-out control device to reduce mud/dirt track-out from active operations and unpaved truck exit routes.
- The construction contractor shall use street sweepers (using reclaimed water) that comply with SCAQMD Rules 1186 and 1186.1. The street sweepers shall operate for the length of the truck route to and from unpaved construction areas including the marshalling yards and in between construction sites.
- A wheel washing system shall be installed and used to remove bulk material from tires and vehicle undercarriages before vehicles exit the unpaved construction site.

- Operations on unpaved surfaces shall be suspended when winds exceed 25 miles per hour. When wind speeds are high enough to result in dust emissions crossing the work boundary, despite the application of dust mitigation measures, grading and earthmoving operations shall be suspended.
- Visible dust plumes shall not occur during periods when soil is being disturbed by equipment or by wind at any time. If dust plumes are visible or a dust complaint is lodged, dust control may be achieved by applying water before/during earthwork and onto unpaved traffic areas, phasing work to limit dust, and setting up wind fences to limit wind-blown dust.

- *Exposed Surfaces*
    - Water or a stabilizing agent shall be applied at least three times daily, preferably in the mid-morning, afternoon, and after work is done for the day, to exposed surfaces including graded and disturbed areas in sufficient quantity to prevent generation of dust plumes.
    - Soil stabilization shall be required at construction sites after normal working hours, on weekends, and holidays. This requirement also applies to inactive construction areas such as phased projects where disturbed land is left unattended. Applying water to form a visible crust on the soil and restricting vehicle access are often effective for short-term stabilization of disturbed surface areas. Long-term methods include applying dust suppressants and establishing vegetative cover. Stabilization best management practices used for disturbed areas not supporting construction traffic or active work may also include vegetation, plastic covering, erosion control fabrics and matting, and the early application of a gravel base on areas to be paved.
- *Stock Piles*
    - On-site stock piles shall be covered or watered at least twice per day. Water excavated soil piles hourly or cover with temporary coverings. All storage piles shall be covered overnight and during inactivity.
- *Haul Trucks*
    - Moisten excavated soil prior to loading on haul trucks. Cover all loads of dirt leaving the site or leave at least two feet of freeboard capacity in haul truck to reduce fugitive dust emissions while in-route to disposal site.

MM AQ-2: Exhaust Emissions Control

Exhaust emissions from worker vehicles, and construction equipment and vehicles shall be minimized by implementing the following control measures:

- Use ultra-low sulfur diesel fuel (e.g., <15 ppm).
- Use clean burning on- and off-road diesel engines. Heavy-duty diesel-powered construction equipment manufactured after 1996 (with federally mandated “clean” diesel engines) shall be utilized.
- Construction workers shall carpool to construction sites.
- Restrict construction vehicle idling time to less than 5 minutes.
- Properly maintain mechanical equipment.
- Use particle traps and other appropriate controls to reduce diesel particulate matter (DPM). Other control equipment includes devices such as specialized catalytic converters (oxidation catalysts) control approximately 20 percent of DPM, 40 percent of carbon monoxide, and 50 percent of hydrocarbon emissions.

- Provide temporary traffic controls, such as a flag person, during all phases of construction to maintain smooth traffic flow.
- Provide dedicated turn lanes for movement of construction trucks and equipment on- and off-site.
- Reroute construction trucks away from congested streets or sensitive receptor areas.
- During Project construction, all off-road diesel-powered construction equipment greater than 50 hp shall meet the Tier 4 emission standards, where available. In addition, all construction equipment shall be outfitted with BACT devices certified by CARB. Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations (i.e., if Project construction goes beyond the anticipated schedule).
- A copy of each unit's certified tier specification, BACT documentation, and CARB or SCAQMD operating permit shall be provided to the CPUC at the time of mobilization for each applicable unit of equipment.

Thus, to reduce the potential air quality impacts, the Proposed Project would not allow Conductor & OPGW Installation to occur simultaneously with the TSP Foundation Installation and TSP Erection. Removing this simultaneous construction activity (i.e., Conductor & OPGW Installation would not start until after the TSP Foundation Installation and TSP Erection have completed) would result in a mitigated maximum daily emissions of PM_{10} of 147 pounds during construction of the Proposed Project, with enhanced measures, which would be less than the SCAQMD Significance Threshold of 150 pounds per day. This maximum daily condition would occur when the Underground Vault Installation, Duct Bank Installation, Underground Cable Installation, Cable Terminating, Cable Splicing, Jack and Bore, and Distribution Relocation would occur simultaneously (from May 23 of 2022 through August 8 of 2022).

Table 6 Mitigated Proposed Project Maximum Daily Construction Emissions with Enhanced Measures and Construction Schedule Limitations shows the estimated enhanced mitigated maximum daily emissions for all construction related emissions (including combustion engine and fugitive dust emissions) for the Proposed Project, incorporating the 2013 RTRP EIR air quality mitigation measures, identified as **Enhanced 2013 RTRP EIR Mitigation Measures** and **Construction Schedule Limitation Measure**. With the enhanced mitigation and construction schedule limitations, all pollutant emission during the entire construction period would be less than the SCAQMD Significance Threshold.

Again, the mitigated average daily construction emissions (total construction emissions divided by the number of construction days) for PM_{10} with enhanced measures and construction schedule limitations during the two-year period would be 72 pounds, which would be less than the SCAQMD Significance Threshold.

Table 6: Mitigated Proposed Project Maximum Daily Construction Emissions with Enhanced Measures and Construction Schedule Limitations (pounds)

Project Element	NOx	VOC	CO	PM10	PM2.5	SO2
Proposed Project						
Underground Vault Installation	12.5	1.10	35.8	41.6	7.79	0.10
Duct Bank Installation	11.8	0.80	26.1	32.3	6.03	0.07
Underground Cable Installation	1.66	0.25	17.9	9.01	1.55	0.04
Cable Terminating	1.33	0.24	10.8	12.4	1.76	0.02
Cable Splicing	2.52	0.45	16.6	21.7	3.10	0.04
Distribution Relocation	3.51	0.17	4.29	23.8	3.45	0.01
Jack and Bore	4.57	0.81	31.1	6.35	0.98	0.07
Total for Proposed Project	**37.9**	**3.81**	**143**	**147**	**24.7**	**0.35**
SCAQMD Significance Threshold	100	75	550	150	55	150
Exceedance?	No	No	No	No	No	No

Source: RCH Group, 2017 compiled from Power Engineers, Riverside Transmission Reliability Project, Air Quality Technical Report, June 2011, Environmental Impact Report, October 2012, AECOM, Emissions and Air Quality Modeling Results Associated with the Underground Hybrid I-15 230-kV Route of the Riverside Transmission Reliability Project (RTRP); Riverside County, California, November 21, 2016

Construction Schedule Limitation Measure.

MM AQ-3: Overlap of Construction Activities

The final project construction schedule shall be coordinated to ensure that the Conductor & OPGW Installation activity shall not occur simultaneously with the TSP Foundation Installation and TSP Erection activities. Furthermore, construction of SCE project components shall not overlap with construction of the RPU components of the RTRP. The final construction schedule shall be provided to the CPUC at least two weeks prior to construction.

As such, the Proposed Project would not generate significant mitigated air quality emissions. The **Enhanced 2013 RTRP EIR Mitigation Measures** and **Construction Schedule Limitation Measure** are also necessary to demonstrate that particulate matter concentrations would be below the significance thresholds for Ambient Air Quality Standards (see **Table 2 and Ambient Air Quality Modeling Results**).

Operational Emissions Inventory Results for Proposed Project.

Operation and maintenance activities that would affect air quality would be minimal. As shown in **Table 7 Estimated Maximum Daily Emissions from Project Operations**, the estimated maximum daily emissions from all operation and maintenance activities for the Proposed Project are less than the SCAQMD Significance Thresholds.

Table 7: Estimated Maximum Daily Emissions from Project Operations (pounds)

Project Element	NOx	VOC	CO	PM10	PM2.5	SO2
Total for the Proposed Project	**0.42**	**0.01**	**0.05**	**10.4**	**1.13**	**0.00**
SCAQMD Significance Threshold	55	55	550	150	55	150
Exceedance?	No	No	No	No	No	No

Source: RCH Group, 2017 compiled from Power Engineers, Riverside Transmission Reliability Project, Air Quality Technical Report, June 2011, Environmental Impact Report, October 2012, AECOM, Emissions and Air Quality Modeling Results Associated with the Underground Hybrid I-15 230-kV Route of the Riverside Transmission Reliability Project (RTRP); Riverside County, California, November 21, 2016

Air Emission Calculation Methodology.

On-Road Vehicles

Vehicular emissions were computed using the CARB's emission factor model, EMFAC2016, to estimate on-road emissions. Employee trips were modeled using the light-duty auto classification. Paved road dust, break wear, and tire wear particulate emissions were also accounted for and included in the analysis using EMFAC factors and methodologies from CARB and the USEPA. Employee trips are a composite of gasoline and diesel vehicles. Vehicles usage were assumed to be 40 miles per day. Distance traveled is assumed to be 30 miles for delivery trucks. The paved and unpaved travel distances for on-road vehicles during underground-related activities were estimated to be 29 miles and 1 mile, respectively.

Vehicular emissions were computed using the CARB's emission factor model, EMFAC, to estimate on-road emissions. Employee vehicles were modeled as light-duty cars and trucks. Foreman trucks used on-site were modeled as light heavy-duty trucks. Haul trucks were modeled using the T7 classification, which is a heavy-heavy duty truck emission factor for public vehicles.

Criteria pollutant emissions associated with on-road vehicles were calculated by combining the activity information with emissions factors, in grams per mile and grams per idle hour, derived using the CARB EMFAC emissions model. Emissions calculations were based on **Equation 1**. The EMFAC emissions factors are summarized on **Table 8 Emissions Factors for On-Road Vehicles** for employee vehicles, pickup trucks, foreman trucks, and haul trucks. EMFAC estimates emission factors for 2020 were used.

Equation 1

*Emission Rate (tons/year) = EMFAC Emission Factor (gram/mile) * trips per day * miles per trip * days/year * (453.59/2000 tons/gram)*

*Emission Rate (tons/year) = EMFAC Emission Factor (gram/hour) * total idle hours * (453.59/2000 tons/gram)*

Table 8: Emissions Factors (g/mile) for On-Road Vehicles

Vehicle Type	ROG	CO	NOx	CO2	PM10	PM2.5
Employee Vehicles	0.0175	0.837	0.0757	324	0.0469	0.0197
Pickup Truck	0.0412	1.81	0.171	350	0.0481	0.0209
Foreman Truck	0.0592	1.46	0.356	740	0.0859	0.0361
Haul Trucks	0.141	0.574	4.78	1,576	0.121	0.0575

Source: CARB EMFAC2014 Emissions Model.

Off-Road Equipment

Operation of the Proposed Project would require the use of heavy-duty equipment, such as excavators, loaders, forklifts, off-road haul trucks. This equipment would be used to load and unload material and otherwise sort and handle material. Emissions from this equipment were estimated using the same approach as construction emissions. Emission factors from the OFFROAD emissions model were used. Equipment load factors were adjusted using the latest information in the OFFROAD emissions model. All equipment will work during business hours. Hours of operation (business hours) are 6 am to 6 pm during weekdays. Parameters for off-road

equipment, including equipment and fuel type, estimated horsepower and estimated annual hours of operation, were developed.

This information was applied to criteria pollutant emissions factors, in grams per horsepower-hour, primarily derived using the CARB OFFROAD emissions model. **Equation 2** outlines how off-road construction equipment emissions were computed, and the emissions factors used in this assessment are summarized, by equipment type within **Table 9 Emissions Factors for Off-Road Equipment.** OFFROAD estimates emission factors for 2020 were used.

Equation 2

*Emission Rate (tons/year) = OFFROAD Emission Factor (gram/hp-hour) * size (hp) * hours of operation * Load Factor * (453.59/2000 tons/gram)*

Table 9: Emissions Factors (g/hp-hour) for Off-Road Equipment

Equipment	HP	LF	ROG	CO	NOx	PM10	PM2.5	CO2
Rough Terrain Forklift	125	0.40	0.143	2.84	1.87	0.0684	0.0629	472
Tractors/Loaders/Backhoes	60	0.37	0.331	3.60	3.33	0.210	0.194	475
Tractors/Loaders/Backhoes	75	0.37	0.331	3.60	3.33	0.210	0.194	475
Tractors/Loaders/Backhoes	125	0.37	0.246	3.11	2.41	0.122	0.112	468
Tractors/Loaders/Backhoes	175	0.37	0.246	3.11	2.41	0.122	0.112	468
Tractors/Loaders/Backhoes	350	0.37	0.194	1.36	2.08	0.073	0.0672	468
Rubber Tired Dozers	150	0.40	0.726	3.89	7.19	0.411	0.378	473
Forklift	200	0.20	0.293	1.44	3.24	0.126	0.116	473
Grader	250	0.41	0.352	1.34	4.68	0.150	0.138	475
Rubber Tired Loaders	250	0.36	0.290	1.27	3.42	0.114	0.105	470
Roller	15	0.38	0.926	4.73	4.53	0.329	0.303	526
Roller	25	0.38	0.926	4.73	4.53	0.329	0.303	526
Roller	100	0.38	0.388	3.53	3.88	0.248	0.228	474
Air Compressors	60	0.48	0.489	3.70	3.40	0.224	0.224	568
Bore/Drill Rigs	175	0.50	0.142	1.07	1.81	0.0521	0.0479	467
Bore/Drill Rigs	210	0.50	0.142	1.07	1.81	0.0521	0.0479	467
Bore/Drill Rigs	275	0.50	0.125	1.01	1.41	0.0446	0.0410	467
Cranes	215	0.29	0.384	1.79	4.56	0.188	0.173	473
Cranes	250	0.29	0.384	1.79	4.56	0.188	0.173	473
Cranes	275	0.29	0.321	2.66	3.86	0.155	0.142	473
Cranes	400	0.29	0.321	2.66	3.86	0.155	0.142	473
Cranes	500	0.29	0.321	2.66	3.86	0.155	0.142	473
Off-Highway Trucks	300	0.38	0.246	1.41	2.35	0.0855	0.0787	475
Off-Highway Trucks	350	0.38	0.246	1.41	2.35	0.0855	0.0787	475
Off-Highway Trucks	375	0.38	0.246	1.41	2.35	0.0855	0.0787	475
Other Construction Equipment	10	0.42	1.07	5.40	5.04	0.405	0.373	528
Pavers	175	0.42	0.299	3.01	3.24	0.159	0.146	483
Pavers	250	0.42	0.187	1.03	3.11	0.0842	0.0774	484

Pavers	500	0.42	0.166	0.986	2.27	0.0810	0.0746	477

Source: CARB OFFROAD Emissions Model.

Paved Roads

Particulate emissions occur whenever vehicles travel over a paved surface such as a road or parking lot. Particulate emissions from paved roads are due to direct emissions from vehicles in the form of exhaust, brake wear and tire wear emissions and resuspension of loose material on the road surface. In general terms, resuspended particulate emissions from paved roads originate from, and result in the depletion of, the loose material present on the surface (i.e., the surface loading). In turn, that surface loading is continuously replenished by other sources. At industrial sites, surface loading is replenished by spillage of material and trackout from unpaved roads and staging areas. The emission factors were calculated using the methodology found in Section 13.2, of the USEPA's AP-42.[16]

The quantity of particulate emissions from resuspension of loose material on the road surface due to vehicle travel on a dry paved road may be estimated using the following empirical expression:

$$EF = k\,(sL)^{0.91}\,(W)^{1.02}$$

where:

E = particulate emission factor in pounds per vehicle mile traveled

k = particle size multiplier for particle size range and units of interest (PM_{10} = 0.0022, $PM_{2.5}$ = 0.00054)

sL = road surface silt loading of 0.7 grams per square meter

W = Mean vehicle weight (1.4 and 13 tons for passenger vehicle and truck)

Based on available data, the emission factor for paved roads is 0.0022 and 0.022 pounds of PM_{10} per vehicle mile traveled for passenger vehicles and haul trucks, respectively. The emission factor for paved roads is 0.00055 and 0.0053 pounds of $PM_{2.5}$ per vehicle mile traveled for passenger vehicles and haul trucks, respectively. The ratio of $PM_{2.5}$ to PM_{10} was assumed to be 25 percent.

Unpaved Roads

When a vehicle travels over an unpaved road, the force of the wheels on the road surface causes pulverization of surface material. Particles are lifted and dropped from the rolling wheels, and the road surface is exposed to strong air currents in turbulent shear with the surface. The turbulent wake behind the vehicle continues to act on the road surface after the vehicle has passed. The emission factors were calculated using the methodology found in Section 13.2, of the USEPA's AP-42.[17] The equation for developing the emission factor is:

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[16] Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, Section 13.2.1 P*aved Roads* (http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s0201.pdf), January 2011.

[17] Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, Section 13.2.2 *Unpaved Roads* (http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s0202.pdf), November 2006.

$$EF = k\,(S/12)^{a}(W/3)^{b}\,[(365-p)/365]\,(1-CE)$$

where:

EF	=	size-specific emission factor (lb/VMT)
k	=	empirical constant (PM_{10} = 1.5, $PM_{2.5}$ = 0.15)
S	=	Silt content of 8.3 percent (use whole number value)
W	=	Mean vehicle weight (1.4 and 13 tons for passenger vehicle and truck)
p	=	Number of days with measurable precipitation (31 days)
a	=	0.91 (empirical constant)
b	=	1.02 (empirical constant)
CE	=	Control efficiency rate of 75 percent

Based on available data, the uncontrolled emission factor for unpaved roads is 0.76 and 2.08 pounds of PM_{10} per vehicle mile traveled for passenger vehicles and haul trucks, respectively. To account for emission controls, a control efficiency of 75 percent was applied. The number of days with measurable precipitation in Riverside, California, was assumed to be 31 days. The uncontrolled emission factor for unpaved roads is 0.18 and 0.46 pounds of PM_{10} per vehicle mile traveled for passenger vehicles and haul trucks, respectively. The ratio of $PM_{2.5}$ to PM_{10} was assumed to be 10 percent.

Fugitive Dust from Proposed Project Site Activities

Fugitive dust emissions from site preparation, grading equipment passes, soil movement, unloading/loading of materials, and other construction related activities is based on work performed by Midwest Research Institute (MRI).[18] For most parts of California, the emission factor used is 0.11 tons PM_{10} per acre-month of activity. This emission factor is based on MRI's observation of the types, quantity, and duration of operations at eight construction sites (three in Las Vegas and five in California). The bulk of the operations observed were site preparation-related activities. The observed activity data were then combined with operation-specific emission factors provided in USEPA's AP-42 to produce emissions estimates.[19] The construction emission factor is assumed to include the effects of typical control measures such as routine watering. A dust control effectiveness of 75 percent is assumed from these measures, which is based on the estimated control effectiveness of watering. The MRI also includes an emission

[18] Midwest Research Institute, *Inventory of Agricultural Tilling, Unpaved Roads and Airstrips and Construction Sites*, November 1974, https://nepis.epa.gov/Exe/ZyNET.exe/2000Z8L8.TXT?ZyActionD=ZyDocument&Client=EPA&Index=Prior+to+1976&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C70thru75%5CTxt%5C00000004%5C2000Z8L8.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL

[19] Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, Section 13.2.3 *Heavy Construction Operations* (https://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s02-3.pdf), January 1995

factor for worst-case emissions of 0.42 tons PM_{10} per acre-month.[20] This emission factor is appropriate for large-scale construction operations, which involve substantial earthmoving operations. The South Coast Air Quality Management District (SCAQMD) estimated that 25 percent of their construction projects involve these types of operations, and applied the larger emission factor to the activities. For the remainder of the state, such detailed information is not readily available, so the average emission factor of 0.11 tons PM_{10} per acre-month (or 0.22 tons PM_{10} per acre-month without dust control measures) was recommended.[21]

When more information is known about the construction project (e.g., the amount of earthmoving, the total project area, duration, and on-site and offsite cut/fill amounts), the guidance documents suggests an emission factor of 0.011 tons PM_{10} per acre-month plus 0.059 tons per 1,000 cubic yards of on-site cut/fill and/or 0.22 tons per 1,000 cubic yards of offsite cut/fill).[22] Based on an on-site cut/fill of 125 cubic yards and an off-site cut/fill of 125 cubic yards, the refined emissions factor is 0.0459 tons PM_{10} per acre-month (or 0.0918 tons PM_{10} per acre-month without dust control measures). To account for emission controls, compliance with SCAQMD Rules 401, 402, and 403, and **2013 RTRP EIR Mitigation Measures** and **Enhanced AQ Mitigation Measures**, a control efficiency of 75 percent was applied (0.0229 tons PM_{10} per acre-month). The ratio of $PM_{2.5}$ to PM_{10} was assumed to be 21 percent. The resultant daily PM_{10} and $PM_{2.5}$ emissions were estimated to be 0.79 and 0.17 pounds, respectively.

Sacramento Metropolitan Air Quality Management District (SMAQMD) Road Construction Emissions Model, Version 8.1, is a roadway construction emissions model to assist roadway (and other similar linear) projects with determining construction emission impacts.[23] This model, which determined a daily mitigated emission rate of 0.85 pounds of PM_{10} and 0.18 pounds of $PM_{2.5}$ was used to further review the calculated results.

Helicopters

Helicopter operations are assumed to occur daily (up to 20 days) during the Conductor & OPGW Installation and involve one Hughes 500E. Helicopter activities would include and cruise operations as landing and takeoffs (LTO) would not occur within the Project site.

A helicopter would fly a lightweight sock line from structure to structure, which would be threaded through the wire rollers in order to engage a cam-lock device that would secure the pulling sock in the roller. This threading process would continue between all structures through the rollers of a particular set of spans selected for a conductor pull. The threading step of wire installation would require the use of one helicopter. On average, the helicopter would operate approximately six hours per day during stringing operations. The operations area of the helicopter would be limited to staging areas and are considered safe locations for landing. Final siting of staging areas for the Proposed Project would be conducted with the input of the helicopter contractor, affected private landowners, and land management agencies. The size of

[20] Worst-case refers to construction sites with active large-scale earth moving operations.

[21] CARB, Section 7.7, Building Construction Dust, September 2002, https://www.arb.ca.gov/ei/areasrc/fullpdf/full7-7.pdf

[22] WRAP Fugitive Dust Handbook, September 7, 2006, https://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf

[23] SMAQMD, Road Construction Emissions Model, Version 8.1, May 26, 2016, http://www.airquality.org/businesses/ceqa-land-use-planning/ceqa-guidance-tools

each staging area would be dependent upon the size and number of structures to be removed and installed. Staging areas would likely change as the work progresses along the transmission lines.

Helicopter combustion emissions were based on the FAA's *Aviation Emissions and Air Quality Handbook*[24] and the FAA's Aviation Environmental Design Tool.[25] The helicopter combustion emission calculations were reviewed per the *Guidance on Determination of Helicopter Emissions*.[26] Default aircraft time-in-mode values were used for each helicopter (e.g., a total of 13.5 minutes within ground idle mode, takeoff, and approach).

Ambient Air Quality Analysis Methodology.

Dispersion is the process by which atmospheric pollutants disseminate due to wind and vertical stability. The results of a dispersion analysis are used to assess pollutant concentrations at or near an emission source. This section presents the methodology used for the dispersion modeling analysis and addresses all of the fundamental components of an air dispersion modeling analysis including:

- Model selection and options
- Receptor locations
- Meteorological data
- Source release characteristics

The dispersion modeling analysis was conducted similarly to the AECOM's Emissions and Air Quality Modeling Results Associated with the Underground Hybrid I-15 230-kV Route of the Riverside Transmission Reliability Project Riverside County, California (dated November 21, 2016).

Notably, there are a number of important limitations and uncertainties commonly associated with a dispersion modeling analysis. This dispersion modeling analysis was performed using the best available data and methodologies, notwithstanding the following uncertainties:

- There are uncertainties associated with the estimation of emissions from project activities. Where project-specific data, such as emission factors, are not available, default assumptions and professional judgement were used.
- The limitations of the air dispersion model provide a source of uncertainty in the estimation of exposure concentrations. According to USEPA, errors due to the limitation

[24] Federal Aviation Administration, Aviation Emissions and Air Quality Handbook, Version 3, Update 1, January, 2015, https://www.faa.gov/regulations_policies/policy_guidance/envir_policy/airquality_handbook/

[25] Federal Aviation Administration, Aviation Environmental Design Tool, https://www.faa.gov/about/office_org/headquarters_offices/apl/research/models/aedt/

[26] Guidance on the Determination of Helicopter Emissions, December 2015, https://www.bazl.admin.ch/bazl/en/home/specialists/regulations-and-guidelines/environment/pollutant-emissions/triebwerkemissionen/guidance-on-the-determination-of-helicopter-emissions.html

of the algorithms implemented in the air dispersion model in the highest estimated concentrations of +/- 10 percent to 40 percent are typical.[27]

- The source parameters used to model emission sources add uncertainty. For all emission sources, the source parameters used source-specific, recommended as defaults, are expected to produce more conservative results. Discrepancies might exist in actual emissions characteristics of a source and its representation in the model; exposure concentrations used in this assessment represent approximate exposure concentrations.

Model Selection and Options

The American Meteorological Society/USEPA Regulatory Model Improvement Committee Model (AERMOD) Version 16216 was used to model the air dispersion of pollutants from the Project site and from off-site ambient air concentrations in order to evaluate compliance with the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS). AERMOD is the USEPA preferred dispersion model for general industrial purposes and has been approved for use by the USEPA, CARB, and SCAQMD. AERMOD incorporates multiple variables in its algorithms including:

- Meteorological data representative of surface and upper air conditions;
- Local terrain data to account for elevation changes; and
- Physical specification of emission sources including information such as:
    - Location;
    - Release height; and
    - Source dimensions.

AERMOD is the appropriate model for this analysis based on the coverage of simple, intermediate, and complex terrain. It also predicts both short-term (1 to 24 hours) and long-term (annual) average concentrations. The model was executed using the regulatory default options (stack-tip downwash, buoyancy-induced dispersion, and final plume rise), default wind speed profile categories, default potential temperature gradients, and no pollutant decay. This approach is conservative, since it assumes that maximum daily emissions could occur on any day, even though there is a low probability that worst-case meteorological conditions would occur at exactly the same time as when the maximum emissions would occur.

The selection of the appropriate dispersion coefficients depends on the land use within three kilometers (km) of the representative Proposed Project area. The land use typing was based on the classification method defined by Auer (1978); using pertinent United States Geological Survey (USGS) 1:24,000 scale (7.5 minute) topographic maps of the area. If the Auer land use types of heavy industrial, light-to-moderate industrial, commercial, and compact residential account for 50 percent or more of the total area, the *Guideline on Air Quality Models* recommends using urban dispersion coefficients; otherwise, the appropriate rural coefficients were used. The following criteria apply:

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[27] United States Environmental Protection Agency, *Guideline on Air Quality Models (Revised), 40 Code of Federal Regulations, Part 51, Appendix W,* November 2005, https://www3.epa.gov/scram001/guidance/guide/appw_05.pdf

- If land use (i.e., industrial, commercial, and dense residential) types I1, I2, C1, R2, and R3 account for 50 percent or more of the area, use urban dispersion coefficients; otherwise, use appropriate rural dispersion coefficients.
- If average population density is greater than 750 people/km^2, use urban dispersion coefficients; otherwise use appropriate rural dispersion coefficients.

Based on observation of the area surrounding the Proposed Project area and SCAQMD guidance, urban dispersion coefficients were applied in the analysis.[28] The population of Riverside County of 2,189,641 was used in the dispersion modeling, per SCAQMD guidance.

AERMOD incorporates two options to address concerns regarding model performance under low wind speed conditions. The LOWWIND1 option increases the minimum value of sigma-v (i.e., horizontal turbulence) from 0.2 to 0.5 m/s and "turns off" the horizontal meander component. The LOWWIND2 option increases the minimum value of sigma-v from 0.2 to 0.3 m/s, and incorporates the meander component, with some adjustments to the algorithm, including an upper limit on the meander factor of 0.95. These low wind options can be used in conjunction with the option to adjust the surface friction velocity u* (pronounced ustar) under low-wind/stable conditions, which is utilized by SCAQMD during the development of the meteorological data. This air dispersion modeling used the LOWWIND2 option along with the u* adjustment.

Background Concentrations

The closest air monitoring station to the Proposed Project is the "Mira Loma (Van Buren)" (also referred to as Metropolitan Riverside 3) station located at 5130 Poinsettia Place in Riverside. Maximum concentrations over the most recent 3-year period (2014 to 2016) are shown in **Table 10 Mira Loma Station – Background Concentrations**.[29] Background concentrations for particulate matter are not included in the analysis for ambient concentrations as the region is in nonattainment and the SCAQMD significance thresholds are used to determine the project's contribution to the pollutant in nonattainment.

Table 10: Mira Loma Station – Background Concentrations

Monitor	Pollutant	Averaging Period	Year	Maximum Monitor Concentration	Design Concentration (3-year Maximum)	Units
Mira Loma/Metropolitan Riverside 3 (Station No. 4165)	CO	1-Hour	2014	2.0	2.3	ppm
			2015	2.3		
			2016	1.9		
		8-Hour	2014	2.4	2.4	ppm
			2015	1.6		
			2016	1.4		
	NO_2	1-Hour	2014	0.057	0.068	ppm
			2015	0.068		
			2016	0.0649		

[28] SCAQMD Modeling Guidance for AERMOD, http://www.aqmd.gov/home/air-quality/air-quality-data-studies/meteorological-data/modeling-guidance

[29] SCAQMD Historical Data by Year (2014 to 2016), http://www.aqmd.gov/home/air-quality/air-quality-data-studies/historical-data-by-year

Source: SCAQMD Historical Data by Year (2014 to 2016), http://www.aqmd.gov/home/air-quality/air-quality-data-studies/historical-data-by-year

Receptor Locations

For the underground segment, three locations were analyzed to determine the potential ambient air pollutant concentrations as a result of the Proposed Project: Louis Vandermolen Elementary School, residence along 68th Street, and residence along Pats Ranch Road. For the overhead segment, one location was analyzed to determine the potential ambient air pollutant concentrations as a result of the Proposed Project: residence along Bradford Street.

Per SCAQMD guidance, receptor grids contained 25-meter spacing between each receptor and receptors were placed at a height of 0.0 meters (ground-level concentration). Terrain elevations for receptor locations were used (i.e., complex terrain) based on available USGS information for the area. Residences were identified within varying distances to the Proposed Project area, as close as 75 feet to the proposed overhead alignment and 30 feet to the proposed underground segment. **Table 11 Sensitive Receptors within 1,000 feet of the Proposed Project** provides the sensitive receptors located within 1,000 feet of the Proposed Project area. The air quality analysis was performed for receptors at the Louis Vandermolen Fundamental Elementary School, 65th Street, Pats Ranch Road, and Bradford Street. However, the analysis is generally applicable for other receptors near underground and overhead project components.

Table 11: Sensitive Receptors within 1,000 feet of the Proposed Project

Receptor Type	Distance to Nearest Project Feature/Work Area (feet)	Project Feature/Work Area
Overhead Alignment		
Residence – Bradford Street	75	Overhead Alignment
Underground Transmission Alignment		
Residence – Pats Ranch Road	30	Underground Alignment
Residence – 68th Street	30	Underground Alignment
Luis Vandermolen Elementary School	50	Underground Alignment
Existing Distribution Line Modifications		
Residence	85	Location 1
Etiwanda Marshalling Yard		
Residence	495	Etiwanda Yard
Jurupa Valley High School	421	Etiwanda Yard

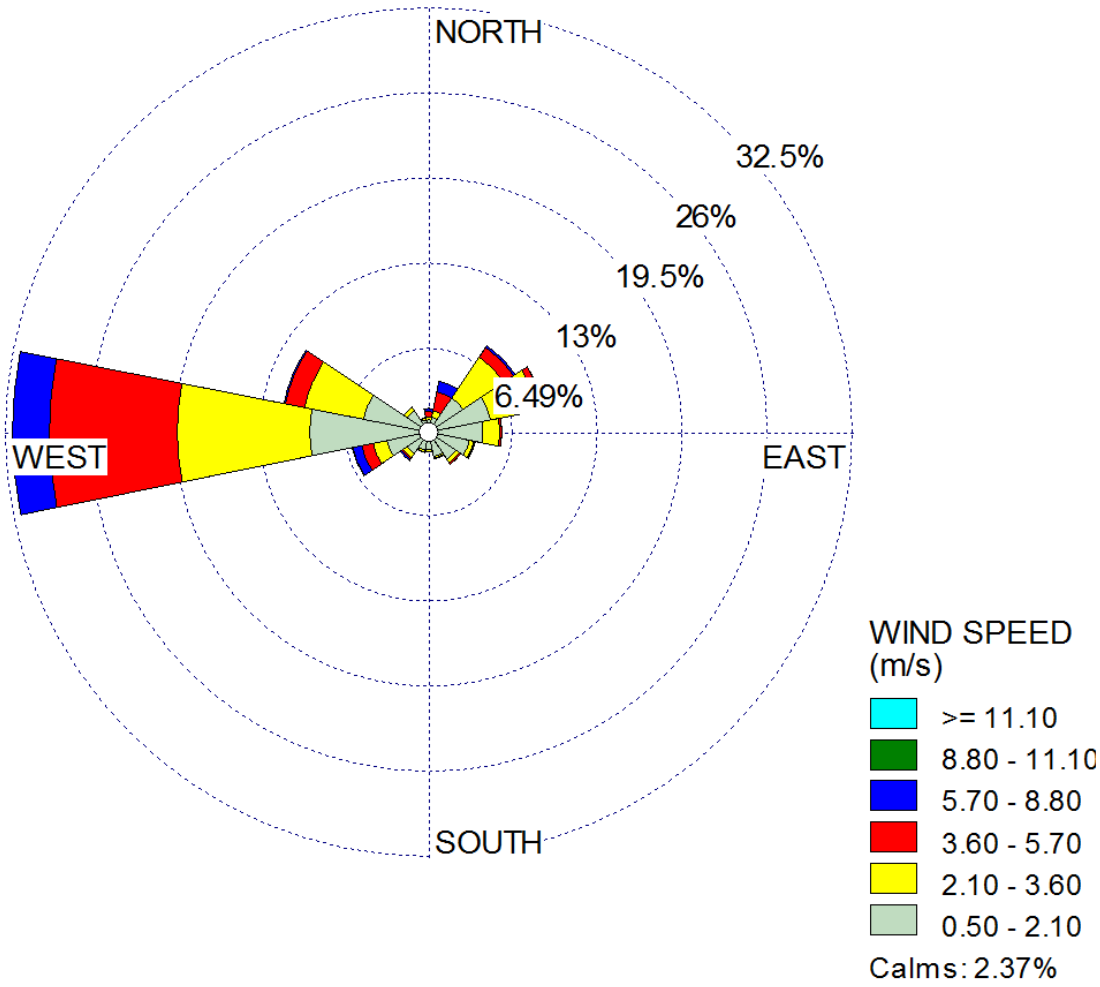
Meteorological Data

Air quality is a function of both the rate and location of pollutant emissions under the influence of meteorological conditions and topographic features affecting pollutant movement and dispersal. Atmospheric conditions such as wind speed, wind direction, atmospheric stability, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants, and consequently affect air quality.

Surface meteorological data and upper air meteorological (mixing heights) data from Riverside and Los Angeles, California, respectively, were used for the modeling analysis. Meteorological

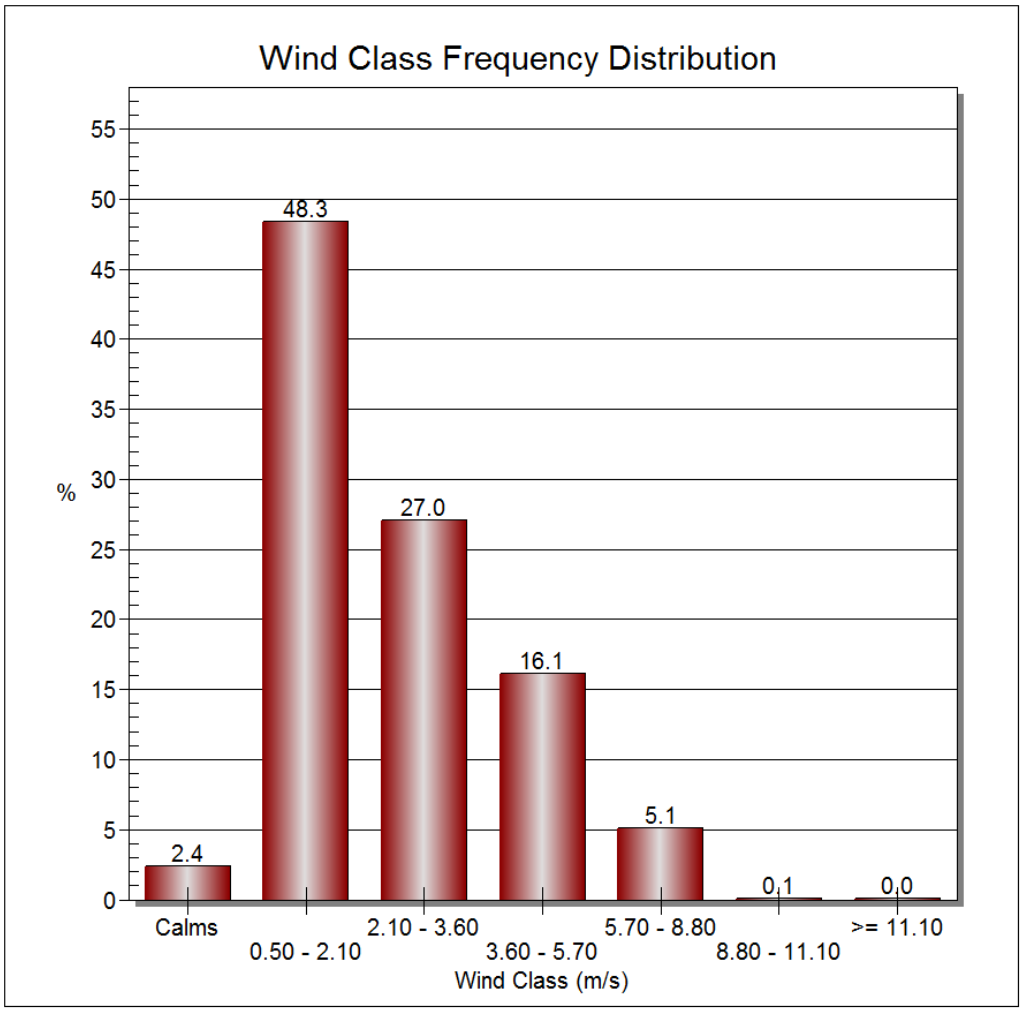
data were obtained from SCAQMD for the period 2012 through 2016.[30] The windrose (**Exhibit 1 Windrose for Riverside**) indicates winds are predominantly from the west-northwest and low wind speed conditions with an average wind speed of 2.51 meters per second (5.6 miles per hour). **Exhibit 2 Wind Speed Frequency Distribution for Riverside** displays the frequency distribution of wind speeds.

Exhibit 1: Windrose for Riverside



[30] SCAQMD Meteorological Data for AERMOD, http://www.aqmd.gov/home/air-quality/air-quality-data-studies/meteorological-data/data-for-aermod

Exhibit 2: Wind Speed Frequency Distribution for Riverside



Source Release Characteristics

Underground construction equipment exhaust emissions are treated as a set of 15 adjacent elevated volume sources that cover an area approximately 50 meters long and 30 meters wide (only slightly different than the estimated work area of 150 feet long and 100 feet wide). Each volume source footprint is 30 meters by 30 meters, and the release height is assumed to be 5 meters. This represents the mid-range of the expected plume rise from frequently used construction equipment during daytime atmospheric conditions. All construction exhaust emissions are assumed to take place over the 12-hour period between 6 am and 6 pm.

Fugitive dust emissions for underground activities are treated as a ground-based rectangular area source covering a maximum daily 150 feet long and 100 feet wide construction zone. An initial vertical dimension of one meter is assumed to represent vertical spread of the emissions.

Terrain elevations for emission source locations and receptors were based on available USGS information for the area.

Overhead construction equipment exhaust emissions are treated as a set of 135 adjacent elevated volume sources that cover an area approximately 480 meters long and 30 meters wide. Each volume source footprint is 11 meters by 30 meters, and the release height is assumed to be 5 meters. This represents the mid-range of the expected plume rise from frequently used construction equipment during daytime atmospheric conditions. All construction exhaust emissions are assumed to take place over the 12-hour period between 6 am and 6 pm.

Fugitive dust emissions for overhead activities are treated as a ground-based rectangular area source covering a maximum daily 1580 feet long and 100 feet wide construction zone. An initial vertical dimension of one meter is assumed to represent vertical spread of the emissions. Terrain elevations for emission source locations and receptors were based on available USGS information for the area.

Helicopter activities are treated as a line of 45 volume sources at the center of the 135 adjacent construction equipment volumes sources with a length of side of 11 meters and an initial vertical dimension of 6.1 meters per volume source. The release height is approximately 120 feet above ground level.

Ambient Air Quality Modeling Results – Underground Activities.

For the underground segment, three locations were analyzed to determine the potential ambient air pollutant concentrations as a result of the Proposed Project: Louis Vandermolen Elementary School, residence along 68th Street, and residence along Pats Ranch Road. The ambient air concentration results are presented for the unmitigated and mitigated conditions. **2013 RTRP EIR Mitigation Measures** and **Enhanced AQ Mitigation Measures** would reduce combustion and fugitive dust emissions and thus air concentrations.

The unmitigated NO_2, PM_{10}, and $PM_{2.5}$ concentrations are above the SCAQMD significance thresholds for all three locations. At the Louis Vandermolen Elementary School, the mitigated CO, NO_2, PM_{10}, and $PM_{2.5}$ concentrations are below the SCAQMD significance thresholds. At the 68th Street and Pats Ranch Road, the mitigated PM_{10} concentrations are above the SCAQMD significance thresholds (NO_2 and $PM_{2.5}$ impacts are less than significant) and additional ambient monitoring mitigation measures are provided. However, the significance PM_{10} impacts may be unavoidable for underground activities. Construction of the underground segment would generate the greatest concentration of ambient air pollutant emissions compared to all other Proposed Project components (i.e., overhead).

Notably, the closest SCAQMD air monitoring station to the Proposed Project is the "Mira Loma (Van Buren)" (also referred to as Metropolitan Riverside 3) station located at 5130 Poinsettia Place in Riverside. Background concentrations for particulate matter reflect the fact that the region is in nonattainment for PM_{10} and $PM_{2.5}$. During 2015 and 2016 the highest PM_{10} concentrations within the SCAQMD occurred at the Mira Loma air monitoring station.

The ambient air quality impacts from surface-based emission sources generally decrease rapidly the further the receptor is from the emission sources. Compared to a distance of 30 meters, the fugitive dust concentration is approximately half the estimated maximum ambient concentration at a distance of 85 feet from the emissions source and approximately a quarter the estimated maximum ambient concentration at a distance of 250 feet from the emissions

source. Thus, any elevated air concentrations as a result of Proposed Project activities would likely be confined to a small geographical area immediately adjacent to the project site.

Louis Vandermolen Elementary School

Table 12 Estimated Proposed Project Unmitigated Ambient Concentration from Underground Construction - **Louis Vandermolen Elementary School** displays the unmitigated ambient concentrations resulting from construction of the underground segment proposed as part of the Proposed Project. The reported ambient concentrations could occur at sensitive receptors associated with the Louis Vandermolen Elementary School within 50 feet of the underground segment.

Under the unmitigated condition, the CO impacts including background concentrations are 2.8 and 2.5 ppm for the 1-hour and 8-hour averaging periods, respectively; well below the thresholds of 20 and 9 ppm, respectively. Under the unmitigated condition, the NO_2 impacts including background concentrations are 0.50 ppm for the 1-hour averaging period. The unmitigated 1-hour NO_2 impacts are above the threshold of 0.18 ppm. The SO_2 impacts are less than 0.01 ppm as a result of ultra-low sulfur diesel. The unmitigated PM_{10} impacts from Proposed Project construction are 24.2 $\mu g/m^3$ for 24-hour impact. The unmitigated PM_{10} impacts are potentially greater than the 24-hour threshold of 10.4 $\mu g/m^3$. A vast majority of the PM_{10} concentration impacts are due to fugitive dust with minor contributions from off-road equipment. The unmitigated $PM_{2.5}$ impacts from Proposed Project construction are 8.4 $\mu g/m^3$ for 24-hour impacts. The unmitigated impacts for 24-hour $PM_{2.5}$ are below the 24-hour threshold of 10.4 $\mu g/m^3$. Therefore, the unmitigated emissions from construction of the Proposed Project may cause potential significant impacts to ambient concentrations for NO_2 and PM_{10}.

Table 12: Estimated Proposed Project Unmitigated Ambient Concentration from Underground Construction - Louis Vandermolen Elementary School

Criteria	CO		NO_2	PM10	PM2.5
	1-Hour	8-Hour	1-Hour	24-Hour	24-Hour
Maximum Modeled Concentration ($\mu g/m^3$)	616	145	820	24.2	8.39
Maximum Modeled Concentration (ppm)	0.54	0.13	0.44	-	-
Background Concentration (ppm)	2.30	2.40	0.07	-	-
Total Concentration ($\mu g/m^3$ or ppm)	**2.84**	**2.53**	**0.51**	**24.2**	**8.39**
LST Threshold	20	9	0.18	10.4	10.4
LST Threshold Units	ppm	ppm	ppm	$\mu g/m^3$	$\mu g/m^3$
Exceed Threshold (Yes/No)?	**No**	**No**	**Yes**	**Yes**	**No**

Source: RCH Group, 2017 compiled from Power Engineers, Riverside Transmission Reliability Project, Air Quality Technical Report, June 2011, Environmental Impact Report, October 2012, AECOM, Emissions and Air Quality Modeling Results Associated with the Underground Hybrid I-15 230-kV Route of the Riverside Transmission Reliability Project (RTRP); Riverside County, California, November 21, 2016

Table 13 Estimated Proposed Project Enhanced Mitigated Ambient Concentration from Underground Construction - Louis Vandermolen Elementary School displays the ambient concentrations resulting from the mitigated Proposed Project. Under the mitigated condition, the CO impacts including background concentrations are 2.9 and 2.5 ppm for the 1-hour and 8-hour averaging periods, respectively; well below the thresholds of 20 and 9 ppm, respectively. Under the mitigated condition, the NO_2 impacts including background concentrations are 0.10 ppm for the 1-hour averaging period. The mitigated 1-hour NO_2 impacts are below the threshold of 0.18 ppm. The SO_2 impacts are less than 0.01 ppm as a result of ultra-low sulfur diesel. The

mitigated PM_{10} impacts from Proposed Project construction are 6.0 µg/m^3 for 24-hour impact. The mitigated PM_{10} impacts are less than the 24-hour threshold of 10.4 µg/m^3. The mitigated $PM_{2.5}$ impacts from Proposed Project construction are 1.4 µg/m^3 for 24-hour impacts. The mitigated impacts for 24-hour $PM_{2.5}$ are less than the 24-hour threshold of 10.4 µg/m^3. Therefore, the mitigated emissions from construction of the Proposed Project would be less than significant impact for CO, NO_2, PM_{10} and $PM_{2.5}$.

Table 13: Estimated Proposed Project Enhanced Mitigated Ambient Concentration from Underground Construction - Louis Vandermolen Elementary School

Criteria	CO		NO_2	PM10	PM2.5
	1-Hour	8-Hour	1-Hour	24-Hour	24-Hour
Maximum Modeled Concentration (µg/m^3)	649	152	69.1	5.99	1.44
Maximum Modeled Concentration (ppm)	0.56	0.14	0.04	-	-
Background Concentration (ppm)	2.30	2.40	0.07	-	-
Total Concentration (µg/m^3 or ppm)	**2.86**	**2.54**	**0.11**	**5.99**	**1.44**
LST Threshold	20	9	0.18	10.4	10.4
LST Threshold Units	ppm	ppm	ppm	µg/m^3	µg/m^3
Exceed Threshold (Yes/No)?	**No**	**No**	**No**	**No**	**No**

Source: RCH Group, 2017 compiled from Power Engineers, Riverside Transmission Reliability Project, Air Quality Technical Report, June 2011, Environmental Impact Report, October 2012, AECOM, Emissions and Air Quality Modeling Results Associated with the Underground Hybrid I-15 230-kV Route of the Riverside Transmission Reliability Project (RTRP); Riverside County, California, November 21, 2016

Residence along 68th Street

Table 14 Estimated Proposed Project Unmitigated Ambient Concentration from Underground Construction – Residence along 68th Street displays the unmitigated ambient concentrations resulting from construction of the underground segment proposed as part of the Proposed Project. The reported ambient concentrations could occur at sensitive receptors associated with the Residence along 68th Street within 30 feet of the underground segment.

Under the unmitigated condition, the CO impacts including background concentrations are 2.8 and 2.5 ppm for the 1-hour and 8-hour averaging periods, respectively; well below the thresholds of 20 and 9 ppm, respectively. Under the unmitigated condition, the NO_2 impacts including background concentrations are 0.46 ppm for the 1-hour averaging period. The unmitigated 1-hour NO_2 impacts are above the threshold of 0.18 ppm. The SO_2 impacts are less than 0.01 ppm as a result of ultra-low sulfur diesel. The unmitigated PM_{10} impacts from Proposed Project construction are 23.8 µg/m^3 for 24-hour impact. The unmitigated PM_{10} impacts are potentially greater than the 24-hour threshold of 10.4 µg/m^3. The unmitigated $PM_{2.5}$ impacts from Proposed Project construction are 9.1 µg/m^3 for 24-hour impacts. The unmitigated impacts for 24-hour $PM_{2.5}$ are less than the 24-hour threshold of 10.4 µg/m^3. Therefore, the unmitigated emissions from construction of the Proposed Project may cause potential significant impacts to ambient concentrations for NO_2 and PM_{10}.

Table 14: Estimated Proposed Project Unmitigated Ambient Concentration from Underground Construction - Residence along 68th Street

Criteria	CO		NO_2	PM10	PM2.5
	1-Hour	8-Hour	1-Hour	24-Hour	24-Hour
Maximum Modeled Concentration (µg/m³)	553	147	735	23.8	9.09
Maximum Modeled Concentration (ppm)	0.48	0.13	0.39	-	-
Background Concentration (ppm)	2.30	2.40	0.07	-	-
Total Concentration (µg/m³ or ppm)	**2.78**	**2.53**	**0.46**	**23.8**	**9.09**
LST Threshold	20	9	0.18	10.4	10.4
LST Threshold Units	ppm	ppm	ppm	µg/m³	µg/m³
Exceed Threshold (Yes/No)?	**No**	**No**	**Yes**	**Yes**	**No**

Source: RCH Group, 2017 compiled from Power Engineers, Riverside Transmission Reliability Project, Air Quality Technical Report, June 2011, Environmental Impact Report, October 2012, AECOM, Emissions and Air Quality Modeling Results Associated with the Underground Hybrid I-15 230-kV Route of the Riverside Transmission Reliability Project (RTRP); Riverside County, California, November 21, 2016

Table 15 Estimated Proposed Project Enhanced Mitigated Ambient Concentration from Underground Construction - Residence along 68th Street displays the ambient concentrations resulting from the mitigated Proposed Project. Under the mitigated condition, the CO impacts including background concentrations are 2.8 and 2.5 ppm for the 1-hour and 8-hour averaging periods, respectively; well below the thresholds of 20 and 9 ppm, respectively. Under the mitigated condition, the NO_2 impacts including background concentrations are 0.10 ppm for the 1-hour averaging period. The mitigated 1-hour NO_2 impacts are below the threshold of 0.18 ppm. The SO_2 impacts are less than 0.01 ppm as a result of ultra-low sulfur diesel. The mitigated PM_{10} impacts from Proposed Project construction are 5.9 µg/m³ for 24-hour impact. The mitigated PM_{10} impacts are greater than the 24-hour threshold of 10.4 µg/m³. The mitigated $PM_{2.5}$ impacts from Proposed Project construction are 1.5 µg/m³ for 24-hour impacts. The mitigated impacts for 24-hour $PM_{2.5}$ are less than the 24-hour threshold of 10.4 µg/m³. Therefore, the mitigated emissions from construction of the Proposed Project would be less than significant impact for CO, NO_2, PM_{10}, and $PM_{2.5}$.

Table 15: Estimated Proposed Project Enhanced Mitigated Ambient Concentration from Underground Construction - Residence along 68th Street

Criteria	CO		NO_2	PM10	PM2.5
	1-Hour	8-Hour	1-Hour	24-Hour	24-Hour
Maximum Modeled Concentration (µg/m³)	582	155	62.0	5.87	1.46
Maximum Modeled Concentration (ppm)	0.51	0.14	0.03	-	-
Background Concentration (ppm)	2.30	2.40	0.07	-	-
Total Concentration (µg/m³ or ppm)	**2.81**	**2.54**	**0.10**	**5.87**	**1.46**
LST Threshold	20	9	0.18	10.4	10.4
LST Threshold Units	ppm	ppm	ppm	µg/m³	µg/m³
Exceed Threshold (Yes/No)?	**No**	**No**	**No**	**No**	**No**

Source: RCH Group, 2017 compiled from Power Engineers, Riverside Transmission Reliability Project, Air Quality Technical Report, June 2011, Environmental Impact Report, October 2012, AECOM, Emissions and Air Quality Modeling Results Associated with the Underground Hybrid I-15 230-kV Route of the Riverside Transmission Reliability Project (RTRP); Riverside County, California, November 21, 2016

Residence and Park along Pats Ranch Road

Table 16 Estimated Proposed Project Unmitigated Ambient Concentration from Underground Construction - Residence along Pats Ranch Road displays the unmitigated ambient concentrations resulting from construction of the underground segment proposed as part of the Proposed Project. The reported ambient concentrations could occur at sensitive receptors associated with the Residence and Park along Pats Ranch Road within 30 and 45 feet, respectively, of the underground segment.

Under the unmitigated condition, the CO impacts including background concentrations are 2.8 and 2.6 ppm for the 1-hour and 8-hour averaging periods, respectively; well below the thresholds of 20 and 9 ppm, respectively. Under the unmitigated condition, the NO_2 impacts including background concentrations are 0.46 ppm for the 1-hour averaging period. The unmitigated 1-hour NO_2 impacts are above the threshold of 0.18 ppm. The SO_2 impacts are less than 0.01 ppm as a result of ultra-low sulfur diesel. The unmitigated PM_{10} impacts from Proposed Project construction are 37.2 $\mu g/m^3$ for 24-hour impact. The unmitigated PM_{10} impacts are potentially greater than the 24-hour threshold of 10.4 $\mu g/m^3$. The unmitigated $PM_{2.5}$ impacts from Proposed Project construction are 12.5 $\mu g/m^3$ for 24-hour impacts. The unmitigated impacts for 24-hour $PM_{2.5}$ are potentially greater than the 24-hour threshold of 10.4 $\mu g/m^3$. Therefore, the unmitigated emissions from construction of the Proposed Project may cause potential significant impacts to ambient concentrations for NO_2, PM_{10}, and $PM_{2.5}$.

Table 16: Estimated Proposed Project Unmitigated Ambient Concentration from Underground Construction - Residence along Pats Ranch Road

Criteria	CO		NO_2	PM10	PM2.5
	1-Hour	8-Hour	1-Hour	24-Hour	24-Hour
Maximum Modeled Concentration ($\mu g/m^3$)	553	202	735	37.2	12.5
Maximum Modeled Concentration (ppm)	0.48	0.18	0.39	-	-
Background Concentration (ppm)	2.30	2.40	0.07	-	-
Total Concentration ($\mu g/m^3$ or ppm)	**2.78**	**2.58**	**0.46**	**37.2**	**12.5**
LST Threshold	20	9	0.18	10.4	10.4
LST Threshold Units	ppm	ppm	ppm	$\mu g/m^3$	$\mu g/m^3$
Exceed Threshold (Yes/No)?	**No**	**No**	**Yes**	**Yes**	**Yes**

Source: RCH Group, 2017 compiled from Power Engineers, Riverside Transmission Reliability Project, Air Quality Technical Report, June 2011, Environmental Impact Report, October 2012, AECOM, Emissions and Air Quality Modeling Results Associated with the Underground Hybrid I-15 230-kV Route of the Riverside Transmission Reliability Project (RTRP); Riverside County, California, November 21, 2016

Table 17 Estimated Proposed Project Enhanced Mitigated Ambient Concentration from Underground Construction - Residence and Park along Pats Ranch Road displays the ambient concentrations resulting from the mitigated Proposed Project. Under the mitigated condition, the CO impacts including background concentrations are 2.8 and 2.6 ppm for the 1-hour and 8-hour averaging periods, respectively; well below the thresholds of 20 and 9 ppm, respectively. Under the mitigated condition, the NO_2 impacts including background concentrations are 0.10 ppm for the 1-hour averaging period. The mitigated 1-hour NO_2 impacts are below the threshold of 0.18 ppm. The SO_2 impacts are less than 0.01 ppm as a result of ultra-low sulfur diesel. The mitigated PM_{10} impacts from Proposed Project construction are 9.2 $\mu g/m^3$ for 24-hour impact. The mitigated PM_{10} impacts are less than the 24-hour threshold of 10.4 $\mu g/m^3$. The mitigated $PM_{2.5}$ impacts from Proposed Project construction are 2.2 $\mu g/m^3$ for 24-hour impacts. The mitigated impacts for 24-hour $PM_{2.5}$ are less than the 24-hour threshold of 10.4 $\mu g/m^3$.

Therefore, the mitigated emissions from construction of the Proposed Project would be less than significant impact for CO, NO_2, PM_{10}, and $PM_{2.5}$.

Table 17: Estimated Proposed Project Enhanced Mitigated Ambient Concentration from Underground Construction - Residence and Park along Pats Ranch Road

Criteria	CO		NO_2	PM10	PM2.5
	1-Hour	8-Hour	1-Hour	24-Hour	24-Hour
Maximum Modeled Concentration (µg/m^3)	582	212	61.9	9.21	2.19
Maximum Modeled Concentration (ppm)	0.51	0.19	0.03	-	-
Background Concentration (ppm)	2.30	2.40	0.07	-	-
Total Concentration (µg/m^3 or ppm)	**2.81**	**2.59**	**0.10**	**9.21**	**2.19**
LST Threshold	20	9	0.18	10.4	10.4
LST Threshold Units	ppm	ppm	ppm	µg/m^3	µg/m^3
Exceed Threshold (Yes/No)?	**No**	**No**	**No**	**No**	**No**

Source: RCH Group, 2017 compiled from Power Engineers, Riverside Transmission Reliability Project, Air Quality Technical Report, June 2011, Environmental Impact Report, October 2012, AECOM, Emissions and Air Quality Modeling Results Associated with the Underground Hybrid I-15 230-kV Route of the Riverside Transmission Reliability Project (RTRP); Riverside County, California, November 21, 2016

Ambient Air Quality Modeling Results – Overhead Activities.

Bradford Street

For the overhead segment, one location was analyzed to determine the potential ambient air pollutant concentrations as a result of the Proposed Project: residence along Bradford Street. **Table 18 Estimated Proposed Project Unmitigated Ambient Concentration from Overhead Construction** – **Bradford Street** displays the unmitigated ambient concentrations resulting from construction of the overhead segment. The reported ambient concentrations could occur at sensitive receptors associated with the Bradford Street area within 75 feet of the underground segment.

Under the unmitigated condition, the CO impacts including background concentrations are 2.4 and 2.4 ppm for the 1-hour and 8-hour averaging periods, respectively; well below the thresholds of 20 and 9 ppm, respectively. Under the unmitigated condition, the NO_2 impacts including background concentrations are 0.14 ppm for the 1-hour averaging period. The unmitigated 1-hour NO_2 impacts are below the threshold of 0.18 ppm. The SO_2 impacts are less than 0.01 ppm as a result of ultra-low sulfur diesel. The unmitigated PM_{10} impacts from Proposed Project construction are 17.2 µg/m^3 for 24-hour impact. The unmitigated PM_{10} impacts are potentially greater than the 24-hour threshold of 10.4 µg/m^3. The unmitigated $PM_{2.5}$ impacts from Proposed Project construction are 4.5 µg/m^3 for 24-hour impacts. The unmitigated impacts for 24-hour $PM_{2.5}$ are below the 24-hour threshold of 10.4 µg/m^3. Therefore, the unmitigated emissions from construction of the Proposed Project may cause potential significant impacts to ambient concentrations for PM_{10}.

Table 18: Estimated Proposed Project Unmitigated Ambient Concentration from Overhead Construction – Bradford Street

Criteria	CO		NO_2	PM10	PM2.5
	1-Hour	8-Hour	1-Hour	24-Hour	24-Hour
Maximum Modeled Concentration (µg/m³)	80.1	34.2	125	17.2	4.50
Maximum Modeled Concentration (ppm)	0.07	0.03	0.07	-	-
Background Concentration (ppm)	2.30	2.40	0.07	-	-
Total Concentration (µg/m³ or ppm)	**2.37**	**2.43**	**0.14**	**17.2**	**4.50**
LST Threshold	20	9	0.18	10.4	10.4
LST Threshold Units	ppm	ppm	ppm	µg/m³	µg/m³
Exceed Threshold (Yes/No)?	**No**	**No**	**No**	**Yes**	**No**

Source: RCH Group, 2017 compiled from Power Engineers, Riverside Transmission Reliability Project, Air Quality Technical Report, June 2011, Environmental Impact Report, October 2012, AECOM, Emissions and Air Quality Modeling Results Associated with the Underground Hybrid I-15 230-kV Route of the Riverside Transmission Reliability Project (RTRP); Riverside County, California, November 21, 2016

Table 19 Estimated Proposed Project Enhanced Mitigated Ambient Concentration from Overhead Construction – Bradford Street displays the ambient concentrations resulting from the mitigated Proposed Project. Under the mitigated condition, the CO impacts including background concentrations are 2.4 and 2.4 ppm for the 1-hour and 8-hour averaging periods, respectively; well below the thresholds of 20 and 9 ppm, respectively. Under the mitigated condition, the NO_2 impacts including background concentrations are 0.08 ppm for the 1-hour averaging period. The mitigated 1-hour NO_2 impacts are below the threshold of 0.18 ppm. The SO_2 impacts are less than 0.01 ppm as a result of ultra-low sulfur diesel. The mitigated PM_{10} impacts from Proposed Project construction are 4.2 µg/m³ for 24-hour impact. The mitigated PM_{10} impacts are less than the 24-hour threshold of 10.4 µg/m³. The mitigated $PM_{2.5}$ impacts from Proposed Project construction are 1.0 µg/m³ for 24-hour impacts. The mitigated impacts for 24-hour $PM_{2.5}$ are less than the 24-hour threshold of 10.4 µg/m³. Therefore, the mitigated emissions from construction of the Proposed Project would be less than significant impact for CO, NO_2, PM_{10}, and $PM_{2.5}$.

Table 19: Estimated Proposed Project Enhanced Mitigated Ambient Concentration from Overhead Construction – Bradford Street

Criteria	CO		NO_2	PM10	PM2.5
	1-Hour	8-Hour	1-Hour	24-Hour	24-Hour
Maximum Modeled Concentration (µg/m³)	114	48.6	13.7	4.19	1.03
Maximum Modeled Concentration (ppm)	0.10	0.04	0.01	-	-
Background Concentration (ppm)	2.30	2.40	0.07	-	-
Total Concentration (µg/m³ or ppm)	**2.40**	**2.44**	**0.08**	**4.19**	**1.03**
LST Threshold	20	9	0.18	10.4	10.4
LST Threshold Units	ppm	ppm	ppm	µg/m³	µg/m³
Exceed Threshold (Yes/No)?	**No**	**No**	**No**	**No**	**No**

Source: RCH Group, 2017 compiled from Power Engineers, Riverside Transmission Reliability Project, Air Quality Technical Report, June 2011, Environmental Impact Report, October 2012, AECOM, Emissions and Air Quality Modeling Results Associated with the Underground Hybrid I-15 230-kV Route of the Riverside Transmission Reliability Project (RTRP); Riverside County, California, November 21, 2016

Toxic Air Contaminants

Diesel-powered equipment and vehicles such as haul trucks, back hoes, and cranes would be used during construction of the Proposed Project. Operation of diesel-powered equipment

would generate diesel exhaust emissions. Diesel exhaust is a complex mixture of gases and fine particles and includes over 40 substances that are listed by the USEPA as hazardous air pollutants and by the CARB as toxic air contaminants.[31]

Some receptors are considered more sensitive to air pollutants than others, because of preexisting health problems, proximity to the emissions source, or duration of exposure to air pollutants. Land uses such as primary and secondary schools, hospitals, and convalescent homes are considered to be relatively sensitive to poor air quality because the very young, the old, and the infirm are more susceptible to respiratory infections and other air quality-related health problems than the general public. Residential areas are also considered sensitive to poor air quality because people in residential areas are often at home for extended periods. Recreational land uses are moderately sensitive to air pollution because vigorous exercise associated with recreation places having a high demand on respiratory system function. Children under 16 years are more susceptible to carcinogens compared to adults. As such, child care centers and schools are higher risk sensitive receptors.

Sensitive receptors including child care centers, schools, residences, and elder care facilities are located near the Proposed Project components. Construction vehicles and trucks carrying construction equipment to and from work sites would travel along construction routes to and from staging yards in the vicinity of sensitive receptors. Truck traffic and associated diesel exhaust would increase for approximately one month at any one sensitive receptor during construction. Residences were identified within varying distances to the Proposed Project components. The Proposed Project components are adjacent to many residential receptors and is close to schools such as Louis Vandermolen Fundamental Elementary School.

In accordance with California Code of Regulations (CCR) § 2485, trucks with a gross vehicle weight rating over 10,000 pounds must not idle longer than five consecutive minutes except under extenuating circumstances. As required by CCR § 2480, a vehicle stopping at or within 100 feet of a school must not idle for more than 30 seconds. Idling restriction regulations would limit impacts to sensitive receptors in the vicinity of the staging yards and construction routes.

Due to the uncertainty in assessing cancer risk from very short-term exposures, the California Office of Environmental Health Hazard Assessment (OEHHA)'s *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*[32] recommends not assessing cancer risk for projects lasting less than two months at an exposure individual receptor.

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[31] In August of 1998, CARB identified particulate emissions from diesel-fueled engines as a toxic air contaminant. CARB developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*. The document represents a proposal to reduce diesel particulate emissions, with the goal to reduce emissions and the associated health risk by 75 percent in 2010 and by 85 percent in 2020. The program aims to require the use of state-of-the-art catalyzed diesel particulate filters and ultra-low sulfur diesel fuel on diesel-fueled engines.

Diesel particulate matter (DPM) is the most complex of diesel emissions. Diesel particulates, as defined by most emission standards, are sampled from diluted and cooled exhaust gases. This definition includes both solid and liquid material that condenses during the dilution process. The basic fractions of DPM are elemental carbon; heavy hydrocarbons derived from the fuel and lubricating oil and hydrated sulfuric acid derived from the fuel sulfur. DPM contains a large portion of the polycyclic aromatic hydrocarbons found in diesel exhaust. Diesel particulates include small nuclei particles of diameters below 0.04 micrometers (μm) and their agglomerates of diameters up to 1 μm.

[32] Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*, February 2015, http://oehha.ca.gov/air/hot_spots/hotspots2015.html

Construction activities would occur throughout the Proposed Project area. Construction-related emissions would be short term in duration. TAC emissions from construction equipment and activities could impact sensitive receptors within 1,000 feet. These emissions would not affect sensitive receptors at any one location for longer than two months. **2013 RTRP EIR Mitigation Measures** and **Enhanced AQ Mitigation Measures** would substantially reduce the DPM emissions and health impacts associated with the construction activities. Therefore, it is not anticipated that exposure to construction-related DPM or other air toxics would result in an adverse health impacts and health impacts to sensitive receptors would be less than significant.

Greenhouse Gas Emissions

"Global warming" and "global climate change" are the terms used to describe the increase in the average temperature of the earth's near-surface air and oceans since the mid-20th century and its projected continuation. Warming of the climate system is now considered to be unequivocal (IPCC, 2007), with global surface temperature increasing approximately 1.33 degrees Fahrenheit (°F) over the last 100 years. Continued warming is projected to increase global average temperature between 2 and 11°F over the next 100 years.

Natural processes and human actions have been identified as the causes of this warming. The International Panel on Climate Change (IPCC) concludes that variations in natural phenomena such as solar radiation and volcanoes produced most of the warming from pre-industrial times to 1950 and had a small cooling effect afterward. After 1950, however, increasing GHG concentrations resulting from human activity such as fossil fuel burning and deforestation have been responsible for most of the observed temperature increase. These basic conclusions have been endorsed by more than 45 scientific societies and academies of science, including all of the national academies of science of the major industrialized countries. Since 2007, no scientific body of national or international standing has maintained a dissenting opinion.

Increases in GHG concentrations in the earth's atmosphere are thought to be the main cause of human-induced climate change. GHG naturally trap heat by impeding the exit of solar radiation that has hit the earth and is reflected back into space. Some GHG occur naturally and are necessary for keeping the earth's surface inhabitable. However, increases in the concentrations of these gases in the atmosphere during the last 100 years have decreased the amount of solar radiation that is reflected back into space, intensifying the natural greenhouse effect and resulting in the increase of global average temperature.

Gases that trap heat in the atmosphere are referred to as GHG because they capture heat radiated from the sun as it is reflected back into the atmosphere, much like a greenhouse does. The accumulation of GHG has been implicated as the driving force for global climate change. The primary GHG are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), ozone, and water vapor.

While the presence of the primary GHG in the atmosphere are naturally occurring, CO_2, CH_4, and N_2O are also emitted from human activities, accelerating the rate at which these compounds occur within earth's atmosphere. Emissions of CO_2 are largely by-products of fossil fuel combustion, whereas methane results from off-gassing associated with agricultural practices and landfills. Other GHG include hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride,

and are generated in certain industrial processes. Greenhouse gases are typically reported in "carbon dioxide-equivalent" measures (CO_2e).[33]

There is international scientific consensus that human-caused increases in GHG have and will continue to contribute to global warming. Potential global warming impacts in California may include, but are not limited to, loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years. Secondary effects are likely to include a global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity.[34]

The estimated Proposed Project construction GHG emissions are 1,888 metric tons of CO_2e. As indicated, 30-year amortized annual construction related GHG emissions would be approximately 63 metric tons of CO_2e per year. Estimated potential SF_6 emissions due to substation operations assumes a one percent leak rate (36.2 metric tons of CO_2e per year) and typical maintenance associated with the operations would result in approximately 5 metric tons of CO_2e per year.

Estimated 30-year amortized construction and operational GHG emissions from the Proposed Project were compared to the previously proposed SCE project's construction and operational GHG emissions. The results of the comparison are presented in **Table 14 Estimated Greenhouse Gas Emissions**. The GHG construction and unmitigated operational emissions from the Proposed Project would be 104 metric tons of CO_2e per year, which is less than the emissions calculated for the previously proposed SCE project. Therefore, the Proposed Project would not generate significant GHG emissions.

Table 14: Estimated Greenhouse Gas Emissions

Source	Annual CO_2e Metric Tons
Proposed Project	
Total Construction Emissions	1,888
Total 30-Year Amortized Construction Emissions	62.9
Operational Emissions (Substation)	36.2
Operational Emissions (Maintenance)	4.59
Total GHG Emissions (Construction plus Operational)	**104**
SCAQMD Significance Threshold	10,000
Exceeds Threshold?	No

Source: RCH Group, 2017 compiled from Power Engineers, Riverside Transmission Reliability Project, Air Quality Technical Report, June 2011, Environmental Impact Report, October 2012, AECOM, Emissions and Air Quality Modeling Results Associated with the Underground Hybrid I-15 230-kV Route of the Riverside Transmission Reliability Project (RTRP); Riverside County, California, November 21, 2016

[33] Because of the differential heat absorption potential of various GHG, GHG emissions are frequently measured in "carbon dioxide-equivalents," which present a weighted average based on each gas's heat absorption (or "global warming") potential.

[34] 2006 Final Climate Action Team Report to the Governor and Legislature. March 2006. http://www.climatechange.ca.gov/climate_action_team/reports/2006report/2006-04-03_FINAL_CAT_REPORT.PDF.

APPENDIX G

Air Quality and Greenhouse Gas Supporting Information

- Air Quality Memo
- Air Quality Summary Calculations for Proposed Project
- Air Quality Detailed Calculations for Proposed Project (See Excel Files)

Underground Hybrid--RTRP I-15 230 kV Project (Unmitigated)

Time Period	Activity	Peak Daily Construction Emissions (lbs/day)					
		NOx	VOC	CO	PM10	PM2.5	SO2
(09-Mar-21 to 15-Apr-21)	Marshalling Yard	0.87	0.07	1.65	10.8	1.25	0.00
(15-Mar-21 to 22-Mar-21)	LST Steel Haul	2.89	0.22	4.58	32.1	3.64	0.01
(15-Mar-21 to 26-Mar-21)	Modify Existing LST	8.11	0.70	8.92	72.5	9.12	0.02
(15-Mar-21 to 03-May-21)	Install LST Foundations	8.25	0.65	7.57	103	12.4	0.03
(23-Mar-21 to 27-Mar-21)	LST Steel Assembly	6.90	0.69	8.05	43.2	5.10	0.02
(08-Apr-21 to 27-Mar-21)	LST Erection	15.2	1.34	13.0	54.1	6.56	0.03
(15-Mar-21 to 06-Apr-21)	TSP Haul	6.67	0.54	5.82	32.2	3.79	0.01
(15-Mar-21 to 25-Oct-21)	TSP Foundation Installation	10.8	0.86	8.48	99.2	11.5	0.03
(07-Apr-21 to 17-Jun-21)	TSP Assembly	7.07	0.69	8.69	32.7	3.94	0.02
(02-Jun-21 to 25-Oct-21)	TSP Erection	10.4	0.89	8.89	53.6	6.27	0.02
(20-Oct-21 to 24-Jan-22)	Conductor & OPGW Installation	62.1	5.72	33.6	227	27.7	0.12
(25-Jan-22 to 08-Mar-22)	Restoration	9.10	0.76	7.36	53.4	6.20	0.02
(16-Sep-21 to 13-Oct-21)	Riser Pole Preparation	1.59	0.11	2.28	61.3	7.63	0.01
(16-Sep-21 to 08-Aug-22)	Vault Installation	48.1	3.67	32.6	104	15.5	0.10
(04-Mar-22 to 08-Aug-22)	Duct Bank Installation	25.2	2.17	20.0	80.4	11.6	0.07
(13-Apr-22 to 26-Aug-22)	Underground Cable Installation	18.6	1.69	14.9	24.9	3.55	0.04
((15-Apr-22 to 04-Oct-22)	Cable Terminating	10.1	0.82	10.3	43.1	5.13	0.02
(23-May-22 to 10-Jan-23)	Cable Splicing	15.5	1.58	11.6	75.8	8.94	0.04
(29-Nov-22 to 14-Mar-23)	Trench Restoration/Paving	5.26	0.57	6.29	53.2	6.10	0.01
(05-Feb-21 to 06-Dec-21)	Wildlife Substation	5.61	0.39	5.40	110	12.5	0.02
(09-Dec-21 to 07-Oct-22)	Distribution Relocation	5.57	0.45	3.91	87.2	11.0	0.01
Schedule Not Identified	Survey	0.95	0.09	2.13	32.0	3.58	0.01
	Guard Structure Installation	4.45	0.37	4.32	64.6	7.32	0.02
	Guard Structure Removal	2.77	0.24	3.34	64.5	7.28	0.01
	Jack and Bore	30.4	2.08	17.1	27.6	4.09	0.06
	Total Daily (Concurrent Elements)	167	13.6	106	622	77.6	0.35
	Maximum Daily (Single Element)	62.1	5.72	33.6	227	27.7	0.12
	Significance Threshold	100	75	550	150	55	150

Underground Hybrid--RTRP I-15 230 kV Project (Unmitigated)

	Total Construction Emissions (tons)					
	NOx	VOC	CO	PM10	PM2.5	SO2
Survey	0.00	0.00	0.00	0.12	0.01	0.00
Marshalling Yard	0.00	0.00	0.00	0.01	0.00	0.00
Roads & Landing Work	0.21	0.02	0.12	10.4	2.16	0.00
Guard Structure Installation	0.01	0.00	0.01	1.16	0.23	0.00
Install LST Foundations	0.09	0.01	0.08	9.66	1.91	0.00
LST Steel Haul	0.01	0.00	0.01	0.06	0.01	0.00
LST Steel Assembly	0.13	0.01	0.14	0.71	0.08	0.00
LST Erection	0.13	0.01	0.12	0.77	0.09	0.00
TSP Foundation Installation	0.58	0.05	0.44	8.67	1.39	0.00
TSP Haul	0.05	0.00	0.04	0.18	0.02	0.00
TSP Assembly	0.12	0.01	0.16	0.56	0.07	0.00
TSP Erection	0.48	0.04	0.37	2.18	0.26	0.00
Modify Existing LST	0.04	0.00	0.04	8.69	1.80	0.00
Conductor & OPGW Installation	0.98	0.09	0.57	19.9	3.69	0.00
Guard Structure Removal	0.00	0.00	0.00	1.16	0.23	0.00
Vault Installation	2.81	0.23	2.18	7.95	1.41	0.01
Duct Bank Installation	1.13	0.10	0.94	4.54	0.78	0.00
Underground Cable Installation	0.85	0.08	0.64	2.23	0.11	0.00
Cable Splicing	1.17	0.12	0.79	5.68	0.72	0.00
Riser Pole Preparation	0.01	0.00	0.01	8.85	1.82	0.00
Cable Terminating	0.56	0.05	0.52	1.94	0.23	0.00
Trench Restoration/Paving	0.07	0.01	0.07	0.64	0.07	0.00
Restoration	0.05	0.00	0.03	0.23	0.03	0.00
Jack and Bore	0.30	0.02	0.16	0.38	0.07	0.00
Grand Total (tons)	9.77	0.86	7.42	96.7	17.2	0.02
Average Daily (pounds)	26.8	2.35	20.3	265	47.1	0.06
Significance Threshold	100	75	550	150	55	150

Underground Hybrid--RTRP I-15 230 kV Project (Mitigated)

Time Period	Activity	Peak Daily Construction Emissions (lbs/day)					
		NOx	VOC	CO	PM10	PM2.5	SO2
(09-Mar-21 to 15-Apr-21)	Marshalling Yard	0.16	0.04	2.02	5.44	0.69	0.00
(15-Mar-21 to 22-Mar-21)	LST Steel Haul	0.76	0.11	5.72	15.9	1.97	0.01
(15-Mar-21 to 26-Mar-21)	Modify Existing LST	2.13	0.23	9.58	35.9	4.8	0.02
(15-Mar-21 to 03-May-21)	Install LST Foundations	3.00	0.31	11.3	50.8	6.47	0.03
(23-Mar-21 to 27-Mar-21)	LST Steel Assembly	2.07	0.21	9.40	21.6	2.70	0.02
(08-Apr-21 to 27-Mar-21)	LST Erection	1.93	0.31	11.8	26.8	3.35	0.03
(15-Mar-21 to 06-Apr-21)	TSP Haul	0.90	0.14	5.55	16.0	1.97	0.01
(15-Mar-21 to 25-Oct-21)	TSP Foundation Installation	2.99	0.30	12.4	48.6	6.01	0.03
(07-Apr-21 to 17-Jun-21)	TSP Assembly	2.07	0.21	9.50	16.3	2.07	0.02
(02-Jun-21 to 25-Oct-21)	TSP Erection	2.13	0.23	8.32	26.5	3.25	0.02
(20-Oct-21 to 24-Jan-22)	Conductor & OPGW Installation	30.9	2.86	43.3	107	13.7	0.12
(25-Jan-22 to 08-Mar-22)	Restoration	1.43	0.20	9.06	26.4	3.22	0.02
(16-Sep-21 to 13-Oct-21)	Riser Pole Preparation	0.88	0.07	2.66	30.4	4.05	0.01
(16-Sep-21 to 08-Aug-22)	Vault Installation	12.5	1.10	35.8	59.9	9.71	0.10
(04-Mar-22 to 08-Aug-22)	Duct Bank Installation	11.8	0.80	26.1	46.4	7.48	0.07
(13-Apr-22 to 26-Aug-22)	Underground Cable Installation	1.66	0.25	17.9	13.6	1.96	0.04
((15-Apr-22 to 04-Oct-22)	Cable Terminating	1.33	0.24	10.8	21.4	2.67	0.02
(23-May-22 to 10-Jan-23)	Cable Splicing	2.52	0.45	16.6	37.6	4.70	0.04
(29-Nov-22 to 14-Mar-23)	Trench Restoration/Paving	1.67	0.15	6.61	26.3	3.19	0.01
(05-Feb-21 to 06-Dec-21)	Wildlife Substation	2.97	0.19	4.90	53.8	6.69	0.02
(09-Dec-21 to 07-Oct-22)	Distribution Relocation	3.51	0.17	4.29	42.9	5.74	0.01
Schedule Not Identified	Survey	0.24	0.05	2.51	15.9	1.96	0.01
	Guard Structure Installation	2.14	0.17	5.75	31.9	3.90	0.02
	Guard Structure Removal	1.90	0.11	3.71	31.9	3.89	0.01
	Jack and Bore	4.57	0.81	31.12	14.7	2.20	0.07
	Total Daily (Concurrent Elements)	56.0	5.49	136	310	41.6	0.35
	Maximum Daily (Single Element)	30.9	2.86	43.3	107	13.7	0.12
	Significance Threshold	100	75	550	150	55	150

Underground Hybrid--RTRP I-15 230 kV Project (Mitigated)

	Total Construction Emissions (tons)					
	NOx	VOC	CO	PM10	PM2.5	SO2
Survey	0.00	0.00	0.00	0.06	0.01	0.00
Marshalling Yard	0.00	0.00	0.00	0.00	0.00	0.00
Roads & Landing Work	0.02	0.00	0.14	5.20	1.07	0.00
Guard Structure Installation	0.00	0.00	0.01	0.58	0.12	0.00
Install LST Foundations	0.04	0.00	0.12	4.82	0.96	0.00
LST Steel Haul	0.00	0.00	0.01	0.03	0.00	0.00
LST Steel Assembly	0.04	0.00	0.16	0.36	0.04	0.00
LST Erection	0.02	0.00	0.10	0.39	0.05	0.00
TSP Foundation Installation	0.14	0.01	0.60	4.29	0.70	0.00
TSP Haul	0.01	0.00	0.03	0.09	0.01	0.00
TSP Assembly	0.05	0.00	0.17	0.28	0.04	0.00
TSP Erection	0.10	0.01	0.32	1.07	0.13	0.00
Modify Existing LST	0.01	0.00	0.04	4.34	0.90	0.00
Conductor & OPGW Installation	0.40	0.04	0.74	9.88	1.85	0.00
Guard Structure Removal	0.00	0.00	0.00	0.58	0.12	0.00
Vault Installation	0.62	0.07	2.40	4.42	0.81	0.01
Duct Bank Installation	0.53	0.04	1.20	2.54	0.46	0.00
Underground Cable Installation	0.07	0.01	0.76	1.17	0.06	0.00
Cable Splicing	0.19	0.03	1.16	2.82	0.37	0.00
Riser Pole Preparation	0.01	0.00	0.01	4.42	0.91	0.00
Cable Terminating	0.07	0.01	0.53	0.96	0.12	0.00
Trench Restoration/Paving	0.02	0.00	0.07	0.31	0.04	0.00
Restoration	0.01	0.00	0.04	0.12	0.01	0.00
Jack and Bore	0.04	0.01	0.29	0.20	0.04	0.00
Grand Total (tons)	2.39	0.25	8.92	48.9	8.82	0.02
Average Daily (pounds)	6.54	0.68	24.4	134	24.2	0.06
Significance Threshold	100	75	550	150	55	150

Underground Hybrid--RTRP I-15 230 kV Project (Enhanced Mitigated)

Time Period	Activity	Peak Daily Construction Emissions (lbs/day)					
		NOx	VOC	CO	PM10	PM2.5	SO2
(09-Mar-21 to 15-Apr-21)	Marshalling Yard	0.16	0.04	2.02	3.19	0.46	0.00
(15-Mar-21 to 22-Mar-21)	LST Steel Haul	0.76	0.11	5.72	9.19	1.29	0.01
(15-Mar-21 to 26-Mar-21)	Modify Existing LST	2.13	0.23	9.58	20.3	3.0	0.02
(15-Mar-21 to 03-May-21)	Install LST Foundations	3.00	0.31	11.31	28.5	4.00	0.03
(23-Mar-21 to 27-Mar-21)	LST Steel Assembly	2.07	0.21	9.40	12.6	1.80	0.02
(08-Apr-21 to 27-Mar-21)	LST Erection	1.93	0.31	11.8	15.6	2.22	0.03
(15-Mar-21 to 06-Apr-21)	TSP Haul	0.90	0.14	5.55	9.19	1.29	0.01
(15-Mar-21 to 25-Oct-21)	TSP Foundation Installation	2.99	0.30	12.4	27.3	3.76	0.03
(07-Apr-21 to 17-Jun-21)	TSP Assembly	2.07	0.21	9.50	9.57	1.39	0.02
(02-Jun-21 to 25-Oct-21)	TSP Erection	2.13	0.23	8.32	15.2	2.12	0.02
(20-Oct-21 to 24-Jan-22)	Conductor & OPGW Installation	30.9	2.86	43.3	60.3	8.68	0.12
(25-Jan-22 to 08-Mar-22)	Restoration	1.43	0.20	9.06	15.1	2.10	0.02
(16-Sep-21 to 13-Oct-21)	Riser Pole Preparation	0.88	0.07	2.66	17.0	2.48	0.01
(16-Sep-21 to 08-Aug-22)	Vault Installation	12.5	1.10	35.8	41.6	7.79	0.10
(04-Mar-22 to 08-Aug-22)	Duct Bank Installation	11.8	0.80	26.1	32.3	6.03	0.07
(13-Apr-22 to 26-Aug-22)	Underground Cable Installation	1.66	0.25	17.9	9.01	1.55	0.04
((15-Apr-22 to 04-Oct-22)	Cable Terminating	1.33	0.24	10.8	12.4	1.76	0.02
(23-May-22 to 10-Jan-23)	Cable Splicing	2.52	0.45	16.6	21.7	3.10	0.04
(29-Nov-22 to 14-Mar-23)	Trench Restoration/Paving	1.67	0.15	6.61	15.0	2.06	0.01
(05-Feb-21 to 06-Dec-21)	Wildlife Substation	2.97	0.19	4.90	30.2	4.21	0.02
(09-Dec-21 to 07-Oct-22)	Distribution Relocation	3.51	0.17	4.29	23.8	3.45	0.01
Schedule Not Identified	Survey	0.24	0.05	2.51	9.18	1.28	0.01
	Guard Structure Installation	2.14	0.17	5.75	18.1	2.49	0.02
	Guard Structure Removal	1.90	0.11	3.71	18.1	2.48	0.01
	Jack and Bore	4.57	0.81	31.12	6.35	0.98	0.07
	Total Daily (Concurrent Elements)	56.0	5.49	136	181	27.5	0.35
	Maximum Daily (Single Element)	30.9	2.86	43.3	60.3	8.68	0.12
	Significance Threshold	100	75	550	150	55	150

Underground Hybrid--RTRP I-15 230 kV Project (Enhanced Mitigated)

	Total Construction Emissions (tons)					
	NOx	VOC	CO	PM10	PM2.5	SO2
Survey	0.00	0.00	0.00	0.03	0.00	0.00
Marshalling Yard	0.00	0.00	0.00	0.00	0.00	0.00
Roads & Landing Work	0.02	0.00	0.14	2.62	0.54	0.00
Guard Structure Installation	0.00	0.00	0.01	0.29	0.06	0.00
Install LST Foundations	0.04	0.00	0.12	2.45	0.49	0.00
LST Steel Haul	0.00	0.00	0.01	0.02	0.00	0.00
LST Steel Assembly	0.04	0.00	0.16	0.21	0.03	0.00
LST Erection	0.02	0.00	0.10	0.22	0.03	0.00
TSP Foundation Installation	0.14	0.01	0.60	2.29	0.39	0.00
TSP Haul	0.01	0.00	0.03	0.05	0.01	0.00
TSP Assembly	0.05	0.00	0.17	0.16	0.02	0.00
TSP Erection	0.10	0.01	0.32	0.61	0.08	0.00
Modify Existing LST	0.01	0.00	0.04	2.18	0.45	0.00
Conductor & OPGW Installation	0.40	0.04	0.74	5.11	0.97	0.00
Guard Structure Removal	0.00	0.00	0.00	0.29	0.06	0.00
Vault Installation	0.62	0.07	2.40	2.84	0.56	0.01
Duct Bank Installation	0.53	0.04	1.20	1.65	0.32	0.00
Underground Cable Installation	0.07	0.01	0.76	0.67	0.05	0.00
Cable Splicing	0.19	0.03	1.16	1.60	0.24	0.00
Riser Pole Preparation	0.01	0.00	0.01	2.22	0.46	0.00
Cable Terminating	0.07	0.01	0.53	0.55	0.08	0.00
Trench Restoration/Paving	0.02	0.00	0.07	0.18	0.02	0.00
Restoration	0.01	0.00	0.04	0.07	0.01	0.00
Jack and Bore	0.04	0.01	0.29	0.09	0.02	0.00
Grand Total (tons)	2.39	0.25	8.92	26.4	4.90	0.02
Average Daily (pounds)	6.54	0.68	24.4	72.3	13.4	0.06
Significance Threshold	100	75	550	150	55	150

Underground Hybrid--RTRP I-15 230 kV Project (Enhanced Mitigated) Wirh Schedule Limitation

Time Period	Activity	Peak Daily Construction Emissions (lbs/day)					
		NOx	VOC	CO	PM10	PM2.5	SO2
(09-Mar-21 to 15-Apr-21)	Marshalling Yard	0.16	0.04	2.02	3.19	0.46	0.00
(15-Mar-21 to 22-Mar-21)	LST Steel Haul	0.76	0.11	5.72	9.19	1.29	0.01
(15-Mar-21 to 26-Mar-21)	Modify Existing LST	2.13	0.23	9.58	20.3	3.0	0.02
(15-Mar-21 to 03-May-21)	Install LST Foundations	3.00	0.31	11.31	28.5	4.00	0.03
(23-Mar-21 to 27-Mar-21)	LST Steel Assembly	2.07	0.21	9.40	12.6	1.80	0.02
(08-Apr-21 to 27-Mar-21)	LST Erection	1.93	0.31	11.8	15.6	2.22	0.03
(15-Mar-21 to 06-Apr-21)	TSP Haul	0.90	0.14	5.55	9.19	1.29	0.01
(15-Mar-21 to 25-Oct-21)	TSP Foundation Installation	2.99	0.30	12.4	27.3	3.76	0.03
(07-Apr-21 to 17-Jun-21)	TSP Assembly	2.07	0.21	9.50	9.57	1.39	0.02
(02-Jun-21 to 25-Oct-21)	TSP Erection	2.13	0.23	8.32	15.2	2.12	0.02
(20-Oct-21 to 24-Jan-22)	Conductor & OPGW Installation	30.9	2.86	43.3	60.3	8.68	0.12
(25-Jan-22 to 08-Mar-22)	Restoration	1.43	0.20	9.06	15.1	2.10	0.02
(16-Sep-21 to 13-Oct-21)	Riser Pole Preparation	0.88	0.07	2.66	17.0	2.48	0.01
(16-Sep-21 to 08-Aug-22)	Vault Installation	12.5	1.10	35.8	41.6	7.79	0.10
(04-Mar-22 to 08-Aug-22)	Duct Bank Installation	11.8	0.80	26.1	32.3	6.03	0.07
(13-Apr-22 to 26-Aug-22)	Underground Cable Installation	1.66	0.25	17.9	9.01	1.55	0.04
((15-Apr-22 to 04-Oct-22)	Cable Terminating	1.33	0.24	10.8	12.4	1.76	0.02
(23-May-22 to 10-Jan-23)	Cable Splicing	2.52	0.45	16.6	21.7	3.10	0.04
(29-Nov-22 to 14-Mar-23)	Trench Restoration/Paving	1.67	0.15	6.61	15.0	2.06	0.01
(05-Feb-21 to 06-Dec-21)	Wildlife Substation	2.97	0.19	4.90	30.2	4.21	0.02
(09-Dec-21 to 07-Oct-22)	Distribution Relocation	3.51	0.17	4.29	23.8	3.45	0.01
Schedule Not Identified	Survey	0.24	0.05	2.51	9.18	1.28	0.01
	Guard Structure Installation	2.14	0.17	5.75	18.1	2.49	0.02
	Guard Structure Removal	1.90	0.11	3.71	18.1	2.48	0.01
	Jack and Bore	4.57	0.81	31.1	6.35	0.98	0.07
	Total Daily (Concurrent Elements)	37.9	3.81	143	147	24.7	0.35
	Maximum Daily (Single Element)	30.9	2.86	43.3	60.3	8.68	0.12
	Significance Threshold	100	75	550	150	55	150

APPENDIX G

Air Quality and Greenhouse Gas Supporting Information

Air Quality Memo

Air Quality Summary Calculations for Proposed Project

Air Quality Detailed Calculations for Proposed Project (See Excel Files)