Appendix B

Quantification of Criteria Air Pollutant and Greenhouse Gas Emissions, and Energy Use

Operational Emissions Summary

Project Operational Emissions:

		Daily Emissions (lb/day)										Max Annual Emissions (tons/year)									Total Emissions (metric tons)
Air District	Operational Activity	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20	CO2e
SJVAPCD																					
	Locomotive Operations	0.74	22.58	17.64	0.08	0.26	0.26	8,656.12	0.68	0.22	8,738.80	0.09	2.86	2.23	0.01	0.03	0.03	1095.00	0.09	0.03	1002.85
	Station Electricity Emissions	-	-	-	-	-	-	55.34	0.01	0.00	55.72	-	-	-	-	-	-	9.16	0.00	0.00	9.22
	Station Waste Emissions	-	-	-	-	-	-	10.51	0.52	0.00	23.53	-	-	-	-	-	-	1.74	0.09	0.00	3.90
	Sub-total	*0.74*	*22.58*	*17.64*	*0.08*	*0.26*	*0.26*	*8711.46*	*0.68*	*0.22*	*8794.52*	*0.09*	*2.86*	*2.23*	*0.01*	*0.03*	*0.03*	*1105.90*	*0.17*	*0.03*	*1015.98*
	Air District Threshold	100.00	100.00	100.00	100.00	100.00	100.00	-	-	-		10.00	100.00	10.00	27.00	15.00	15.00	-	-	-	
	Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**					**No**	**No**	**No**	**No**	**No**	**No**				
SMAQMD																					
	Locomotive Operations	0.98	29.66	23.17	0.11	0.35	0.34	11368.36	0.89	0.29	11476.94	0.12	3.75	2.93	0.01	0.04	0.04	1438.10	0.11	0.04	1317.08
	Station Electricity Emissions	-	-	-	-	-	-	398.41	0.02	0.00	399.78	-	-	-	-	-	-	65.96	0.00	0.00	66.19
	Station Waste Emissions	-	-	-	-	-	-	50.13	2.49	0.00	112.29	-	-	-	-	-	-	8.30	0.41	0.00	18.59
	Airport Shuttle Service	0.00	0.01	0.12	0.00	0.04	0.02	287.66	0.01	0.05	301.37	0.00	0.00	0.02	0.00	0.00	0.00	36.39	0.00	0.01	34.58
	Sub-total	*0.98*	*29.67*	*23.29*	*0.11*	*0.38*	*0.35*	*12104.57*	*3.41*	*0.34*	*12290.37*	*0.12*	*3.75*	*2.95*	*0.01*	*0.05*	*0.04*	*1548.75*	*0.53*	*0.04*	*1436.44*
	Air District Threshold	65.00	-	65.00	-	80.00	82.00	-	-	-		-	-	-	-	14.60	15.00	-	-	-	1100.00
	Exceed Threshold?	**No**		**No**		**No**	**No**									**No**	**No**				**Yes**

Net Operational Emissions Accounting for Displaced VMT

		Daily Emissions (lb/day)										Max Annual Emissions (tons/year)									Total Emissions (metric tons)
On-Road Emissions Avoided Due to VMT Displaced by Rail Ridership Increase		ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20	CO2e
	SJVAPCD	(1.50)	(110.29)	(6.96)	(0.45)	(7.85)	(3.23)	(45,716.40)	(0.38)	(0.81)	(45,967.61)	(0.19)	(13.95)	(0.88)	(0.06)	(0.99)	(0.41)	(5,783.12)	(0.05)	(0.10)	(5,275.19)
	SMAQMD	(1.97)	(144.85)	(9.14)	(0.59)	(10.31)	(4.25)	(60,040.79)	(0.50)	(1.06)	(60,370.71)	(0.25)	(18.32)	(1.16)	(0.08)	(1.30)	(0.54)	(7,595.16)	(0.06)	(0.13)	(6,928.07)
Net Regional Emissions (Project Direct Emissions - VMT Displaced Emissions Reductions)																					
	SJVAPCD	(0.76)	(87.71)	10.68	(0.37)	(7.59)	(2.98)	(37,004.94)	0.30	(0.59)	(37,173.09)	(0.10)	(11.10)	1.35	(0.05)	(0.96)	(0.38)	(4,677.22)	0.12	(0.07)	(4,259.21)
	SMAQMD	(1.00)	(115.18)	14.15	(0.48)	(9.93)	(3.90)	(47,936.23)	2.90	(0.73)	(48,080.34)	(0.13)	(14.57)	1.79	(0.06)	(1.26)	(0.49)	(6,046.41)	0.47	(0.09)	(5,491.63)

Conversion Factors	
pounds per ton	2000
pounds per metric ton	2204.62262

Project GHG Emission Summary:

Operational Activity	**Maximum Annual Emissions (tons per year)**			**Total Annual GHG Emissions (metric tons per year)**
	CO2	CH4	N20	CO2e
Locomotive Operations	2,533	0.20	0.06	2,320
Station Electricity Emissions	75	0.00	0.00	75
Station Waste Emissions	10	0.50	-	22
Shuttle	36	0.00	0.01	35
Sub-total	2,655	0.70	0.07	2,452
On-road Mobile Emission Reductions	(13,378)	(0.11)	(0.24)	(12,203)
Net Project Regional Emissions	**(10,724)**	**0.59**	**(0.17)**	**(9,751)**

Operational Energy

Table 4.6-4 Estimated Energy Usage During Project Operation

County	Operational Activity	**Energy Requirement**	Energy Unit	Annual Energy Consumption (MMBtu)
San Joaquin				
	Locomotive Operations	98,706	Gallson Diesel/year	13,631
	Electricity Use	117,120	KWh/yr	400
	Subtotal			14,031
Sacramento				
	Locomotive Operations	129,634	Gallson Diesel/year	17,902
	Shuttle Service	3,404	Gallson Diesel/year	470
	Electricity Use	391,824	KWh/yr	1,337
	Subtotal			19,709

County	On-Road Fuel Demand Avoided Due to VMT Displaced by Rail Ridership Increase	**Energy Requirement**	Energy Unit	Annual Energy Consumption (MMBtu)
San Joaquin				
	DSL	(6,006)	Gallons Diesel/year	(829)
	GAS	(586,719)	Gallons Gasoline/year	(73,340)
	Subtotal			(74,169)
Sacramento				
	DSL	(7,888)	Gallons Diesel/year	(1,089)
	GAS	(770,556)	Gallons Gasoline/year	(96,319)
	Subtotal			(97,409)

County	Net Energy Reductions	Annual Energy Consumption (MMBtu)
San Joaquin		
	Operational Demand	14,031
	Operational Offsets	(74,169)
	Subtotal	(60,139)
Sacramento		
	Operational Demand	19,709
	Operational Offsets	(97,409)
	Subtotal	(77,700)

Conversion Factors			
Category	**Amount**	**Units**	
Diesel (heat content)	5.8	MMBtu/barrel	http://www.theclimateregistry.org/wp-content/uploads/2017/05/2017-Climate-Registry-Default-Emission-Factors.pdf
Motor Gasoline	5.25	MMBtu/barrel	http://www.theclimateregistry.org/wp-content/uploads/2017/05/2017-Climate-Registry-Default-Emission-Factors.pdf
Natural Gas	0.1	MMBtu/therm	https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references
Propane	0.0913	MMBtu/gallon	https://www.eia.gov/environment/emissions/co2_vol_mass.php
Kerosene	0.135	MMBtu/gallon	https://www.eia.gov/environment/emissions/co2_vol_mass.php
Wood	20	MMBtu/cord	https://www.eia.gov/energyexplained/index.cfm?page=about_btu
Gallons per Barrel	42	gallons/barrel	http://www.theclimateregistry.org/wp-content/uploads/2017/05/2017-Climate-Registry-Default-Emission-Factors.pdf

Project Mobile Fuel Estimates:

County		GHG Emissions from Fuel Use	Emission Factor	2025
	Operational Activity	(metric tons CO2e/year)	(MT CO2/gallon) a	Gallons of Fuel
San Joaquin				
	Locomotive Operations	1002.85	1.02E-02	98,706.18
	Sub-total	1002.85		98,706.18
Sacramento				
	Locomotive Operations	1317.08	1.02E-02	129,633.94
	Airport Shuttle Service	34.58	1.02E-02	3,404.00
	Sub-total	1351.67		133,037.94
	On-Road Fuel Demand Avoided Due to VMT Displaced by Rail Ridership Increase			
San Joaquin		(5,275.2)		
	DSL	1%	1.02E-02	(6,006.22)
	GAS	99%	8.89E-03	(586,718.53)
Sacramento		(6,928.1)		
	DSL	1%	1.02E-02	(7,888.16)
	GAS	99%	8.89E-03	(770,555.84)

EMFAC2017 (v1.0.2) Emission Rates
Region Type: County
Region: SAN JOAQUIN
Calendar Year: 2025
Season: Annual
Vehicle Classification: EMFAC2011 Categories
Units: miles/day for VMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HTSK and RUNLS, g/vehicle/day for IDLEX, RESTL and DIURN

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	VMT	% VMT*
SAN JOAC	2025	LDA	Aggregated	Aggregated	GAS	323207.155	1.2E+07	61.34%
SAN JOAC	2025	LDA	Aggregated	Aggregated	DSL	3082.90456	124352	0.62%
SAN JOAC	2025	LDT1	Aggregated	Aggregated	GAS	32110.0094	1109936	5.58%
SAN JOAC	2025	LDT1	Aggregated	Aggregated	DSL	17.3278395	311.918	0.00%
SAN JOAC	2025	LDT2	Aggregated	Aggregated	GAS	102634.084	3642480	18.30%
SAN JOAC	2025	LDT2	Aggregated	Aggregated	DSL	690.251608	28424.9	0.14%
SAN JOAC	2025	MDV	Aggregated	Aggregated	GAS	87466.714	2711830	13.63%
SAN JOAC	2025	MDV	Aggregated	Aggregated	DSL	2099.72241	77150	0.39%
						Total:	19903126	100.00%

EMFAC2017 (v1.0.2) Emission Rates
Region Type: County
Region: SACRAMENTO
Calendar Year: 2025
Season: Annual
Vehicle Classification: EMFAC2011 Categories
Units: miles/day for VMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HTSK and RUNLS, g/vehicle/day for IDLEX, RESTL and DIURN

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	VMT	% VMT*
SACRAME	2025	LDA	Aggregated	Aggregated	GAS	635993.874	2.2E+07	60.44%
SACRAME	2025	LDA	Aggregated	Aggregated	DSL	6649.4425	234802	0.64%
SACRAME	2025	LDT1	Aggregated	Aggregated	GAS	67470.7121	2184625	5.98%
SACRAME	2025	LDT1	Aggregated	Aggregated	DSL	140.833561	2204.9	0.01%
SACRAME	2025	LDT2	Aggregated	Aggregated	GAS	216827.922	7183352	19.66%
SACRAME	2025	LDT2	Aggregated	Aggregated	DSL	1470.04907	56082.3	0.15%
SACRAME	2025	MDV	Aggregated	Aggregated	GAS	149939.678	4660429	12.76%
SACRAME	2025	MDV	Aggregated	Aggregated	DSL	3616.43487	131508	0.36%
						Total:	36536312	100.00%

Locomotive Operational Emissions

Daily Locomotive Operational Emissions by Air District

	Daily In-Transit Emissions (lbs/day)									
Air District	**ROG**	**CO**	**NOX**	**SO2**	**PM10**	**PM2.5**	**CO2**	**CH4**	**N2O**	**CO2e**
SJVAPCD	0.743052624	22.58089646	17.64132536	0.081421502	0.26461988	0.256681284	8656.123395	0.678512514	0.220516567	8738.800145
SMAQMD	0.975874423	29.65620279	23.16890843	0.106933424	0.347533627	0.337107618	11368.35959	0.891111863	0.289611355	11476.94157

In-Transit Train Operations Emissions				Daily In-Transit Emissions (lbs/day)									
	Daily Operational Hours	*HP*	*Load Factor*	**ROG**	**CO**	**NOX**	**SO2**	**PM10**	**PM2.5**	**CO2**	**CH4**	**N2O**	**CO2e**
Total Daily Operations*	19	4000	0.25	1.7189	52.2371	40.8102	0.1884	0.6122	0.5938	20024.4830	1.5696	0.5101	20216

**Calculations account for average idling time and time in each notch power level.*

Emission Factors

	Emission Factors (g/bhp-hr)*				Emission Factors (g/bhp-hr)									
Locomotive Application	**PM10**	**HC**	**Nox**	**CO**	**HC**	**ROG**	**CO**	**NO_x**	**SO2**	**PM10**	**PM2.5**	**CO2**	**CH4**	**N2O**
Line Haul (Tier 4)	0.015	0.04	1	1.28	0.04	0.04212	1.28	1	0.004615385	0.015	0.01455	490.673077	0.038461538	0.0125

*Source: EPA Emission Factors for Locomotives - Technical Highlights (EPA-420-F-09-025)

Notes:

Assumes Line-Haul Locomotives with Tier 4 Engines

Emission Factors Calculations:	Conversion Factor
ROG is estimated as 1.053 times the EF for HC	1.053
PM10 = PM	
PM2.5 as a 97% of PM10	97%
SO2 Emission Factor (g/gal) = (fuel density) * (64 g SO2 / 32 g S) * (S content of fuel)	
Fuel density	3200
Sulfur Content of Fuel (15 ppm) (per CARB regulations, CCR Title 13, Div 3, Chapter 5, Article 2, Section 2281)	15
SO2 EF (g/gal)	0.096
CO2 is defined by U.S. EPA as 10,206 g CO2/gal fuel	10206
CH4 and N2O Emission Factors per EPA: Table 5 in https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf	
CH4 g/gal	0.8
N2O g/gal	0.26
Conversion for g/gal to g/hp-hr (divide by) per EPA 2009 Technical Highlights	
Line Haul and Passenger	20.8
Switch	15.2

CO2 (g/gal) = (fuel density) * (44 g CO2/12 g C) * (C content of fuel)

Carbon content of renewable diesel = density of fuel 3200 g/gal

39.33 gCO2e/MJ

Operational Variables	
Total New Locomotive Daily Operating Hours	18.67
Engine Tier	4
Engine HP	4000
% Travel Distance per Air District	
SJVAPCD	43%
SMAQMD	57%

**One leg of train route is approximately 1 hour and15 to 20 minutes . Total of 14 one-way trips per day = 18 2/3 operating hours. Inclusive of idling time at stations.*

Horsepower and Load Factor Calculations

Notch	*Percent Operating Time at Each Notch Power Level*[1]	Reweighted time (split idle and moving time)	Notch Power Level as a Percent of Rater Power[2]
Normal Idle	*47.40%*	100.00%	0.40%
Dynamic Break	*6.20%*	11.79%	2.10%
Notch 1	*7.00%*	13.31%	4.50%
Notch 2	*5.10%*	9.70%	11.50%
Notch 3	*5.70%*	10.84%	23.50%
Notch 4	*4.70%*	8.94%	35.00%
Notch 5	*4.00%*	7.60%	48.50%
Notch 6	*2.90%*	5.51%	64.00%
Notch 7	*1.40%*	2.66%	85.00%
Notch 8	*15.60%*	29.66%	100.00%

1. Per EPA 1998 Locomotive Emission Standards Regulatory Support Document , Table 4-5 https://nepis.epa.gov/Exe/ZyPDF.cgi/P100F9QT.PDF?Dockey=P100F9QT.PDF
2. Per EPA 1998 Locomotive Emission Standards Regulatory Support Document , Table 5-2 https://nepis.epa.gov/Exe/ZyPDF.cgi/P100F9QT.PDF?Dockey=P100F9QT.PDF

Time-weighted engine Load Factor

Idle	0.40%
In-transit	24.8%

Conversion Factors (per EPA 2009 Emission Factors for Locomotives Technical Highlights - Table 3)

Locomotive Application	**Conversion Factor (bhp-hr/gal)**
Large Line-Haul and Passenger	20.8
Small Line-Haul	18.2
Switching	15.2

Conversion Factors	
grams per pound	453.59237
pounds per ton	2000
pounds per metric ton	2204.62262
Global Warming Potential	
CO2	1
Ch4	25
N20	298

Note: GWP are the 100-year GWPs from the IPCC fourth assessment report (AR4), consistent with the California Air Resources Board 2019 GHG emissions inventory.

On-Road Emissions Avoided

		Emissions (lb/day)														Emissions (tons/year) (CO2e measured in MT/year)													
Air District	**Displaced Daily VMT**	**ROG**	**CO**	**NOX**	**SO2**	**PM10 Fugitive Dust**	**PM10 Exhaust**	**PM10 Total**	**PM2.5 Fugitive Dust**	**PM2.5 Exhaust**	**PM2.5 Total**	**CO2**	**CH4**	**N2O**	**CO2e**	**ROG**	**CO**	**NOX**	**SO2**	**PM10 Fugitive Dust**	**PM10 Exhaust**	**PM10 Total**	**PM2.5 Fugitive Dust**	**PM2.5 Exhaust**	**PM2.5 Total**	**CO2**	**CH4**	**N2O**	**CO2e**
SJVAPCD	77,222.44	1.50	110.29	6.96	0.45	7.62	0.23	7.85	3.02	0.21	3.23	45,716.40	0.38	0.81	45,968	0.2739401	20.128766	1.2699079	0.0825257	1.390380902	0.04220261	1.432583511	0.551491866	0.038866108	0.590358	8343.2435	0.0701381	0.1479588	7,610
SMAQMD	101,418.66	1.97	144.85	9.14	0.59	10.01	0.30	10.31	3.97	0.28	4.25	60,040.79	0.50	1.06	60,371	0.3597742	26.435742	1.6678101	0.1083835	1.826031046	0.055426017	1.881457063	0.724291644	0.051044084	0.7753357	10957.445	0.0921146	0.194319	9,995
Total	178,641.10	3.47	255.15	16.10	1.05	17.62	0.53	18.16	6.99	0.49	7.48	105,757.19	0.89	1.88	106,338	0.6337144	46.564508	2.937718	0.1909092	3.216411947	0.097628627	3.314040574	1.27578351	0.089910192	1.3656937	19300.688	0.1622526	0.3422778	17,606

Percent Rail Operations Per Air District	
Air District	**%**
SJVAPCD	43%
SMAQMD	57%

**Percent based upon relative percent of proposed rail operational distance within each air district.*

Displaced VMT:	**Annual**	**Daily**
Due to ACE Ridership	35,804,100	98,093
Due to San Joaquins Ridership	29,399,900	80,548
Total	65,204,000	178,641

*Calculations based upon TRCIP Application and traffic analysis.

Operational days per year: 365

Vehicle Category	**Emission Factors (g/mile)** [1]											
	ROG	**CO**	**NOX**	**SO2**	**PM10 Fugitive Dust**	**PM10 Exhaust**	**PM10 Total**	**PM2.5 Fugitive Dust**	**PM2.5 Exhaust**	**PM2.5 Total**	**CO2**	**CH4**	**N2O**
LDA, LDT1, LDT2, MDV Fleet Average	0.008816882	0.647853061	0.040872538	0.0026561	0.04475	0.001358309	0.046108322	0.01775	0.00125092	0.01900093	268.53091	0.002257425	0.0047621

*EMFAC 2017

Conversion Factors	
grams per pound	453.59237
pounds per ton	2000
pounds per metric ton	2204.62262
Global Warming Potential	
CO2	1
Ch4	25
N20	298

Note: GWP are the 100-year GWPs from the IPCC fourth assessment report (AR4), consistent with the California Air Resources Board 2019 GHG emissions inventory.

Station Electricity Emissions (Indirect)

			Emissions (lb/day)				Emissions (metric tons per year)			
Station	**kWh/month**	**Electricity Provider**	**CO2**	**CH4**	**N2O**	**CO2e**	**CO2**	**CH4**	**N2O**	**CO2e**
Lodi	4,019	PG&E	38.74	0.00	0.00	39.01	6.41	0.00	0.00	6.46
Lodi Variant	5,741	PG&E	55.34	0.01	0.00	55.72	9.16	0.00	0.00	9.22
Elk Grove	10,621	SMUD	205.46	0.01	0.00	206.16	34.02	0.00	0.00	34.13
Elk Grove Variant	12,056	SMUD	233.21	0.01	0.00	234.01	38.61	0.00	0.00	38.74
City College	287	SMUD	5.55	0.00	0.00	5.57	0.92	0.00	0.00	0.92
Midtown	718	SMUD	13.89	0.00	0.00	13.94	2.30	0.00	0.00	2.31
Old North Sacramento	3,229	SMUD	62.46	0.00	0.00	62.68	10.34	0.00	0.00	10.38
Natomas	4,306	SMUD	83.30	0.00	0.00	83.58	13.79	0.00	0.00	13.84

*Anticipated station electricity use provided by project engineering team.

Station Electricity Emissions by Air District

	Emissions (pounds per day)				Emissions (metric tons per year)			
	CO2	**CH4**	**N2O**	**CO2e**	**CO2**	**CH4**	**N2O**	**CO2e**
SJVAPCD	55.34	0.01	0.00	55.72	9.16	0.00	0.00	9.22
SMAQMD	398.41	0.02	0.00	399.78	65.96	0.00	0.00	66.19

Emission Factors

	CO2 (lb/MWh)	CH4 (lb/MWh)	N2O (lb/MWh)
PG&E[1]	294.00	0.033	0.004
SMUD[2]	590	0.033	0.004

Notes:
1. PG&E CO2 emission factor based upon PG&E 2018 Corporate Responsibility and Sustainability Report (http://www.pgecorp.com/corp_responsibility/reports/2018/assets/PGE_CRSR_2018.pdf). Emission factors for CH4 and N2O based upon U.S. EPA eGrid (https://www.epa.gov/sites/production/files/2018-02/documents/egrid2016_summarytables.pdf)
2. SMUD emission factors based upon U.S. EPA eGrid 2016

Conversion Factors	
kWh to MWh	0.001
pounds per ton	2000
pounds per metric ton	2204.62262
average days per month	30.5
days per year	365
Global Warming Potential	
CO2	1
Ch4	25
N20	298
Note: GWP are the 100-year GWPs from the IPCC fourth	

Station Waste Emissions (Indirect)

Station	Average Monthly Tonnage	Emissions (lb/day) CO2	CH4	N2O	CO2e	Emissions (metric tons per year) CO2	CH4	N2O	CO2e
Lodi	0.58	8.7061	0.4317	0.0000	19.4987	1.44	0.07	0.00	3.23
Lodi Variant	0.70	10.5073	0.5210	0.0000	23.5329	1.74	0.09	0.00	3.90
Elk Grove	1.80	27.0189	1.3398	0.0000	60.5133	4.47	0.22	0.00	10.02
Elk Grove Variant	1.80	27.0189	1.3398	0.0000	60.5133	4.47	0.22	0.00	10.02
City College	0.05	0.7505	0.0372	0.0000	1.6809	0.12	0.01	0.00	0.28
Midtown	0.14	2.1015	0.1042	0.0000	4.7066	0.35	0.02	0.00	0.78
Old North Sacramento	0.54	8.1057	0.4019	0.0000	18.1540	1.34	0.07	0.00	3.01
Natomas	0.81	12.1585	0.6029	0.0000	27.2310	2.01	0.10	0.00	4.51

*Anticipated station electricity use provided by project engineering team.

Station Waste Emissions by Air District

	Emissions (pounds per day) CO2	CH4	N2O	CO2e	Emissions (metric tons per year) CO2	CH4	N2O	CO2e
SJVAPCD	10.51	0.52	0.00	23.53	1.74	0.09	0.00	3.90
SMAQMD	50.13	2.49	0.00	112.29	8.30	0.41	0.00	18.59

Emission Factors

CO2 (tons/ton waste)	CH4 (tons/ton waste)	N2O (tons/ton waste)
0.23	0.011350894	0

Source: CalEEMod

Conversion Factors	
pounds per ton	2000
pounds per metric ton	2204.62262
average days per month	30.5
days per year	365
Global Warming Potential	
CO2	1
Ch4	25
N20	298
Note: GWP are the 100-year GWPs from the IPCC fourth	

Shuttle Bus Emissions

					Emissions (lb/day)													Emissions (tons/year) (CO2e measured in MT/year)												
Air District	Number of Busses per Trip	One-Way Trips per Day	Distance per Trip (miles)	Vehicle Category	ROG	CO	NOX	SO2	PM10 Fugitive Dust	PM10 Exhaust	PM10 Total	PM2.5 Fugitive Dust	PM2.5 Exhaust	PM2.5 Total	CO2	CH4	N2O	CO2e	ROG	CO	NOX	SO2	PM10 Fugitive Dust	PM10 Exhaust	PM10 Total	PM2.5 Fugitive Dust	PM2.5 Exhaust	PM2.5 Total	CO2	CH4	N2O	CO2e
SJVAPCD	0	0	0	Urban Bus (Diesel)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SMAQMD	1	14	8	Urban Bus (Diesel)	0.00013	0.01449	0.12106	0.00272	0.03515	0.00098	0.03613	0.01453	0.00094	0.01547	287.658	0.00945	0.04522	301.3681225	2.46355E-05	0.00265	0.02209	0.0005	0.00641	0.00018	0.00659	0.00265	0.00017	0.00282	52.4975	0.00172	0.00825	49.8949

Operational days per year: 365

Vehicle Category	Emission Factors (g/mile) [3]												
	ROG	CO	NOX	SO2	PM10 Fugitive Dust	PM10 Exhaust	PM10 Total	PM2.5 Fugitive Dust	PM2.5 Exhaust	PM2.5 Total	CO2	CH4	N2O
UBUS (Diesel)	0.000546697	0.587034	0.4903046	0.011013381	0.1423401	0.0039644	0.1463045	0.05886	0.0037929	0.0626529	1164.9938	0.0382626	0.1831208

[3]Source: EMFAC 2017 v1.0.2 Emission Rates for Sacramento County Calendar Year 2025 (operational year)

Note: Fugitive dust accountes for tire wear and brake wear.

Conversion Factors	
grams per pound	453.59237
pounds per ton	2000
pounds per metric ton	2204.62262
Global Warming Potential	
CO2	1
Ch4	25
N20	298
Note: GWP are the 100-year GWPs from the IPCC fourth	

EMFAC2017 (v1.0.2) Emission Rates

Construction Emissions by Location

		Daily Emissions (lb/day)									Daily Emissions (metric tons/day)	Max Annual Emissions (tons/year)									Total Emissions (metric tons)
Project Element	Construction Start Year	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
LODE STATION																					
Equipment		8.03	39.75	99.90	0.10	3.17	3.06	9735.88	1.40	0.63	4.52	0.52	2.92	5.46	0.01	0.23	0.22	585.38	0.14	0.06	550.93
Onsite Vehicles		0.10	0.29	0.59	0.00	0.04	0.03	190.95	0.01	0.02	0.08	0.01	0.02	0.05	0.00	0.37	0.04	12.59	0.00	0.00	11.34
Earthmoving	-	-	-	-	-	19.72	10.80	-	-	-	-	-	-	-	-	0.38	0.21	-	-	-	-
Paving	-	0.19	-	-	-	-	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.19	3.53	2.38	0.02	2.31	0.06	2.37	0.61	0.06	0.66	0.02	0.20	0.28	0.00	0.19	0.06	136.88	0.00	0.01	124.18
Total	2021	*8.50*	*43.57*	*102.87*	*0.12*	*32.15*	*14.61*	*9929.19*	*2.01*	*0.71*	*5.27*	*0.55*	*3.13*	*5.79*	*0.01*	*1.18*	*0.52*	*734.76*	*0.14*	*0.08*	*686.45*
LODE STATION - SOUTH ALTERNATIVE																					
Equipment		8.03	39.75	99.90	0.10	3.17	3.06	9735.88	1.40	0.63	4.52	0.52	2.92	5.46	0.01	0.23	0.22	585.38	0.14	0.06	550.93
Onsite Vehicles		0.10	0.29	0.59	0.00	0.04	0.03	190.95	0.01	0.02	0.08	0.01	0.02	0.05	0.00	0.37	0.04	12.59	0.00	0.00	11.34
Earthmoving	-	-	-	-	-	19.82	10.81	-	-	-	-	-	-	-	-	0.38	0.21	-	-	-	-
Paving	-	0.21	-	-	-	-	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.19	3.53	2.38	0.02	2.31	0.06	2.37	0.61	0.06	0.66	0.02	0.20	0.28	0.00	0.19	0.06	136.88	0.00	0.01	124.18
Total	2021	8.53	43.57	102.87	0.12	32.34	14.62	9929.19	2.01	0.71	5.27	0.55	3.13	5.79	0.01	1.18	0.52	734.76	0.14	0.08	686.45
TRACK CURVE RECONSTRUCTION EAST MARCH LN TO EAST SWAIN RD																					
Equipment		5.56	21.51	77.11	0.06	2.16	2.08	5936.26	0.94	0.42	2.75	0.05	0.23	0.68	0.00	0.02	0.02	55.92	0.01	0.01	52.42
Onsite Vehicles		0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.02	0.00	0.69	0.00	0.00	0.63
Earthmoving	-	-	-	-	-	19.58	10.79	-	-	-	-	-	-	-	-	0.02	0.01	-	-	-	-
Paving	-	0.00	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.01	0.01	0.00	0.01	0.00	7.14	0.00	0.00	6.48
Total	2022	5.78	23.92	79.77	0.07	28.02	13.37	6065.29	1.40	0.49	3.31	0.06	0.25	0.70	0.00	0.07	0.04	63.74	0.01	0.01	59.52
TRACK CURVE RECONSTRUCTION NORTH OF NORTH NEW HOPE RD																					
Equipment		5.56	21.51	77.11	0.06	2.16	2.08	5936.26	0.94	0.42	2.75	0.05	0.23	0.68	0.00	0.02	0.02	55.92	0.01	0.01	52.42
Onsite Vehicles		0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.02	0.00	0.69	0.00	0.00	0.63
Earthmoving	-	-	-	-	-	19.58	10.79	-	-	-	-	-	-	-	-	0.02	0.01	-	-	-	-
Paving	-	0.00	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.01	0.01	0.00	0.01	0.00	7.14	0.00	0.00	6.48
Total	2022	5.78	23.92	79.77	0.07	28.02	13.37	6065.29	1.40	0.49	3.31	0.06	0.25	0.70	0.00	0.07	0.04	63.74	0.01	0.01	59.52
HAMMER LANE SIDING UPGRADE																					
Equipment		5.56	21.51	77.11	0.06	2.16	2.08	5936.26	0.94	0.42	2.75	0.11	0.47	1.37	0.00	0.05	0.04	111.83	0.02	0.01	104.84
Onsite Vehicles		0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.05	0.00	1.38	0.00	0.00	1.25
Earthmoving	-	-	-	-	-	19.58	10.79	-	-	-	-	-	-	-	-	0.03	0.02	-	-	-	-
Paving	-	0.00	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.02	0.02	0.00	0.02	0.01	14.28	0.00	0.00	12.95
Total	2023	5.78	23.92	79.77	0.07	28.03	13.37	6065.29	1.40	0.49	3.31	0.11	0.49	1.39	0.00	0.15	0.07	127.49	0.02	0.01	119.04
THORNTON SIDING UPGRADE & EXTENSION																					
Equipment		5.56	21.51	77.11	0.06	2.16	2.08	5936.26	0.94	0.42	2.75	0.22	0.93	2.73	0.00	0.09	0.09	223.66	0.05	0.02	209.67
Onsite Vehicles		0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06	0.00	0.00	0.01	0.00	0.10	0.01	2.76	0.00	0.00	2.50
Earthmoving	-	-	-	-	-	20.42	10.89	-	-	-	-	-	-	-	-	0.07	0.04	-	-	-	-
Paving	-	0.00	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.05	0.05	0.00	0.04	0.01	28.56	0.00	0.00	25.91
Total	2023	5.79	23.92	79.77	0.07	28.86	13.47	6065.29	1.40	0.49	3.33	0.22	0.98	2.79	0.00	0.30	0.14	254.98	0.05	0.02	238.08
LODE SIDING																					
Equipment		5.56	21.51	77.11	0.06	2.16	2.08	5936.26	0.94	0.42	2.75	0.44	1.87	5.46	0.00	0.19	0.18	447.32	0.09	0.04	419.35
Onsite Vehicles		0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06	0.00	0.01	0.02	0.00	0.20	0.02	5.51	0.00	0.00	5.00
Earthmoving	-	-	-	-	-	20.65	10.92	-	-	-	-	-	-	-	-	0.13	0.07	-	-	-	-
Paving	-	0.01	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.01	0.10	0.10	0.00	0.08	0.02	57.12	0.00	0.00	51.82
Total	2021	5.80	23.92	79.77	0.07	29.09	13.50	6065.29	1.40	0.49	3.33	0.45	1.97	5.58	0.01	0.59	0.29	509.96	0.09	0.05	476.17
Max Daily / Annual	**2021**	**14.33**	**67.49**	**182.64**	**0.19**	**61.33**	**28.12**	**15,994.49**	**3.41**	**1.20**	**8.58**	**0.99**	**5.10**	**11.37**	**0.01**	**1.77**	**0.81**	**1,244.72**	**0.23**	**0.12**	**1,162.61**
	2022	**11.57**	**47.84**	**159.54**	**0.14**	**56.05**	**26.74**	**12,130.59**	**2.80**	**0.99**	**6.63**	**0.11**	**0.49**	**1.39**	**0.00**	**0.15**	**0.07**	**127.49**	**0.02**	**0.01**	**119.04**
	2023	**11.57**	**47.84**	**159.54**	**0.14**	**56.89**	**26.85**	**12,130.59**	**2.80**	**0.99**	**6.63**	**0.33**	**1.48**	**4.18**	**0.00**	**0.44**	**0.22**	**382.47**	**0.07**	**0.04**	**357.13**
	SJVAPCD Thresholds	100.00	100.00	100.00	100.00	100.00	100.00	-	-	-		10.00	100.00	10.00	27.00	15.00	15.00	-	-	-	
	Emissions Exceed Thresholds?	No	No	Yes	No	No	No					No	No	Yes	No	No	No				

Project Element	Construction Start Year	Daily Emissions (lb/day)									Daily Emissions (metric tons/day)	Max Annual Emissions (tons/year)									Total Emissions (metric tons)
		ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20	CO2e
ELK GROVE STATION ACCESS (New Intersection West of Existing)																					
Equipment		3.15	18.55	33.90	0.04	1.53	1.41	3,851.34	0.94	0.42	1.79	0.44	2.63	4.47	0.01	0.20	0.19	505.60	0.12	0.06	476.64
Onsite Vehicles		0.07	0.16	0.44	0.00	3.79	0.38	122.32	0.00	0.02	0.06	0.01	0.01	0.04	0.00	0.34	0.03	11.76	0.00	0.00	10.67
Earthmoving		-	-	-	-	19.89	10.82	-	-	-	-	-	-	-	-	0.38	0.21	-	-	-	-
Paving		0.61	-	-	-	-	-	-	-	-	-	0.02	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.16	2.09	2.18	0.01	1.65	0.95	1.71	0.43	0.05	0.49	0.02	0.19	0.28	0.00	0.18	0.05	130.80	0.00	0.01	118.66
Total	2021	3.98	20.81	36.52	0.05	26.86	12.66	3,975.37	1.38	0.49	2.34	0.49	2.83	4.79	0.01	1.11	0.48	648.16	0.13	0.07	605.98
ELK GROVE STATION ACCESS (Fourth Leg of Existing Intersection)																					
Equipment		3.15	18.55	33.90	0.04	1.53	1.41	3,851.34	0.94	0.42	1.79	0.44	2.63	4.47	0.01	0.20	0.19	505.60	0.12	0.06	476.64
Onsite Vehicles		0.07	0.16	0.44	0.00	3.79	0.38	122.32	0.00	0.02	0.06	0.01	0.01	0.04	0.00	0.34	0.03	11.76	0.00	0.00	10.67
Earthmoving		-	-	-	-	19.85	10.82	-	-	-	-	-	-	-	-	0.38	0.21	-	-	-	-
Paving		0.53	-	-	-	-	-	-	-	-	-	0.02	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.16	2.09	2.18	0.01	1.65	0.95	1.71	0.43	0.05	0.49	0.02	0.19	0.28	0.00	0.18	0.05	130.80	0.00	0.01	118.66
Total	2021	3.90	20.81	36.52	0.05	26.82	12.66	3,975.37	1.38	0.49	2.34	0.48	2.83	4.79	0.01	1.11	0.48	648.16	0.13	0.07	605.98
CITY COLLEGE STATION																					
Equipment		8.03	39.75	99.90	0.10	3.17	3.06	9,735.88	1.40	0.63	4.52	0.52	2.46	6.20	0.01	0.22	0.21	570.81	0.11	0.05	534.42
Onsite Vehicles		0.07	0.38	0.05	0.13	0.33	0.00	3.15	0.01	3.16	0.31	0.00	0.01	0.02	0.00	0.27	0.03	7.58	0.00	0.00	6.88
Earthmoving		-	-	-	-	19.62	10.79	-	-	-	-	-	-	-	-	0.13	0.07	-	-	-	-
Paving		0.00	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.19	3.53	2.38	0.02	2.31	0.96	2.37	0.61	0.06	0.66	0.01	0.14	0.10	0.00	0.10	0.03	73.29	0.00	0.01	66.49
Total	2023	8.29	43.66	102.34	0.25	25.43	13.91	9,741.40	2.01	3.84	5.48	0.53	2.61	6.33	0.01	0.72	0.33	651.68	0.12	0.06	607.79
MIDTOWN SACRAMENTO STATION																					
Equipment		8.03	39.75	99.90	0.10	3.17	3.06	9,735.88	1.40	0.63	4.52	0.66	3.18	7.70	0.01	0.29	0.27	700.12	0.16	0.07	657.67
Onsite Vehicles		0.10	0.29	0.59	0.00	6.94	0.69	190.95	0.01	0.02	0.09	0.01	0.02	0.04	0.00	0.37	0.04	11.39	0.00	0.00	10.34
Earthmoving		-	-	-	-	19.71	10.80	-	-	-	-	-	-	-	-	0.32	0.17	-	-	-	-
Paving		0.28	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.19	3.53	2.38	0.02	2.31	0.96	2.37	0.61	0.06	0.66	0.02	0.19	0.24	0.00	0.17	0.05	122.52	0.00	0.01	111.15
Total	2021	8.60	43.57	102.87	0.12	32.13	14.61	9,929.19	2.01	0.71	5.27	0.68	3.38	7.97	0.01	1.14	0.53	834.04	0.16	0.08	779.16
OLD NORTH SACRAMENTO STATION																					
Equipment		8.03	39.75	99.90	0.10	3.17	3.06	9,735.88	1.40	0.63	4.52	0.74	3.77	8.44	0.01	0.32	0.30	823.61	0.18	0.08	772.75
Onsite Vehicles		0.10	0.29	0.59	0.00	6.94	0.69	190.95	0.01	0.02	0.09	0.01	0.02	0.05	0.00	0.44	0.04	13.46	0.00	0.00	12.21
Earthmoving		-	-	-	-	19.77	10.81	-	-	-	-	-	-	-	-	0.32	0.17	-	-	-	-
Paving		0.20	-	-	-	-	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.19	3.53	2.38	0.02	2.31	0.96	2.37	0.61	0.06	0.66	0.02	0.23	0.24	0.00	0.19	0.05	138.69	0.00	0.01	125.82
Total	2023	8.51	43.57	102.87	0.12	32.20	14.62	9,929.19	2.01	0.71	5.27	0.77	4.02	8.72	0.01	1.27	0.57	975.77	0.18	0.09	910.78
NATOMAS / SACRAMENTO AIRPORT STATION																					
Equipment		8.03	39.75	99.90	0.10	3.17	3.06	9,735.88	1.40	0.63	4.52	0.65	3.17	7.69	0.01	0.29	0.27	689.00	0.16	0.07	656.63
Onsite Vehicles		0.10	0.29	0.59	0.00	6.94	0.69	190.95	0.01	0.02	0.09	0.01	0.01	0.03	0.00	0.34	0.03	10.12	0.00	0.00	9.18
Earthmoving		-	-	-	-	19.95	10.84	-	-	-	-	-	-	-	-	0.26	0.14	-	-	-	-
Paving		0.44	-	-	-	-	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.19	3.53	2.38	0.02	2.31	0.96	2.37	0.61	0.06	0.66	0.01	0.14	0.19	0.00	0.13	0.04	93.96	0.00	0.01	85.24
Total	2021	8.76	43.57	102.87	0.12	32.38	14.64	9,929.19	2.01	0.71	5.27	0.68	3.33	7.91	0.01	1.01	0.48	803.09	0.16	0.08	751.06
NATOMAS MAINTENANCE & LAYOVER FACILITY																					
Equipment		8.03	39.75	99.90	0.10	3.17	3.06	9,735.88	1.40	0.63	4.52	1.45	8.14	16.14	0.02	0.61	0.58	1,822.93	0.34	0.15	1,702.35
Onsite Vehicles		0.10	0.29	0.59	0.00	6.94	0.69	190.95	0.01	0.02	0.09	0.02	0.05	0.10	0.00	1.11	0.11	31.40	0.00	0.00	28.49
Earthmoving		-	-	-	-	19.97	10.84	-	-	-	-	-	-	-	-	0.45	0.24	-	-	-	-
Paving		0.07	-	-	-	-	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.19	3.53	2.38	0.02	2.31	0.96	2.37	0.61	0.06	0.66	0.03	0.58	0.36	0.00	0.38	0.11	292.83	0.00	0.02	265.65
Total	Programmatic	8.39	43.57	102.87	0.12	32.39	14.65	9,929.19	2.01	0.71	5.27	1.50	8.77	16.61	0.02	2.54	1.04	2,147.16	0.34	0.17	1,996.49
TRACK CURVE RECONSTRUCTION SOUTH OF DESMOND RD																					
Equipment		5.56	21.51	77.11	0.06	2.16	2.08	5,936.26	0.94	0.42	2.75	0.05	0.23	0.68	0.00	0.02	0.02	55.92	0.01	0.01	52.42
Onsite Vehicles		0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.02	0.00	0.69	0.00	0.00	0.63
Earthmoving		-	-	-	-	19.58	10.79	-	-	-	-	-	-	-	-	0.02	0.01	-	-	-	-
Paving		0.00	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.96	1.79	0.45	0.05	0.51	0.00	0.01	0.01	0.00	0.01	0.00	7.14	0.00	0.00	6.48
Total	2022	5.78	23.92	79.77	0.07	28.03	13.37	6,065.29	1.40	0.49	3.31	0.06	0.25	0.70	0.00	0.07	0.04	63.74	0.01	0.01	59.52
TRACK CURVE RECONSTRUCTION NORTH OF ELK GROVE STATION																					
Equipment		5.56	21.51	77.11	0.06	2.16	2.08	5,936.26	0.94	0.42	2.75	0.05	0.23	0.68	0.00	0.02	0.02	55.92	0.01	0.01	52.42
Onsite Vehicles		0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.02	0.00	0.69	0.00	0.00	0.63
Earthmoving		-	-	-	-	19.58	10.79	-	-	-	-	-	-	-	-	0.02	0.01	-	-	-	-
Paving		0.00	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.96	1.79	0.45	0.05	0.51	0.00	0.01	0.01	0.00	0.01	0.00	7.14	0.00	0.00	6.48
Total	2022	5.78	23.92	79.77	0.07	28.02	13.37	6,065.29	1.40	0.49	3.31	0.06	0.25	0.70	0.00	0.07	0.04	63.74	0.01	0.01	59.52
PHILLIPS SIDING UPGRADE & EXTENSION																					
Equipment		5.56	21.51	77.11	0.06	2.16	2.08	5,936.26	0.94	0.42	2.75	0.11	0.47	1.37	0.00	0.05	0.04	111.83	0.02	0.01	104.84
Onsite Vehicles		0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.05	0.00	1.38	0.00	0.00	1.25
Earthmoving		-	-	-	-	20.70	10.93	-	-	-	-	-	-	-	-	0.03	0.02	-	-	-	-
Paving		0.01	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.96	1.79	0.45	0.05	0.51	0.00	0.02	0.02	0.00	0.02	0.01	14.28	0.00	0.00	12.95
Total	2021	5.79	23.92	79.77	0.07	29.14	13.51	6,065.29	1.40	0.49	3.31	0.11	0.49	1.39	0.00	0.15	0.07	127.49	0.02	0.01	119.04
POLLOCK SIDING UPGRADE																					
Equipment		5.56	21.51	77.11	0.06	2.16	2.08	5,936.26	0.94	0.42	2.75	0.11	0.47	1.37	0.00	0.05	0.04	111.83	0.02	0.01	104.84
Onsite Vehicles		0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.05	0.00	1.38	0.00	0.00	1.25
Earthmoving		-	-	-	-	19.58	10.79	-	-	-	-	-	-	-	-	0.03	0.02	-	-	-	-
Paving		0.00	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.96	1.79	0.45	0.05	0.51	0.00	0.02	0.02	0.00	0.02	0.01	14.28	0.00	0.00	12.95
Total	2023	5.78	23.92	79.77	0.07	28.03	13.37	6,065.29	1.40	0.49	3.31	0.11	0.49	1.39	0.00	0.15	0.07	127.49	0.02	0.01	119.04
SOUTH SACRAMENTO SIDING UPGRADE																					
Equipment		5.56	21.51	77.11	0.06	2.16	2.08	5,936.26	0.94	0.42	2.75	0.26	1.04	3.36	0.00	0.11	0.10	271.40	0.05	0.02	253.40
Onsite Vehicles		0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06	0.00	0.00	0.01	0.00	0.12	0.01	2.87	0.00	0.00	2.60
Earthmoving		-	-	-	-	19.57	10.79	-	-	-	-	-	-	-	-	0.03	0.02	-	-	-	-
Paving		0.00	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.96	1.79	0.45	0.05	0.51	0.00	0.06	0.03	0.00	0.03	0.01	26.43	0.00	0.00	23.98
Total	2023	5.78	23.92	79.77	0.07	28.01	13.37	6,065.29	1.40	0.49	3.31	0.26	1.10	3.39	0.00	0.29	0.14	300.69	0.05	0.02	279.98
DEL PASO SIDING UPGRADE & EXTENSION																					
Equipment		8.03	39.75	99.90	0.10	3.17	3.06	9,735.88	1.40	0.63	4.52	0.81	3.98	9.68	0.01	0.35	0.33	917.96	0.18	0.08	859.17
Onsite Vehicles		0.10	0.29	0.59	0.00	6.94	0.69	190.95	0.01	0.02	0.09	0.01	0.02	0.04	0.00	0.45	0.04	12.41	0.00	0.00	11.36
Earthmoving		-	-	-	-	20.39	10.89	-	-	-	-	-	-	-	-	0.20	0.11	-	-	-	-
Paving		0.01	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.19	3.53	2.38	0.02	2.31	0.96	2.37	0.61	0.06	0.66	0.01	0.23	0.15	0.00	0.15	0.04	118.02	0.00	0.01	107.67
Total	2021	8.32	43.57	102.87	0.12	32.82	14.70	9,929.19	2.01	0.71	5.27	0.83	4.23	9.87	0.01	1.15	0.52	1,048.39	0.18	0.09	977.59
ELK GROVE SIDING																					
Equipment		8.03	39.75	99.90	0.10	3.17	3.06	9,735.88	1.40	0.63	4.52	0.43	2.19	5.09	0.01	0.18	0.17	509.14	0.10	0.04	467.95
Onsite Vehicles		0.10	0.29	0.59	0.00	6.94	0.69	190.95	0.01	0.02	0.09	0.00	0.01	0.02	0.00	0.25	0.02	6.90	0.00	0.00	6.26
Earthmoving		-	-	-	-	20.39	10.89	-	-	-	-	-	-	-	-	0.10	0.05	-	-	-	-
Paving		0.00	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.19	3.53	2.38	0.02	2.31	0.96	2.37	0.61	0.06	0.66	0.01	0.13	0.08	0.00	0.08	0.02	64.40	0.00	0.00	58.42
Total	2021	8.32	43.57	102.87	0.12	32.83	14.69	9,929.19	2.01	0.71	5.27	0.44	2.33	5.19	0.01	0.62	0.28	571.44	0.10	0.05	532.63
NEW CROSSOVER																					
Equipment		5.56	21.51	77.11	0.06	2.16	2.08	5,936.26	0.94	0.42	2.75	0.11	0.47	1.37	0.00	0.05	0.04	111.83	0.02	0.01	104.84
Onsite Vehicles		0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.05	0.00	1.38	0.00	0.00	1.25
Earthmoving		-	-	-	-	19.58	10.79	-	-	-	-	-	-	-	-	0.03	0.02	-	-	-	-
Paving		0.00	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.96	1.79	0.45	0.05	0.51	0.00	0.02	0.02	0.00	0.02	0.01	14.28	0.00	0.00	12.95
Total	2023	5.78	23.92	79.77	0.07	28.03	13.37	6,065.29	1.40	0.49	3.31	0.11	0.49	1.39	0.00	0.15	0.07	127.49	0.02	0.01	119.04
Max Daily / Annual	**2021**	**43.77**	**219.82**	**527.77**	**0.60**	**186.15**	**84.82**	**49,757.44**	**10.81**	**3.81**	**26.71**	**3.24**	**16.60**	**37.13**	**0.04**	**5.17**	**2.36**	**4,812.60**	**0.75**	**0.39**	**3,765.36**
	2022	**11.57**	**47.84**	**159.54**	**0.14**	**56.05**	**26.74**	**12,130.59**	**2.80**	**0.99**	**6.63**	**0.11**	**0.49**	**1.39**	**0.00**	**0.15**	**0.07**	**127.49**	**0.02**	**0.01**	**119.04**
	2023	**34.16**	**159.00**	**444.52**	**0.59**	**141.70**	**68.65**	**37,866.47**	**8.22**	**6.03**	**20.69**	**1.78**	**8.72**	**21.24**	**0.02**	**2.57**	**1.19**	**2,183.12**	**0.39**	**0.20**	**2,036.64**
	SMAQMD Thresholds	-	-	85.00	-	80.00	82.00	-	-	-	-	-	-	-	-	14.60	15.00	-	-	-	1,100.00
	Emissions Exceed Thresholds?	-	-	Yes	-	Yes	Yes					-	-	-	-	No	No				Yes
								CO2	CH4	N20	CO2e							CO2	CH4	N20	CO2e
Maximum Annual GHG Emissions Across Entire Project Alignment								65,751.93	14.22	5.01	35.29							5277	0.98	0.51	4928
	2021							24,261.17	5.60	1.97	13.25							255	0.05	0.02	238
	2022							49,997.06	11.02	7.01	27.32							2566	0.46	0.24	2394
	2023																	8068	1.49	0.77	7560
	Total																				

Construction Emissions by Location **Construction Emissions by Location**

			Mitigated Daily Emissions (lb/day)									Daily Emissions (metric tons/day)	Mitigated Maximum Annual Emissions (tons/year)									Total Emissions (metric tons)
Project Element	Project Element	Construction Start Year	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20	CO2e
LODE STATION	LODE STATION																					
Equipment	Equipment		1.31	44.27	13.05	0.10	0.20	0.19	9735.88	1.40	0.63	4.52	0.08	2.95	0.50	0.01	0.01	0.01	585.40	0.14	0.06	550.93
Onsite Vehicles	Onsite Vehicles		0.10	0.29	0.59	0.00	2.99	0.30	190.95	0.01	0.02	0.09	0.01	0.02	0.05	0.00	0.16	0.02	12.50	0.00	0.00	11.34
Earthmoving	Earthmoving		-	-	-		7.79	4.22	-	-	-		-	-	-		0.15	0.08	-	-	-	
Paving	Paving		0.19	-	-		-	-	-	-	-		0.01	-	-		-	-	-	-	-	
Offsite Vehicles	Offsite Vehicles		0.19	3.53	2.38	0.02	2.31	0.06	2.37	0.61	0.06	0.66	0.02	0.20	0.28	0.00	0.19	0.06	136.88	0.00	0.01	124.10
Total	Total	2021	*1.78*	*48.09*	*16.01*	*0.12*	*13.28*	*4.78*	*9929.19*	*2.01*	*0.71*	*5.27*	*0.11*	*3.17*	*0.82*	*0.01*	*0.51*	*0.16*	*734.79*	*0.14*	*0.08*	*686.45*
LODE STATION - SOUTH ALTERNATIVE	LODE STATION - SOUTH ALTERNATIVE																					
Equipment	Equipment		1.31	44.27	13.05	0.10	0.20	0.19	9735.88	1.40	0.63	4.52	0.08	2.95	0.50	0.01	0.01	0.01	585.40	0.14	0.06	550.93
Onsite Vehicles	Onsite Vehicles		0.10	0.29	0.59	0.00	2.99	0.30	190.95	0.01	0.02	0.09	0.01	0.02	0.05	0.00	0.16	0.02	12.50	0.00	0.00	11.34
Earthmoving	Earthmoving		-	-	-		7.88	4.23	-	-	-		-	-	-		0.15	0.08	-	-	-	
Paving	Paving		0.21	-	-		-	-	-	-	-		0.01	-	-		-	-	-	-	-	
Offsite Vehicles	Offsite Vehicles		0.19	3.53	2.38	0.02	2.31	0.06	2.37	0.61	0.06	0.66	0.02	0.20	0.28	0.00	0.19	0.06	136.88	0.00	0.01	124.10
Total	Total	2021	1.81	48.09	16.01	0.12	13.37	4.79	9929.19	2.01	0.71	5.27	0.11	3.17	0.82	0.01	0.52	0.17	734.79	0.14	0.08	686.45
TRACK CURVE RECONSTRUCTION EAST MARCH LN TO EAST SWAIN RD	TRACK CURVE RECONSTRUCTION EAST MARCH LN TO EAST SWAIN RD																					
Equipment	Equipment		0.85	22.27	10.02	0.06	0.14	0.13	5936.26	0.94	0.42	2.75	0.01	0.23	0.07	0.00	0.00	0.00	55.94	0.01	0.01	52.42
Onsite Vehicles	Onsite Vehicles		0.06	0.19	0.40	0.00	1.96	0.20	127.24	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.01	0.00	0.69	0.00	0.00	0.63
Earthmoving	Earthmoving		-	-	-		7.64	4.21	-	-	-		-	-	-		0.01	0.00	-	-	-	
Paving	Paving		0.00	-	-		-	-	-	-	-		0.00	-	-		-	-	-	-	-	
Offsite Vehicles	Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.01	0.01	0.00	0.01	0.00	7.14	0.00	0.00	6.48
Total	Total	2022	1.07	24.68	12.68	0.07	11.47	4.60	6065.29	1.40	0.49	3.31	0.01	0.24	0.08	0.00	0.03	0.01	63.77	0.01	0.01	59.52
TRACK CURVE RECONSTRUCTION NORTH OF NORTH NEW HOPE RD	TRACK CURVE RECONSTRUCTION NORTH OF NORTH NEW HOPE RD																					
Equipment	Equipment		0.85	22.27	10.02	0.06	0.14	0.13	5936.26	0.94	0.42	2.75	0.01	0.23	0.07	0.00	0.00	0.00	55.94	0.01	0.01	52.42
Onsite Vehicles	Onsite Vehicles		0.06	0.19	0.40	0.00	1.96	0.20	127.24	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.01	0.00	0.69	0.00	0.00	0.63
Earthmoving	Earthmoving		-	-	-		7.64	4.21	-	-	-		-	-	-		0.01	0.00	-	-	-	
Paving	Paving		0.00	-	-		-	-	-	-	-		0.00	-	-		-	-	-	-	-	
Offsite Vehicles	Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.01	0.01	0.00	0.01	0.00	7.14	0.00	0.00	6.48
Total	Total	2022	1.07	24.68	12.68	0.07	11.47	4.60	6065.29	1.40	0.49	3.31	0.01	0.24	0.08	0.00	0.03	0.01	63.77	0.01	0.01	59.52
HAMMER LANE SIDING UPGRADE	HAMMER LANE SIDING UPGRADE																					
Equipment	Equipment		0.85	22.27	10.02	0.06	0.14	0.13	5936.26	0.94	0.42	2.75	0.02	0.46	0.13	0.00	0.00	0.00	111.86	0.02	0.01	104.84
Onsite Vehicles	Onsite Vehicles		0.06	0.19	0.40	0.00	1.96	0.20	127.24	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.02	0.00	1.38	0.00	0.00	1.25
Earthmoving	Earthmoving		-	-	-		7.64	4.21	-	-	-		-	-	-		0.01	0.01	-	-	-	
Paving	Paving		0.00	-	-		-	-	-	-	-		0.00	-	-		-	-	-	-	-	
Offsite Vehicles	Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.02	0.02	0.00	0.02	0.01	14.28	0.00	0.00	12.95
Total	Total	2023	1.07	24.68	12.68	0.07	11.48	4.60	6065.29	1.40	0.49	3.31	0.02	0.49	0.16	0.00	0.06	0.02	127.52	0.02	0.01	119.04
THORNTON SIDING UPGRADE & EXTENSION	THORNTON SIDING UPGRADE & EXTENSION																					
Equipment	Equipment		0.85	22.27	10.02	0.06	0.14	0.13	5936.26	0.94	0.42	2.75	0.03	0.92	0.27	0.00	0.00	0.00	223.69	0.05	0.02	209.67
Onsite Vehicles	Onsite Vehicles		0.06	0.19	0.40	0.00	1.96	0.20	127.24	0.00	0.01	0.06	0.00	0.00	0.01	0.00	0.04	0.00	2.76	0.00	0.00	2.58
Earthmoving	Earthmoving		-	-	-		8.48	4.31	-	-	-		-	-	-		0.03	0.01	-	-	-	
Paving	Paving		0.00	-	-		-	-	-	-	-		0.00	-	-		-	-	-	-	-	
Offsite Vehicles	Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.05	0.05	0.00	0.04	0.01	28.56	0.00	0.00	25.91
Total	Total	2023	1.08	24.68	12.68	0.07	12.32	4.70	6065.29	1.40	0.49	3.31	0.04	0.97	0.33	0.00	0.11	0.03	255.00	0.05	0.02	238.08
LODE SIDING	LODE SIDING																					
Equipment	Equipment		0.85	22.27	10.02	0.06	0.14	0.13	5936.26	0.94	0.42	2.75	0.06	1.85	0.54	0.00	0.01	0.01	447.35	0.09	0.04	419.35
Onsite Vehicles	Onsite Vehicles		0.06	0.19	0.40	0.00	1.96	0.20	127.24	0.00	0.01	0.06	0.00	0.01	0.02	0.00	0.08	0.01	5.51	0.00	0.00	5.00
Earthmoving	Earthmoving		-	-	-		8.71	4.34	-	-	-		-	-	-		0.06	0.03	-	-	-	
Paving	Paving		0.01	-	-		-	-	-	-	-		0.00	-	-		-	-	-	-	-	
Offsite Vehicles	Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.01	0.10	0.10	0.00	0.08	0.02	57.12	0.00	0.00	51.82
Total	Total	2021	1.09	24.68	12.68	0.07	12.54	4.73	6065.29	1.40	0.49	3.31	0.07	1.95	0.65	0.01	0.23	0.07	509.98	0.09	0.05	476.17
Max Daily / Annual	**Max Daily / Annual**	**2021**	**2.09**	**72.77**	**28.69**	**0.19**	**25.82**	**9.52**	**15,994.69**	**3.41**	**1.20**	**8.58**	**0.18**	**5.12**	**1.47**	**0.01**	**0.74**	**0.23**	**1,244.77**	**0.23**	**0.12**	**1,162.63**
		2022	**2.14**	**49.35**	**25.36**	**0.14**	**22.95**	**9.19**	**12,130.59**	**2.80**	**0.99**	**6.63**	**0.02**	**0.49**	**0.16**	**0.00**	**0.06**	**0.02**	**127.54**	**0.02**	**0.01**	**119.04**
		2023	**2.15**	**49.35**	**25.36**	**0.14**	**23.79**	**9.30**	**12,130.59**	**2.80**	**0.99**	**6.63**	**0.05**	**1.46**	**0.49**	**0.00**	**0.17**	**0.05**	**382.52**	**0.07**	**0.04**	**357.13**
		SJVAPCD Thresholds	100.00	100.00	100.00	100.00	100.00	100.00	-	-	-		10.00	100.00	10.00	27.00	15.00	15.00	-	-	-	
		Emissions Exceed Thresholds?	No	No	No	No	No	No					No	No	No	No	No	No				

Project Element	Project Element	Construction Start Year	Mitigated Daily Emissions (lb/day)									Daily Emissions (metric tons/day)	Mitigated Maximum Annual Emissions (tons/year)									Total Emissions (metric tons)
			ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20	CO2e
ELK GROVE STATION ACCESS (New Intersection West of Existing)	ELK GROVE STATION ACCESS (New Intersection West of Existing)																					
Equipment	Equipment		0.52	22.32	3.40	0.04	0.07	0.07	3851.34	0.94	0.42	1.79	0.07	2.64	0.38	0.01	0.01	0.01	505.62	0.12	0.06	476.64
Onsite Vehicles	Onsite Vehicles		0.07	0.16	0.44	0.00	1.64	0.17	122.32	0.00	0.02	0.06	0.01	0.01	0.04	0.00	0.15	0.02	11.76	0.00	0.00	10.67
Earthmoving	Earthmoving		-	-	-	-	7.95	4.24	-	-	-	-	-	-	-	-	0.15	0.08	-	-	-	-
Paving	Paving		0.61	-	-	-	-	-	-	-	-	-	0.02	-	-	-	-	-	-	-	-	-
Offsite Vehicles	Offsite Vehicles		0.16	2.09	2.18	0.01	1.65	0.05	1.71	0.43	0.05	0.49	0.02	0.19	0.28	0.00	0.18	0.05	130.80	0.00	0.01	118.66
Total	Total	2021	1.35	24.57	6.02	0.05	11.31	4.54	3,975.37	1.38	0.49	2.34	0.11	2.84	0.70	0.01	0.49	0.16	648.19	0.13	0.07	605.98
ELK GROVE STATION ACCESS (Fourth Leg of Existing Intersection)	ELK GROVE STATION ACCESS (Fourth Leg of Existing Intersection)																					
Equipment	Equipment		0.52	22.32	3.40	0.04	0.07	0.07	3851.34	0.94	0.42	1.79	0.07	2.64	0.38	0.01	0.01	0.01	505.62	0.12	0.06	476.64
Onsite Vehicles	Onsite Vehicles		0.07	0.16	0.44	0.00	1.64	0.17	122.32	0.00	0.02	0.06	0.01	0.01	0.04	0.00	0.15	0.02	11.76	0.00	0.00	10.67
Earthmoving	Earthmoving		-	-	-	-	7.91	4.24	-	-	-	-	-	-	-	-	0.15	0.08	-	-	-	-
Paving	Paving		0.53	-	-	-	-	-	-	-	-	-	0.02	-	-	-	-	-	-	-	-	-
Offsite Vehicles	Offsite Vehicles		0.16	2.09	2.18	0.01	1.65	0.05	1.71	0.43	0.05	0.49	0.02	0.19	0.28	0.00	0.18	0.05	130.80	0.00	0.01	118.66
Total	Total	2021	1.28	24.57	6.02	0.05	11.27	4.53	3,975.37	1.38	0.49	2.34	0.11	2.84	0.70	0.01	0.49	0.16	648.19	0.13	0.07	605.98
CITY COLLEGE STATION	CITY COLLEGE STATION																					
Equipment	Equipment		1.31	44.27	13.05	0.10	0.20	0.19	9735.88	1.40	0.63	4.52	0.08	2.56	0.64	0.01	0.01	0.01	570.84	0.11	0.05	534.42
Onsite Vehicles	Onsite Vehicles		0.10	0.29	0.59	0.00	2.99	0.30	190.95	0.01	0.02	0.09	0.00	0.01	0.02	0.00	0.12	0.01	7.58	0.00	0.00	6.88
Earthmoving	Earthmoving		-	-	-	-	7.69	4.21	-	-	-	-	-	-	-	-	0.05	0.03	-	-	-	-
Paving	Paving		0.00	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles	Offsite Vehicles		0.19	3.53	2.38	0.02	2.31	0.06	2.37	0.61	0.06	0.66	0.01	0.14	0.10	0.00	0.10	0.03	73.29	0.00	0.01	66.49
Total	Total	2023	1.50	48.09	16.01	0.12	13.18	4.77	9,929.19	2.01	0.71	5.27	0.09	2.71	0.76	0.01	0.28	0.08	651.71	0.12	0.06	607.78
MIDTOWN SACRAMENTO STATION	MIDTOWN SACRAMENTO STATION																					
Equipment	Equipment		1.31	44.27	13.05	0.10	0.20	0.19	9735.88	1.40	0.63	4.52	0.10	3.16	0.73	0.01	0.01	0.01	700.15	0.16	0.07	657.93
Onsite Vehicles	Onsite Vehicles		0.10	0.29	0.59	0.00	2.99	0.30	190.95	0.01	0.02	0.09	0.01	0.02	0.04	0.00	0.16	0.02	11.39	0.00	0.00	10.34
Earthmoving	Earthmoving		-	-	-	-	7.77	4.22	-	-	-	-	-	-	-	-	0.13	0.07	-	-	-	-
Paving	Paving		0.28	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles	Offsite Vehicles		0.19	3.53	2.38	0.02	2.31	0.06	2.37	0.61	0.06	0.66	0.02	0.19	0.24	0.00	0.17	0.05	122.52	0.00	0.01	111.15
Total	Total	2021	1.87	48.09	16.01	0.12	13.26	4.78	9,929.19	2.01	0.71	5.27	0.12	3.37	1.01	0.01	0.47	0.15	834.06	0.16	0.08	779.16
OLD NORTH SACRAMENTO STATION	OLD NORTH SACRAMENTO STATION																					
Equipment	Equipment		1.31	44.27	13.05	0.10	0.20	0.19	9735.88	1.40	0.63	4.52	0.11	3.88	0.83	0.01	0.02	0.02	823.63	0.18	0.08	772.75
Onsite Vehicles	Onsite Vehicles		0.10	0.29	0.59	0.00	2.99	0.30	190.95	0.01	0.02	0.09	0.01	0.02	0.05	0.00	0.19	0.02	13.46	0.00	0.00	12.21
Earthmoving	Earthmoving		-	-	-	-	7.84	4.24	-	-	-	-	-	-	-	-	0.13	0.07	-	-	-	-
Paving	Paving		0.20	-	-	-	-	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-
Offsite Vehicles	Offsite Vehicles		0.19	3.53	2.38	0.02	2.31	0.06	2.37	0.61	0.06	0.66	0.02	0.23	0.24	0.00	0.19	0.05	138.69	0.00	0.01	125.82
Total	Total	2023	1.79	48.09	16.01	0.12	13.33	4.79	9,929.19	2.01	0.71	5.27	0.14	4.13	1.11	0.01	0.52	0.16	975.79	0.18	0.09	910.78
NATOMAS / SACRAMENTO AIRPORT STATION	NATOMAS / SACRAMENTO AIRPORT STATION																					
Equipment	Equipment		1.31	44.27	13.05	0.10	0.20	0.19	9735.88	1.40	0.63	4.52	0.09	3.16	0.72	0.01	0.01	0.01	699.02	0.16	0.07	656.63
Onsite Vehicles	Onsite Vehicles		0.10	0.29	0.59	0.00	2.99	0.30	190.95	0.01	0.02	0.09	0.01	0.01	0.03	0.00	0.14	0.01	10.12	0.00	0.00	9.18
Earthmoving	Earthmoving		-	-	-	-	8.01	4.26	-	-	-	-	-	-	-	-	0.10	0.05	-	-	-	-
Paving	Paving		0.44	-	-	-	-	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-
Offsite Vehicles	Offsite Vehicles		0.19	3.53	2.38	0.02	2.31	0.06	2.37	0.61	0.06	0.66	0.01	0.14	0.10	0.00	0.13	0.04	93.96	0.00	0.01	85.24
Total	Total	2021	2.04	48.09	16.01	0.12	13.51	4.81	9,929.19	2.01	0.71	5.27	0.12	3.31	0.84	0.01	0.39	0.12	803.11	0.16	0.08	751.06
NATOMAS MAINTENANCE & LAYOVER FACILITY	NATOMAS MAINTENANCE & LAYOVER FACILITY																					
Equipment	Equipment		1.31	44.27	13.05	0.10	0.20	0.19	9735.88	1.40	0.63	4.52	0.24	9.14	1.85	0.02	0.03	0.03	1822.96	0.34	0.15	1702.35
Onsite Vehicles	Onsite Vehicles		0.10	0.29	0.59	0.00	2.99	0.30	190.95	0.01	0.02	0.09	0.02	0.05	0.10	0.00	0.48	0.05	31.40	0.00	0.00	28.49
Earthmoving	Earthmoving		-	-	-	-	8.03	4.26	-	-	-	-	-	-	-	-	0.18	0.10	-	-	-	-
Paving	Paving		0.07	-	-	-	-	-	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-
Offsite Vehicles	Offsite Vehicles		0.19	3.53	2.38	0.02	2.31	0.06	2.37	0.61	0.06	0.66	0.03	0.58	0.36	0.00	0.38	0.11	292.83	0.00	0.02	265.65
Total	Total	Programmatic	1.66	48.09	16.01	0.12	13.53	4.82	9,929.19	2.01	0.71	5.27	0.29	9.77	2.31	0.02	1.07	0.28	2,147.19	0.34	0.17	1,996.49
TRACK CURVE RECONSTRUCTION SOUTH OF DESMOND RD	TRACK CURVE RECONSTRUCTION SOUTH OF DESMOND RD																					
Equipment	Equipment		0.85	22.27	10.02	0.06	0.14	0.13	5936.26	0.94	0.42	2.75	0.01	0.23	0.07	0.00	0.00	0.00	55.94	0.01	0.01	52.42
Onsite Vehicles	Onsite Vehicles		0.06	0.19	0.40	0.00	1.96	0.20	127.24	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.01	0.00	0.69	0.00	0.00	0.63
Earthmoving	Earthmoving		-	-	-	-	7.64	4.21	-	-	-	-	-	-	-	-	0.01	0.00	-	-	-	-
Paving	Paving		0.00	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles	Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.01	0.01	0.00	0.01	0.00	7.14	0.00	0.00	6.48
Total	Total	2022	1.07	24.68	12.68	0.07	11.48	4.60	6,065.29	1.40	0.49	3.31	0.01	0.24	0.08	0.00	0.03	0.01	63.77	0.01	0.01	59.52
TRACK CURVE RECONSTRUCTION NORTH OF ELK GROVE STATION	TRACK CURVE RECONSTRUCTION NORTH OF ELK GROVE STATION																					
Equipment	Equipment		0.85	22.27	10.02	0.06	0.14	0.13	5936.26	0.94	0.42	2.75	0.01	0.23	0.07	0.00	0.00	0.00	55.94	0.01	0.01	52.42
Onsite Vehicles	Onsite Vehicles		0.06	0.19	0.40	0.00	1.96	0.20	127.24	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.01	0.00	0.69	0.00	0.00	0.63
Earthmoving	Earthmoving		-	-	-	-	7.64	4.21	-	-	-	-	-	-	-	-	0.01	0.00	-	-	-	-
Paving	Paving		0.00	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles	Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.01	0.01	0.00	0.01	0.00	7.14	0.00	0.00	6.48
Total	Total	2022	1.07	24.68	12.68	0.07	11.47	4.60	6,065.29	1.40	0.49	3.31	0.01	0.24	0.08	0.00	0.03	0.01	63.77	0.01	0.01	59.52
PHILLIPS SIDING UPGRADE & EXTENSION	PHILLIPS SIDING UPGRADE & EXTENSION																					
Equipment	Equipment		0.85	22.27	10.02	0.06	0.14	0.13	5936.26	0.94	0.42	2.75	0.02	0.46	0.13	0.00	0.00	0.00	111.86	0.02	0.01	104.84
Onsite Vehicles	Onsite Vehicles		0.06	0.19	0.40	0.00	1.96	0.20	127.24	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.02	0.00	1.38	0.00	0.00	1.25
Earthmoving	Earthmoving		-	-	-	-	8.76	4.35	-	-	-	-	-	-	-	-	0.01	0.01	-	-	-	-
Paving	Paving		0.01	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles	Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.02	0.02	0.00	0.02	0.01	14.28	0.00	0.00	12.95
Total	Total	2023	1.08	24.68	12.68	0.07	12.60	4.74	6,065.29	1.40	0.49	3.31	0.02	0.49	0.16	0.00	0.06	0.02	127.52	0.02	0.01	119.04
POLLOCK SIDING UPGRADE	POLLOCK SIDING UPGRADE																					
Equipment	Equipment		0.85	22.27	10.02	0.06	0.14	0.13	5936.26	0.94	0.42	2.75	0.02	0.46	0.13	0.00	0.00	0.00	111.86	0.02	0.01	104.84
Onsite Vehicles	Onsite Vehicles		0.06	0.19	0.40	0.00	1.96	0.20	127.24	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.02	0.00	1.38	0.00	0.00	1.25
Earthmoving	Earthmoving		-	-	-	-	7.64	4.21	-	-	-	-	-	-	-	-	0.01	0.01	-	-	-	-
Paving	Paving		0.00	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles	Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.02	0.02	0.00	0.02	0.01	14.28	0.00	0.00	12.95
Total	Total	2023	1.07	24.68	12.68	0.07	11.48	4.60	6,065.29	1.40	0.49	3.31	0.02	0.49	0.16	0.00	0.06	0.02	127.52	0.02	0.01	119.04
SOUTH SACRAMENTO SIDING UPGRADE	SOUTH SACRAMENTO SIDING UPGRADE																					
Equipment	Equipment		0.85	22.27	10.02	0.06	0.14	0.13	5936.26	0.94	0.42	2.75	0.04	1.09	0.36	0.00	0.01	0.01	271.42	0.05	0.02	253.40
Onsite Vehicles	Onsite Vehicles		0.06	0.19	0.40	0.00	1.96	0.20	127.24	0.00	0.01	0.06	0.00	0.00	0.01	0.00	0.05	0.01	2.87	0.00	0.00	2.68
Earthmoving	Earthmoving		-	-	-	-	7.63	4.21	-	-	-	-	-	-	-	-	0.01	0.01	-	-	-	-
Paving	Paving		0.00	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles	Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.06	0.03	0.00	0.03	0.01	26.43	0.00	0.00	23.98
Total	Total	2023	1.07	24.68	12.68	0.07	11.47	4.60	6,065.29	1.40	0.49	3.31	0.04	1.15	0.40	0.00	0.10	0.03	300.72	0.05	0.02	279.98
DEL PASO SIDING UPGRADE & EXTENSION	DEL PASO SIDING UPGRADE & EXTENSION																					
Equipment	Equipment		1.31	44.27	13.05	0.10	0.20	0.19	9735.88	1.40	0.63	4.52	0.12	4.20	1.00	0.01	0.02	0.02	917.98	0.18	0.08	859.17
Onsite Vehicles	Onsite Vehicles		0.10	0.29	0.59	0.00	2.99	0.30	190.95	0.01	0.02	0.09	0.01	0.02	0.04	0.00	0.19	0.02	12.41	0.00	0.00	11.26
Earthmoving	Earthmoving		-	-	-	-	8.45	4.32	-	-	-	-	-	-	-	-	0.08	0.04	-	-	-	-
Paving	Paving		0.01	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles	Offsite Vehicles		0.19	3.53	2.38	0.02	2.31	0.06	2.37	0.61	0.06	0.66	0.01	0.23	0.15	0.00	0.15	0.04	118.02	0.00	0.01	107.07
Total	Total	2021	1.60	48.09	16.01	0.12	13.95	4.87	9,929.19	2.01	0.71	5.27	0.14	4.45	1.20	0.01	0.45	0.12	1,048.42	0.18	0.09	977.50
ELK GROVE SIDING	ELK GROVE SIDING																					
Equipment	Equipment		1.31	44.27	13.05	0.10	0.20	0.19	9735.88	1.40	0.63	4.52	0.07	2.34	0.54	0.01	0.01	0.01	580.17	0.10	0.04	467.95
Onsite Vehicles	Onsite Vehicles		0.10	0.29	0.59	0.00	2.99	0.30	190.95	0.01	0.02	0.09	0.00	0.01	0.02	0.00	0.11	0.01	6.90	0.00	0.00	6.26
Earthmoving	Earthmoving		-	-	-	-	8.45	4.31	-	-	-	-	-	-	-	-	0.04	0.02	-	-	-	-
Paving	Paving		0.00	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles	Offsite Vehicles		0.19	3.53	2.38	0.02	2.31	0.06	2.37	0.61	0.06	0.66	0.01	0.13	0.08	0.00	0.08	0.02	64.40	0.00	0.00	58.43
Total	Total	2021	1.59	48.09	16.01	0.12	13.94	4.86	9,929.19	2.01	0.71	5.27	0.08	2.48	0.63	0.01	0.24	0.06	571.46	0.10	0.05	532.63
NEW CROSSOVER	NEW CROSSOVER																					
Equipment	Equipment		0.85	22.27	10.02	0.06	0.14	0.13	5936.26	0.94	0.42	2.75	0.02	0.46	0.13	0.00	0.00	0.00	111.86	0.02	0.01	104.84
Onsite Vehicles	Onsite Vehicles		0.06	0.19	0.40	0.00	1.96	0.20	127.24	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.02	0.00	1.38	0.00	0.00	1.25
Earthmoving	Earthmoving		-	-	-	-	7.64	4.21	-	-	-	-	-	-	-	-	0.01	0.01	-	-	-	-
Paving	Paving		0.00	-	-	-	-	-	-	-	-	-	0.00	-	-	-	-	-	-	-	-	-
Offsite Vehicles	Offsite Vehicles		0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.02	0.02	0.00	0.02	0.01	14.28	0.00	0.00	12.95
Total	Total	2023	1.07	24.68	12.68	0.07	11.48	4.60	6,065.29	1.40	0.49	3.31	0.02	0.49	0.16	0.00	0.06	0.02	127.52	0.02	0.01	119.04
Max Daily / Annual	**Max Daily / Annual**	**2021**	**9.53**	**241.44**	**82.76**	**0.60**	**78.57**	**28.68**	**49,757.44**	**10.01**	**3.81**	**26.71**	**0.58**	**16.93**	**4.65**	**0.04**	**2.10**	**0.63**	**4,032.76**	**0.75**	**0.35**	**3,765.36**
		2022	**2.14**	**49.35**	**25.36**	**0.14**	**22.95**	**9.20**	**12,130.59**	**2.80**	**0.99**	**6.63**	**0.02**	**0.49**	**0.16**	**0.00**	**0.06**	**0.02**	**127.54**	**0.02**	**0.01**	**119.04**
		2023	**6.59**	**170.21**	**70.07**	**0.45**	**60.94**	**23.35**	**38,054.27**	**8.22**	**2.89**	**20.47**	**0.30**	**8.96**	**2.60**	**0.02**	**1.01**	**0.29**	**2,183.25**	**0.39**	**0.20**	**2,036.64**
		SMAQMD Thresholds	-	-	85.00	-	80.00	82.00	-	-	-	-	-	-	-	-	14.60	15.00	-	-	-	1,100.00
		Emissions Exceed Thresholds?	-	-	No	-	No	No	-	-	-	-	-	-	-	-	No	No	-	-	-	Yes
									CO2	CH4	N20	CO2e							CO2	CH4	N20	CO2e
Maximum Annual GHG Emissions Across Entire Project Alignment:	Maximum Annual GHG Emissions Across Entire Project Alignment:								65,751.93	14.22	5.01	35.29							5,277.53	0.98	0.51	4,927.98
		2021																				
		2022							24,261.17	5.60	1.97	13.25							255.08	0.05	0.02	238.08
		2023							50,184.86	11.02	3.88	27.10							2,565.77	0.46	0.24	2,393.76
		Total							140198	31	11	76							8098	1	1	7560

Constrution Energy

Table 4.6-3 Estimated Fuel Consumption During Project Construction

Segment and Facility	Total Emissions (metric tons CO_2e) per Year			Emission Factor (MT CO_2/gallon) a	Fuel Usage b (gallons/Year)			Total Energy (MMBtu)
	2021	2022	2023		2021	2022	2023	
San Joaquin County								
LODI STATION	686	0	0	1.02E-02	67,564	0	0	9,330
LODI STATION - SOUTH ALTERNATIVE	686	0	0	1.02E-02	67,564	0	0	9,330
TRACK CURVE RECONSTRUCTION EAST MARCH LN TO EAST SWAIN RD	0	60	0	1.02E-02	0	5,858	0	809
TRACK CURVE RECONSTRUCTION NORTH OF NORTH NEW HOPE RD	0	60	0	1.02E-02	0	5,858	0	809
HAMMER LANE SIDING UPGRADE	0	0	119	1.02E-02	0	0	11,717	1,618
THORNTON SIDING UPGRADE & EXTENSION	0	0	238	1.02E-02	0	0	23,433	3,236
LODI SIDING	476	0	0	1.02E-02	46,867	0	0	6,472
Sacramento County								
ELK GROVE STATION ACCESS (Fourth Leg of Existing Intersection)	606	0	0	1.02E-02	59,644	0	0	8,236
ELK GROVE STATION ACCESS (Fourth Leg of Existing Intersection)	606	0	0	1.02E-02	59,644	0	0	8,236
CITY COLLEGE STATION	0	0	608	1.02E-02	0	0	59,822	8,261
MIDTOWN SACRAMENTO STATION	779.16	0	0	1.02E-02	76,689	0	0	10,590
OLD NORTH SACRAMENTO STATION	0	0	911	1.02E-02	0	0	89,644	12,379
NATOMAS / SACRAMENTO AIRPORT STATION	751.06	0	0	1.02E-02	73,923	0	0	10,208
TRACK CURVE RECONSTRUCTION SOUTH OF DESMOND RD	0	60	0	1.02E-02	0	5,858	0	809
TRACK CURVE RECONSTRUCTION NORTH OF ELK GROVE STATION	0	60	0	1.02E-02	0	5,858	0	809
PHILLIPS SIDING UPGRADE & EXTENSION	119.04	0	0	1.02E-02	11,717	0	0	1,618
POLLOCK SIDING UPGRADE	0	0	119	1.02E-02	0	0	11,717	1,618
SOUTH SACRAMENTO SIDING UPGRADE	0	0	280	1.02E-02	0	0	27,557	3,806
DEL PASO SIDING UPGRADE & EXTENSION	2021	0	0	1.02E-02	198,917	0	0	27,470
ELK GROVE SIDING	533	0	0	1.02E-02	52,424	0	0	7,239
NEW CROSSOVER	0	0	119	1.02E-02	0	0	11,717	1,618
Total Construction								
Total Construction San Joaquin County	1,163	119	357	1.02E-02	114,431	11,717	35,150	15,802
Total Construction Sacramento County	3,765	119	2,037	1.02E-02	370,607	11,717	200,456	51,179
Amortized Demands (over 30 years)								
Total Construction San Joaquin County					3,814.35	390.56	1,171.67	527
Total Construction Sacramento County					12,353.56	390.56	6,681.88	1,706

a U.S. Energy Information Administration 2016 (https://www.eia.gov/environment/emissions/co2_vol_mass.php)
b Conservatively assumed diesel

Conversion Factors			
Category	**Amount**	**Units**	
Diesel (heat content)	5.8	MMBtu/barrel	http://www.theclimateregistry.org/wp-content/uploads/2017/05/2017-Climate-Registry-Default-Emission-Factors.pdf
Motor Gasoline	5.25	MMBtu/barrel	http://www.theclimateregistry.org/wp-content/uploads/2017/05/2017-Climate-Registry-Default-Emission-Factors.pdf
Natural Gas	0.1	MMBtu/therm	https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references
Propane	0.0913	MMBtu/gallon	https://www.eia.gov/environment/emissions/co2_vol_mass.php
Kerosene	0.135	MMBtu/gallon	https://www.eia.gov/environment/emissions/co2_vol_mass.php
Wood	20	MMBtu/cord	https://www.eia.gov/energyexplained/index.cfm?page=about_btu
Gallons per Barrel	42	gallons/barrel	http://www.theclimateregistry.org/wp-content/uploads/2017/05/2017-Climate-Registry-Default-Emission-Factors.pdf

Project Construction Data Input		

								Project Element																					
								STATIONS										TRACK IMPROVEMENTS												
DESCRIPTION OF EQUIPMENT	Construction Timing	EMPLOYEES PER DAY	HRS/DAY (onsite)	EQUIPMENT LOAD FACTOR (engine operation)	Onsite Miles/Day (vehicles only)	Offsite Miles/Day (vehicles only)	UNITS	LODI STATION	LODI STATION - SOUTH ALTERNATIVE	ELK GROVE STATION ACCESS (New Intersection West of Existing)	ELK GROVE STATION ACCESS (Fourth Leg of Existing Intersection)	CITY COLLEGE STATION	MIDTOWN SACRAMENTO STATION	OLD NORTH SACRAMENTO STATION	NATOMAS / SACRAMENTO AIRPORT STATION	NATOMAS MAINTENANCE & LAYOVER FACILITY (Programmatic)	TRACK CURVE RECONSTRUCTION EAST MARCH LN TO EAST SWAIN RD	TRACK CURVE RECONSTRUCTION NORTH OF NORTH NEW HOPE RD	TRACK CURVE RECONSTRUCTION SOUTH OF DESMOND RD	TRACK CURVE RECONSTRUCTION NORTH OF ELK GROVE STATION	HAMMER LANE SIDING UPGRADE	THORNTON SIDING UPGRADE & EXTENSION	PHILLIPS SIDING UPGRADE & EXTENSION	POLLOCK SIDING UPGRADE	SOUTH SACRAMENTO SIDING UPGRADE	DEL PASO SIDING UPGRADE & EXTENSION	LODI SIDING	ELK GROVE SIDING	NEW CROSSOVER
REFERENCE CODING																													
CORRIDOR WORK SITE LENGTH							LF					2200	7200	0	4230	9110	1120	970	1411	1080	12020	10580	6770	5220	14110	20035	18000	10250	325
TRACK WORK LENGTH							TF	525	525			2200	1900	0	6730	30395	1120	970	1411	1080	12020	10580	6770	5220	20940	20035	18000	10250	325
PARKING SPACES								278	236	700	700	0	0	252	149														
PROJECT CONSTRUCTION DURATION FOR EACH PROJECT ELEMENT							Months	14	14	14	14	8	12	14	12	30	1	1	1	1	2	4	2	2	4	12	8	8	2
START CONSTRUCTION							YEAR	2021	2021	2021	2021	2023	2021	2023	2021	programmatic	2022	2022	2022	2022	2023	2023	2021	2023	2023	2021	2021	2021	2023
SITE WORK PHASE							MONTHS	12	12	12	12	4	10	10	8	14	0.5	0.5	0.5	0.5	1	2	1	1	1	6	4	3	1
GRADER	Initial Site Work - Prior to other const. activity	1	7	0.6																									
WATER TRUCK (100% onsite)	Initial Site Work - Prior to other const. activity	1	7	0.5	3	0																							
D6 DOZER	Initial Site Work - Prior to other const. activity	2	7	0.7																									
D 8 DOZER	Initial Site Work - Prior to other const. activity	1	6	0.6																									
COMPACTOR	Latter Portion of Site Work Phase	2	6	0.6																									
RENTAL DUMP TRUCKS (50% onsite/50% offsite)	Entire Site Work Phase	4	6	0.6	2	63																							
		11																											
RAIL WORK PHASE							MONTHS	1	1	0	0	4	4	4	4	8	0.5	0.5	0.5	0.5	1	2	1	1	3	6	4	3	1
LOCOMOTIVE (switch. 1200-1500 HP)	Latter Portion of Rail Work Phase	2	5	0.4																									
D6 DOZER	First Portion of Rail Work Phase	1	6	0.5																									
GRADER	First Portion of Rail Work Phase	1	6	0.5																									
WATER TRUCK (100% onsite)	First Portion of Rail Work Phase	2	6	0.5	3	0																							
TAMPER (max 100 HP)	Latter Portion of Rail Work Phase	1	4	0.4																									
ALLIGNER (max 100 HP)	Latter Portion of Rail Work Phase	1	4	0.4																									
SWINGER (max 50 HP)	Latter Portion of Rail Work Phase	1	5	0.3																									
WELDERS	Latter Portion of Rail Work Phase	3	5	0.6																									
FLAT BED TRUCK (75% onsite/25% offsite)	Entire Rail Work Phase	1	5	0.5	2	22																							
PICKUPS (50% onsite/50% offsite)	Entire Rail Work Phase	3	4	0.5	3	35																							
SUV (100% onsite)	Entire Rail Work Phase	2	5	0.5	3	0																							
35 TON RT CRANE	Latter Portion of Rail Work Phase	1	5	0.6																									
FLAT BED TRACTOR (75% onsite/25% offsite)	Entire Rail Work Phase	1	4	0.25	2	9																							
WHEEL LOADER	First Portion of Rail Work Phase	1	5	0.45																									
		24																											
STRUCTURAL WORK PHASE							MONTHS	6	6	6	6	3	3	6	3	24	0	0	0	0	0	0	0	0	0	6	0	4	0
GENERATOR	Entire Structural Work Phase	2	9	0.8																									
75 T MOBILE CRANE	Entire Structural Work Phase	1	5	0.6																									
WATER TRUCK (100% onsite)	Entire Structural Work Phase	1	4	0.4	3	0																							
FLAT BED TRUCK (75% onsite/25% offsite)	Entire Structural Work Phase	1	4	0.5	2	18																							
PICKUPS (50% onsite/50% offsite)	Entire Structural Work Phase	3	7	0.6	3	74																							
CONCRETE MIXERS DELIVERY (100% onsite)	Entire Structural Work Phase	5	5	0.2	2	0																							
CONCRETE PUMP	Entire Structural Work Phase	1	7	0.2																									
WHEEL LOADER	Entire Structural Work Phase	4	4	0.4																									
WELDERS	Entire Structural Work Phase	2	5	0.5																									
		24																											
CLEAR & GRUBBING							ACRES	9	13	16	14	1	2	1	1	5	0	0	0	0	0	5	3	0	0	9	12	7	0
EARTHWORK							C.Y.	16330	35990	51480	45185	2200	3890	7850	18500	135190	200	150	250	200	0	38800	27900	0	0	149200	100000	56940	0
PAVED AREAS							S.F.	200000	230000	650000	570000	0	150000	210000	23800	315000	0	0	0	0	0	1400	1400	0	0	9200	10070	2400	0
DEMOLITION							S.F.	0	0	0	0	0	85000	155000	180000	155000	0	0	0	0	1000	1400	1400	1000	0	9200	10070	2400	1000
Average onsite speed (mph)		5																											
Average offsite speed (mph)		35																											

Off-road Equipment Exhaust Emissions

Project-Specific Equipment (CalEEMod equivalent) [1]	Construction Timing	# / Day	Operational hours / day	Horsepower [2]	Load Factor	Emission Factors (g/hp-hr) [3]									Daily Emissions (lb/day)										Daily Emission (metric tons/day)	Mitigated Emission Factors (g/hp-hr) [4]									Mitigated Daily Emissions (lb/day)										Daily Emissions (metric tons/day)
						ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N2O	CO2e
SITE WORK PHASE																																												
GRADER (grader)	Initial Site Work - Prior to other const. activity	1	7	187	0.41	0.335	1.30687	4.38134	0.005	0.139	0.128	475	0.15	0.07	0.40	1.55	5.18	0.01	0.16	0.15	561	0.18	0.08	0.27	0.06	2.2	0.26	0.005	0.008	0.008	474.539	0.153	0.069	0.071	2.603	0.308	0.006	0.009	0.009	561.474	0.181	0.081	0.268
D6 DOZER (rubber tired dozer)	Initial Site Work - Prior to other const. activity	2	7	247	0.4	0.6	2.31719	6.29617	0.005	0.306	0.281	475	0.15	0.07	1.83	7.07	19.20	0.02	0.93	0.86	1448	0.47	0.21	0.69	0.06	2.2	0.26	0.005	0.008	0.008	474.798	0.154	0.069	0.183	6.709	0.793	0.015	0.024	0.024	1447.866	0.478	0.213	0.691
D8 DOZER (rubber tired dozer)*	Initial Site Work - Prior to other const. activity	1	6	354	0.4	0.492	4.04107	5.081	0.005	0.232	0.214	479	0.16	0.07	0.92	7.57	9.52	0.01	0.43	0.40	897	0.29	0.13	0.43	0.06	2.2	0.26	0.005	0.008	0.008	478.987	0.155	0.070	0.112	4.121	0.487	0.009	0.015	0.015	897.165	0.290	0.131	0.428
Phase Total															*9.15*	*16.18*	*33.90*	*0.03*	*1.53*	*1.41*	*2907*	*0.94*	*0.42*	*1.39*										*0.366*	*13.432*	*1.587*	*0.031*	*0.049*	*0.049*	*2906.501*	*0.941*	*0.423*	*1.386*
COMPACTOR (place compactor)	Latter Portion of Site Work Phase	2	6	8	0.43	0.661	3.469	4.142	0.008	0.161	0.161	568	0.06	0.03	0.06	0.32	0.38	0.00	0.01	0.01	52	0.01	0.00	0.02	0.661	3.469	4.142	0.008	0.161	0.161	568.299	0.059	0.027	0.060	0.316	0.377	0.001	0.015	0.015	51.719	0.005	0.002	0.024
Phase Total															0.06	0.32	0.38	0.00	0.01	0.01	52	0.01	0.00	0.02										0.060	0.316	0.377	0.001	0.015	0.015	51.719	0.005	0.002	0.024
RAIL WORK PHASE																																											
D6 DOZER (rubber tired dozer)	First Portion of Rail Work Phase	1	6	247	0.4	0.6	2.31719	6.29617	0.005	0.306	0.281	475	0.15	0.07	0.78	3.03	8.23	0.01	0.40	0.37	621	0.20	0.09	0.30	0.06	2.2	0.26	0.005	0.008	0.008	474.798	0.154	0.069	0.078	2.875	0.340	0.007	0.010	0.010	620.514	0.201	0.091	0.296
GRADER (grader)	First Portion of Rail Work Phase	1	6	187	0.41	0.335	1.30687	4.38134	0.005	0.139	0.128	475	0.15	0.07	0.34	1.33	4.44	0.01	0.14	0.13	481	0.16	0.07	0.23	0.06	2.2	0.26	0.005	0.008	0.008	474.539	0.153	0.069	0.061	2.231	0.264	0.005	0.008	0.008	481.263	0.155	0.070	0.229
WHEEL LOADER (rubber tired loader)	First Portion of Rail Work Phase	1	5	203	0.36	0.266	1.24034	2.9977	0.005	0.1	0.092	470	0.15	0.07	0.21	1.00	2.41	0.00	0.08	0.07	378	0.12	0.06	0.18	0.06	2.2	0.26	0.005	0.008	0.008	469.564	0.152	0.068	0.048	1.772	0.209	0.004	0.006	0.006	378.266	0.122	0.055	0.180
															1.34	*5.35*	*15.09*	*0.02*	*0.62*	*0.57*	*1480*	*0.48*	*0.22*	*0.71*										*0.188*	*6.879*	*0.813*	*0.016*	*0.025*	*0.025*	*1480.044*	*0.478*	*0.215*	*0.706*
UCOM0701E (switch, 1200-1500 HP) [5]	Latter Portion of Rail Work Phase	1	5	1500	0.4	0.60021	1.83	9.9	0.0063	0.23	0.223	671	0.05	0.02	3.97	12.10	65.48	0.04	1.52	1.48	4441	0.35	0.16	2.04	0.08424	1.83	1	0.0063	0.015	0.01455	671.450	0.053	0.017	0.557	12.103	6.614	0.042	0.099	0.096	4440.882	0.348	0.157	2.039
TAMPER (max 100 HP) (other construction equipment)*	Latter Portion of Rail Work Phase	1	4	100	0.42	0.482	3.70304	4.4558	0.005	0.323	0.298	472	0.15	0.07	0.18	1.37	1.65	0.00	0.12	0.11	175	0.06	0.03	0.08	0.06	3.7	0.26	0.005	0.008	0.008	472.275	0.153	0.069	0.022	1.370	0.096	0.002	0.003	0.003	174.920	0.057	0.026	0.083
ALLIGNER (max 100 HP) (other construction equipment)*	Latter Portion of Rail Work Phase	1	4	100	0.42	0.482	3.70304	4.4558	0.005	0.323	0.298	472	0.15	0.07	0.18	1.37	1.65	0.00	0.12	0.11	175	0.06	0.03	0.08	0.06	3.7	0.26	0.005	0.008	0.008	472.275	0.153	0.069	0.022	1.370	0.096	0.002	0.003	0.003	174.920	0.057	0.026	0.083
SWINGER (max 50 HP) (other construction equipment)*	Latter Portion of Rail Work Phase	1	5	50	0.42	1.01	5.30749	4.90234	0.005	0.382	0.351	528	0.17	0.08	0.23	1.23	1.13	0.00	0.09	0.08	122	0.04	0.02	0.06	0.12	3.7	2.74	0.005	0.008	0.008	527.783	0.171	0.077	0.028	0.856	0.634	0.001	0.002	0.002	122.174	0.040	0.018	0.058
WELDERS (welder)	Latter Portion of Rail Work Phase	3	5	46	0.45	0.829	4.708	4.133	0.007	0.203	0.203	568	0.07	0.03	0.57	3.22	2.83	0.00	0.14	0.14	389	0.05	0.02	0.18	0.12	4.1	2.75	0.007	0.008	0.008	568.299	0.074	0.033	0.082	2.867	1.882	0.005	0.005	0.005	389.021	0.051	0.023	0.180
35 TON RT CRANE (crane)	Latter Portion of Rail Work Phase	1	5	231	0.29	0.349	1.67824	4.10439	0.005	0.167	0.153	473	0.15	0.07	0.26	1.24	3.03	0.00	0.12	0.11	349	0.11	0.05	0.17	0.06	2.2	0.26	0.005	0.008	0.008	472.906	0.153	0.069	0.044	1.625	0.192	0.004	0.006	0.006	349.212	0.113	0.051	0.167
Phase Total															1.39	20.54	75.77	0.06	2.11	2.03	5651	0.66	0.30	2.61										0.756	20.103	9.515	0.055	0.118	0.115	5651.227	0.665	0.299	2.612
FLAT BED TRACTOR (75% onsite/25% offsite) (off-highway truck)	Entire Rail Work Phase	1	4	402	0.37	0.225	1.33781	1.95357	0.005	0.072	0.066	475	0.15	0.07	0.11	0.66	0.96	0.00	0.04	0.03	233	0.08	0.03	0.11	0.06	3.7	0.26	0.005	0.008	0.008	474.542	0.153	0.069	0.039	1.820	0.128	0.002	0.004	0.004	233.415	0.075	0.034	0.111
STRUCTURAL WORK PHASE																																											
GENERATOR (generator sets)	Entire Structural Work Phase	2	9	84	0.74	0.326	3.361	2.888	0.006	0.153	0.153	568	0.03	0.01	0.88	8.29	7.12	0.01	0.38	0.38	1402	0.07	0.03	0.64	0.06	3.7	0.26	0.006	0.008	0.008	568.299	0.029	0.013	0.148	9.127	0.643	0.015	0.020	0.020	1401.828	0.072	0.032	0.641
75 T MOBILE CRANE (crane)	Entire Structural Work Phase	1	5	231	0.29	0.349	1.67824	4.10439	0.005	0.167	0.153	473	0.15	0.07	0.26	1.24	3.03	0.00	0.12	0.11	349	0.11	0.05	0.17	0.06	2.2	0.26	0.005	0.008	0.008	472.906	0.153	0.069	0.044	1.625	0.192	0.004	0.006	0.006	349.212	0.113	0.051	0.167
CONCRETE PUMP (pumps)	Entire Structural Work Phase	1	7	84	0.74	0.347	3.412	2.928	0.006	0.162	0.162	568	0.03	0.01	0.33	3.27	2.81	0.01	0.16	0.16	545	0.03	0.01	0.25	0.06	3.7	0.26	0.006	0.008	0.008	568.300	0.031	0.014	0.058	3.549	0.249	0.006	0.008	0.008	545.156	0.030	0.013	0.249
WHEEL LOADER (rubber tired loader)	Entire Structural Work Phase	4	4	203	0.37	0.266	1.24034	2.9977	0.005	0.1	0.092	470	0.15	0.07	0.70	3.29	7.94	0.01	0.26	0.24	1244	0.40	0.18	0.59	0.06	2.2	0.26	0.005	0.008	0.008	469.564	0.152	0.068	0.159	5.829	0.689	0.013	0.021	0.021	1244.078	0.403	0.181	0.593
WELDERS (welder)	Entire Structural Work Phase	2	5	46	0.45	0.829	4.708	4.133	0.007	0.203	0.203	568	0.07	0.03	0.38	2.15	1.89	0.00	0.09	0.09	259	0.03	0.02	0.12	0.12	4.1	2.75	0.007	0.008	0.008	568.299	0.074	0.033	0.055	1.871	1.255	0.003	0.004	0.004	259.347	0.034	0.015	0.120
Phase Total															*2.48*	*18.24*	*22.79*	*0.04*	*1.01*	*0.98*	*3802*	*0.65*	*0.29*	*1.77*										*0.464*	*22.003*	*3.027*	*0.041*	*0.058*	*0.058*	*3799.619*	*0.651*	*0.293*	*1.770*

1. Equipment list is based on project-specific list of anticipated equipment requirements provided by project engineers. Equipment type, number of each equipment, operational hours per day, and load factor are all project-specific. The CalEEMod equivalent equipment type is listed in parentheses.
2. Used CalEEMod default horsepower unless otherwise indicated by *.
3. Emission factors based on CalEEMod for year 2021 (earliest year of construction) for equipment equivalent and specific horsepower noted.
4. Mitigated emission factors for equipment >25 hp, based on Carl Moyer for ROG, CO, NOx, PM10 and PM2.5. Other EFs based on CalEEMod for year 2021.
5. Locomotive emission factors based upon the following for switch:
   > PM10, HC, NOx, CO: Table 2 of EPA 2009 Emission Factors for Locomotives Technical Highlights
   > PM2.5 assumed to be 97% of PM10.
   > VOC (presented as ROG) = 1.053.* HC emissions
   > SO2 Emission Factor (g/gal) = (fuel density) * (64 g SO2 / 32 g S) * (S content of fuel);
   Sulfur Content of Fuel (ppm) (per CARB regulations in CA) = 15
   SO2 EF = 0.096 g/gal * conversion factor of 1/15.2 = 0.0063 g/hp-hr
   > CO2 is defined by U.S. EPA as 10,206 g CO2/gal fuel * conversion factor of 1/15.2 = 671.45 g/hp-hr
   > CH4 and N20 Emission Factors per EPA: Table 5 in https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf
   *CH4 EF = 0.8 g/gal * 1/15.2 conversion factor = 0.05263158 g/hp-hr
   *N2O EF = 0.26 g/gal * 1/15.2 conversion factor = 0.01710526 g/hp-hr

Conversion Factors	
grams per pound	453.59237
pounds per ton	2000
pounds per metric ton	2204.62262

Average Workdays per Year	260
Months per Year	12

Global Warming Potential	
CO2	1
CH4	25
N20	298

Note: GWP are the 100-year GWPs from the IPCC fourth assessment report (AR4), consistent with the California Air Resources Board 2019 GHG emissions inventory.

Project Element	Construction Duration (years)				Maximum Daily Emissions (lb/day)									Daily Emissions (metric tons/day)	Maximum Annual Emissions (ton/year)									Total Emissions (metric tons)	Mitigated Maximum Daily Emissions (lb/day)									Daily Emissions (metric tons/day)	Mitigated Maximum Annual Emissions (tons/year)								
	Site Work Prior to Rail Work/Structures Work	Total Site Work Phase	Rail Work	Structures	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20
LODI STATION	0.67	1.00	0.08	0.50	8.03	39.75	99.90	0.10	3.17	3.06	9736	1.40	0.63	4.52	0.516	2.916	5.463	0.006	0.231	0.216	585	0.138	0.062	551	1.31	44.27	13.05	0.10	0.20	0.19	9736	1.40	0.63	4.52	0.080	2.948	0.497	0.006	0.012	0.011	585	0.138	0.062
LODI STATION - SOUTH ALTERNATIVE	0.67	1.00	0.08	0.50	8.03	39.75	99.90	0.10	3.17	3.06	9736	1.40	0.63	4.52	0.516	2.916	5.463	0.006	0.231	0.216	585	0.138	0.062	551	1.31	44.27	13.05	0.10	0.20	0.19	9736	1.40	0.63	4.52	0.080	2.948	0.497	0.006	0.012	0.011	585	0.138	0.062
ELK GROVE STATION ACCESS (New Intersection West of Existing)	0.67	1.00	0.08	0.50	3.15	18.55	33.90	0.04	1.53	1.41	3851	0.94	0.42	1.79	0.442	2.629	4.469	0.005	0.201	0.188	506	0.125	0.056	477	0.52	22.32	3.40	0.04	0.07	0.07	3851	0.94	0.42	1.79	0.070	2.635	0.384	0.005	0.010	0.010	506	0.125	0.056
ELK GROVE STATION ACCESS (Fourth Leg of Existing Intersection)	0.67	1.00	0.08	0.50	3.15	18.55	33.90	0.04	1.53	1.41	3851	0.94	0.42	1.79	0.442	2.629	4.469	0.005	0.201	0.188	506	0.125	0.056	477	0.52	22.32	3.40	0.04	0.07	0.07	3851	0.94	0.42	1.79	0.070	2.635	0.384	0.005	0.010	0.010	506	0.125	0.056
CITY COLLEGE STATION	0.33	0.33	0.33	0.25	8.03	39.75	99.90	0.10	3.17	3.06	9736	1.40	0.63	4.52	0.516	2.458	6.205	0.006	0.220	0.208	571	0.115	0.052	534	1.31	44.27	13.05	0.10	0.20	0.19	9736	1.40	0.63	4.52	0.076	2.560	0.637	0.006	0.011	0.011	571	0.115	0.052
MIDTOWN SACRAMENTO STATION	0.67	0.83	0.33	0.25	8.03	39.75	99.90	0.10	3.17	3.06	9736	1.40	0.63	4.52	0.656	3.180	7.699	0.007	0.287	0.270	700	0.156	0.070	658	1.31	44.27	13.05	0.10	0.20	0.19	9736	1.40	0.63	4.52	0.096	3.163	0.730	0.007	0.014	0.014	700	0.156	0.070
OLD NORTH SACRAMENTO STATION	0.67	0.83	0.33	0.50	8.03	39.75	99.90	0.10	3.17	3.06	9736	1.40	0.63	4.52	0.737	3.772	8.439	0.009	0.320	0.302	824	0.177	0.080	773	1.31	44.27	13.05	0.10	0.20	0.19	9736	1.40	0.63	4.52	0.111	3.878	0.828	0.009	0.016	0.016	824	0.177	0.080
NATOMAS / SACRAMENTO AIRPORT STATION	0.67	0.67	0.33	0.25	8.03	39.75	99.90	0.10	3.17	3.06	9736	1.40	0.63	4.52	0.655	3.173	7.690	0.007	0.287	0.269	699	0.156	0.070	657	1.31	44.27	13.05	0.10	0.20	0.19	9736	1.40	0.63	4.52	0.094	3.156	0.722	0.007	0.014	0.014	699	0.156	0.070
NATOMAS MAINTENANCE & LAYOVER FACILITY	0.50	2.17	0.67	2.00	8.03	39.75	99.90	0.10	3.17	3.06	9736	1.40	0.63	4.52	1.450	8.142	16.144	0.019	0.605	0.577	1823	0.337	0.152	1702	1.31	44.27	13.05	0.10	0.20	0.19	9736	1.40	0.63	4.52	0.238	9.140	1.854	0.019	0.033	0.033	1823	0.337	0.152
TRACK CURVE RECONSTRUCTION EAST MARCH LN TO EAST SWAIN RD	0.04	0.04	0.04	0.00	5.56	21.51	77.11	0.06	2.16	2.08	5936	0.94	0.42	2.75	0.054	0.233	0.683	0.001	0.023	0.022	56	0.012	0.005	52	0.85	22.27	10.02	0.06	0.14	0.13	5936	0.94	0.42	2.75	0.008	0.231	0.067	0.001	0.001	0.001	56	0.012	0.005
TRACK CURVE RECONSTRUCTION NORTH OF NORTH NEW HOPE RD	0.04	0.04	0.04	0.00	5.56	21.51	77.11	0.06	2.16	2.08	5936	0.94	0.42	2.75	0.054	0.233	0.683	0.001	0.023	0.022	56	0.012	0.005	52	0.85	22.27	10.02	0.06	0.14	0.13	5936	0.94	0.42	2.75	0.008	0.231	0.067	0.001	0.001	0.001	56	0.012	0.005
TRACK CURVE RECONSTRUCTION SOUTH OF DESMOND RD	0.04	0.04	0.04	0.00	5.56	21.51	77.11	0.06	2.16	2.08	5936	0.94	0.42	2.75	0.054	0.233	0.683	0.001	0.023	0.022	56	0.012	0.005	52	0.85	22.27	10.02	0.06	0.14	0.13	5936	0.94	0.42	2.75	0.008	0.231	0.067	0.001	0.001	0.001	56	0.012	0.005
TRACK CURVE RECONSTRUCTION NORTH OF ELK GROVE STATION	0.04	0.04	0.04	0.00	5.56	21.51	77.11	0.06	2.16	2.08	5936	0.94	0.42	2.75	0.054	0.233	0.683	0.001	0.023	0.022	56	0.012	0.005	52	0.85	22.27	10.02	0.06	0.14	0.13	5936	0.94	0.42	2.75	0.008	0.231	0.067	0.001	0.001	0.001	56	0.012	0.005
HAMMER LANE SIDING UPGRADE	0.08	0.08	0.08	0.00	5.56	21.51	77.11	0.06	2.16	2.08	5936	0.94	0.42	2.75	0.109	0.466	1.366	0.001	0.047	0.044	112	0.023	0.011	105	0.85	22.27	10.02	0.06	0.14	0.13	5936	0.94	0.42	2.75	0.015	0.461	0.135	0.001	0.002	0.002	112	0.023	0.011
THORNTON SIDING UPGRADE & EXTENSION	0.17	0.17	0.17	0.00	5.56	21.51	77.11	0.06	2.16	2.08	5936	0.94	0.42	2.75	0.218	0.933	2.732	0.002	0.093	0.088	224	0.047	0.021	210	0.85	22.27	10.02	0.06	0.14	0.13	5936	0.94	0.42	2.75	0.030	0.923	0.269	0.002	0.005	0.005	224	0.047	0.021
PHILLIPS SIDING UPGRADE & EXTENSION	0.08	0.08	0.08	0.00	5.56	21.51	77.11	0.06	2.16	2.08	5936	0.94	0.42	2.75	0.109	0.466	1.366	0.001	0.047	0.044	112	0.023	0.011	105	0.85	22.27	10.02	0.06	0.14	0.13	5936	0.94	0.42	2.75	0.015	0.461	0.135	0.001	0.002	0.002	112	0.023	0.011
POLLOCK SIDING UPGRADE	0.08	0.08	0.08	0.00	5.56	21.51	77.11	0.06	2.16	2.08	5936	0.94	0.42	2.75	0.109	0.466	1.366	0.001	0.047	0.044	112	0.023	0.011	105	0.85	22.27	10.02	0.06	0.14	0.13	5936	0.94	0.42	2.75	0.015	0.461	0.135	0.001	0.002	0.002	112	0.023	0.011
SOUTH SACRAMENTO SIDING UPGRADE	0.08	0.08	0.25	0.00	5.56	21.51	77.11	0.06	2.16	2.08	5936	0.94	0.42	2.75	0.257	1.042	3.356	0.003	0.107	0.101	271	0.050	0.022	253	0.85	22.27	10.02	0.06	0.14	0.13	5936	0.94	0.42	2.75	0.036	1.086	0.361	0.003	0.005	0.005	271	0.050	0.022
DEL PASO SIDING UPGRADE & EXTENSION	0.50	0.50	0.50	0.50	8.03	39.75	99.90	0.10	3.17	3.06	9736	1.40	0.63	4.52	0.814	3.983	9.678	0.009	0.346	0.328	918	0.183	0.082	859	1.31	44.27	13.05	0.10	0.20	0.19	9736	1.40	0.63	4.52	0.121	4.198	1.004	0.009	0.017	0.017	918	0.183	0.082
LODI SIDING	0.33	0.33	0.33	0.00	5.56	21.51	77.11	0.06	2.16	2.08	5936	0.94	0.42	2.75	0.435	1.865	5.464	0.005	0.187	0.176	447	0.094	0.042	419	0.85	22.27	10.02	0.06	0.14	0.13	5936	0.94	0.42	2.75	0.061	1.845	0.538	0.005	0.009	0.009	447	0.094	0.042
ELK GROVE SIDING	0.25	0.25	0.25	0.13	8.03	39.75	99.90	0.10	3.17	3.06	9736	1.40	0.63	4.52	0.434	2.189	5.086	0.005	0.184	0.174	500	0.099	0.044	468	1.31	44.27	13.05	0.10	0.20	0.19	9736	1.40	0.63	4.52	0.066	2.337	0.535	0.005	0.009	0.009	500	0.099	0.044
NEW CROSSOVER	0.08	0.08	0.08	0.00	5.56	21.51	77.11	0.06	2.16	2.08	5936	0.94	0.42	2.75	0.109	0.466	1.366	0.001	0.047	0.044	112	0.023	0.011	105	0.85	22.27	10.02	0.06	0.14	0.13	5936	0.94	0.42	2.75	0.015	0.461	0.135	0.001	0.002	0.002	112	0.023	0.011

*Note that some locations do not include all phases, so formulas for maximum daily emissions to above chart vary to not include emissions for phases with no activity at a specific location.
* To estimate maximum daily emissions, it is assumed that all construction phases could overlap at some point within the overal construction duration for each location.

Onsite On-Raod ConstructionVehicle Emissions (Exhaust)

Vehilcle Type	# Vehicles On-Site	Miles / Day [2]	Emission Factors (g/mile) [3] ROG	CO	NOX	SO2	PM10 Fugitive Dust [4]	PM10 Exhaust	PM10 Total	PM2.5 Fugitive Dust [4]	PM2.5 Exhaust	PM2.5 Total	CO2	CH4	N2O
SITE WORK PHASE															
Water Truck (100% on-site)	1	3	1.57	2.70	10.39	0.02	57.16	0.24	57.40	5.57	0.23	5.80	2417	0.07	0.38
RENTAL DUMP TRUCKS (50% onsite/50% offsite)	4	8	1.57	2.70	10.39	0.02	57.16	0.24	57.40	5.57	0.23	5.80	2417	0.07	0.38
Phase Total															
RAIL WORK PHASE															
Water Truck (100% on-site)	2	6	1.57	2.70	10.39	0.02	57.16	0.24	57.40	5.57	0.23	5.80	2417	0.07	0.38
FLAT BED TRUCK (75% onsite/25% offsite)	1	2	0.18	2.53	0.24	0.01	57.16	0.01	57.17	5.57	0.01	5.58	1036	0.04	0.02
PICKUPS (50% onsite/50% offsite)	3	9	0.13	2.01	0.19	0.01	57.16	0.01	57.17	5.57	0.01	5.58	832	0.03	0.02
SUV (100% onsite)	2	6	0.13	2.01	0.19	0.01	57.16	0.01	57.17	5.57	0.01	5.58	832	0.03	0.02
FLAT BED TRUCK (75% onsite/25% offsite)	1	2	0.18	2.53	0.24	0.01	57.16	0.01	57.17	5.57	0.01	5.58	1036	0.04	0.02
Phase Total															
STRUCTURAL WORK PHASE															
Water Truck (100% on-site)	1	3	1.57	2.70	10.39	0.02	57.16	0.24	57.40	5.57	0.23	5.80	2417	0.07	0.38
FLAT BED TRUCK (75% onsite/25% offsite)	1	2	0.18	2.53	0.24	0.01	57.16	0.01	57.17	5.57	0.01	5.58	1036	0.04	0.02
PICKUPS (50% onsite/50% offsite)	3	9	0.13	2.01	0.19	0.01	57.16	0.01	57.17	5.57	0.01	5.58	832	0.03	0.02
Concrete Mixer Delivery (100% onsite)	5	5	1.57	2.70	10.39	0.02	57.16	0.24	57.40	5.57	0.23	5.80	2417	0.07	0.38
Phase Total															

Vehilcle Type	Daily Emissions (lb/day) ROG	CO	NOX	SO2	PM10 Fugitive Dust	PM10 Exhaust	PM10 Total	PM2.5 Fugitive Dust	PM2.5 Exhaust	PM2.5 Total	CO2	CH4	N2O	Daily Emissions (metric tons/day) CO2e
SITE WORK PHASE														
Water Truck (100% on-site)	0.01	0.02	0.07	0.00	0.38	0.00	0.38	0.04	0.00	0.04	16	0.00	0.00	0.01
RENTAL DUMP TRUCKS (50% onsite/50% offsite)	0.03	0.05	0.18	0.00	1.01	0.00	1.01	0.10	0.00	0.10	43	0.00	0.01	0.02
Phase Total	*0.04*	*0.07*	*0.25*	*0.00*	*1.39*	*0.01*	*1.39*	*0.14*	*0.01*	*0.14*	*59*	*0.00*	*0.01*	*0.03*
RAIL WORK PHASE														
Water Truck (100% on-site)	0.02	0.04	0.14	0.00	0.76	0.00	0.76	0.07	0.00	0.08	32	0.00	0.01	0.01
FLAT BED TRUCK (75% onsite/25% offsite)	0.00	0.01	0.00	0.00	0.25	0.00	0.25	0.02	0.00	0.02	5	0.00	0.00	0.00
PICKUPS (50% onsite/50% offsite)	0.00	0.04	0.00	0.00	1.13	0.00	1.13	0.11	0.00	0.11	17	0.00	0.00	0.01
SUV (100% onsite)	0.00	0.03	0.00	0.00	0.76	0.00	0.76	0.07	0.00	0.07	11	0.00	0.00	0.00
FLAT BED TRUCK (75% onsite/25% offsite)	0.00	0.01	0.00	0.00	0.25	0.00	0.25	0.02	0.00	0.02	5	0.00	0.00	0.00
Phase Total	*0.03*	*0.12*	*0.15*	*0.00*	*3.15*	*0.00*	*3.15*	*0.31*	*0.00*	*0.31*	*69*	*0.00*	*0.01*	*0.03*
STRUCTURAL WORK PHASE														
Water Truck (100% on-site)	0.01	0.02	0.07	0.00	0.38	0.00	0.38	0.04	0.00	0.04	16	0.00	0.00	0.01
FLAT BED TRUCK (75% onsite/25% offsite)	0.00	0.01	0.00	0.00	0.25	0.00	0.25	0.02	0.00	0.02	5	0.00	0.00	0.00
PICKUPS (50% onsite/50% offsite)	0.00	0.04	0.00	0.00	1.13	0.00	1.13	0.11	0.00	0.11	17	0.00	0.00	0.01
Concrete Mixer Delivery (100% onsite)	0.02	0.03	0.11	0.00	0.63	0.00	0.63	0.06	0.00	0.06	27	0.00	0.00	0.01
Phase Total	*0.03*	*0.10*	*0.19*	*0.00*	*2.39*	*0.00*	*2.40*	*0.23*	*0.00*	*0.24*	*64*	*0.00*	*0.01*	*0.03*
Total	**0.10**	**0.29**	**0.59**	**0.00**	**6.93**	**0.01**	**6.94**	**0.68**	**0.01**	**0.69**	**191**	**0.01**	**0.02**	**0.09**

Vehilcle Type	Mitigated Emission Factors (g/mile) [3] ROG	CO	NOX	SO2	PM10 Fugitive Dust [4]	PM10 Exhaust	PM10 Total	PM2.5 Fugitive Dust [4]	PM2.5 Exhaust	PM2.5 Total	CO2	CH4	N2O
SITE WORK PHASE													
Water Truck (100% on-site)	1.57	2.70	10.39	0.02	24.58	0.24	57.40	2.40	0.23	5.80	2417	0.07	0.38
RENTAL DUMP TRUCKS (50% onsite/50% offsite)	1.57	2.70	10.39	0.02	24.58	0.24	57.40	2.40	0.23	5.80	2417	0.07	0.38
Phase Total													
RAIL WORK PHASE													
Water Truck (100% on-site)	1.57	2.70	10.39	0.02	24.58	0.24	57.40	2.40	0.23	5.80	2417	0.07	0.38
FLAT BED TRUCK (75% onsite/25% offsite)	0.18	2.53	0.24	0.01	24.58	0.01	57.17	2.40	0.01	5.58	1036	0.04	0.02
PICKUPS (50% onsite/50% offsite)	0.13	2.01	0.19	0.01	24.58	0.01	57.17	2.40	0.01	5.58	832	0.03	0.02
SUV (100% onsite)	0.13	2.01	0.19	0.01	24.58	0.01	57.17	2.40	0.01	5.58	832	0.03	0.02
FLAT BED TRUCK (75% onsite/25% offsite)	0.18	2.53	0.24	0.01	24.58	0.01	57.17	2.40	0.01	5.58	1036	0.04	0.02
Phase Total													
STRUCTURAL WORK PHASE													
Water Truck (100% on-site)	1.57	2.70	10.39	0.02	24.58	0.24	57.40	2.40	0.23	5.80	2417	0.07	0.38
FLAT BED TRUCK (75% onsite/25% offsite)	0.18	2.53	0.24	0.01	24.58	0.01	57.17	2.40	0.01	5.58	1036	0.04	0.02
PICKUPS (50% onsite/50% offsite)	0.13	2.01	0.19	0.01	24.58	0.01	57.17	2.40	0.01	5.58	832	0.03	0.02
Concrete Mixer Delivery (100% onsite)	1.57	2.70	10.39	0.02	24.58	0.24	57.40	2.40	0.23	5.80	2417	0.07	0.38
Phase Total													

Vehilcle Type	Mitigated Daily Emissions (lb/day) ROG	CO	NOX	SO2	PM10 Fugitive Dust	PM10 Exhaust	PM10 Total	PM2.5 Fugitive Dust	PM2.5 Exhaust	PM2.5 Total	CO2	CH4	N2O	Daily Emissions (metric tons/day) CO2e
SITE WORK PHASE														
Water Truck (100% on-site)	0.01	0.02	0.07	0.00	0.16	0.00	0.16	0.02	0.00	0.02	16	0.00	0.00	0.01
RENTAL DUMP TRUCKS (50% onsite/50% offsite)	0.03	0.05	0.18	0.00	0.43	0.00	0.44	0.04	0.00	0.05	43	0.00	0.01	0.02
Phase Total	*0.04*	*0.07*	*0.25*	*0.00*	*0.60*	*0.01*	*0.60*	*0.06*	*0.01*	*0.06*	*59*	*0.00*	*0.01*	*0.03*
RAIL WORK PHASE														
Water Truck (100% on-site)	0.02	0.04	0.14	0.00	0.33	0.00	0.33	0.03	0.00	0.03	32	0.00	0.01	0.01
FLAT BED TRUCK (75% onsite/25% offsite)	0.00	0.01	0.00	0.00	0.11	0.00	0.11	0.01	0.00	0.01	5	0.00	0.00	0.00
PICKUPS (50% onsite/50% offsite)	0.00	0.04	0.00	0.00	0.49	0.00	0.49	0.05	0.00	0.05	17	0.00	0.00	0.01
SUV (100% onsite)	0.00	0.03	0.00	0.00	0.33	0.00	0.33	0.03	0.00	0.03	11	0.00	0.00	0.00
FLAT BED TRUCK (75% onsite/25% offsite)	0.00	0.01	0.00	0.00	0.11	0.00	0.11	0.01	0.00	0.01	5	0.00	0.00	0.00
Phase Total	*0.03*	*0.12*	*0.15*	*0.00*	*1.35*	*0.00*	*1.36*	*0.13*	*0.00*	*0.14*	*69*	*0.00*	*0.01*	*0.03*
STRUCTURAL WORK PHASE														
Water Truck (100% on-site)	0.01	0.02	0.07	0.00	0.16	0.00	0.16	0.02	0.00	0.02	16	0.00	0.00	0.01
FLAT BED TRUCK (75% onsite/25% offsite)	0.00	0.01	0.00	0.00	0.11	0.00	0.11	0.01	0.00	0.01	5	0.00	0.00	0.00
PICKUPS (50% onsite/50% offsite)	0.00	0.04	0.00	0.00	0.49	0.00	0.49	0.05	0.00	0.05	17	0.00	0.00	0.01
Concrete Mixer Delivery (100% onsite)	0.02	0.03	0.11	0.00	0.27	0.00	0.27	0.03	0.00	0.03	27	0.00	0.00	0.01
Phase Total	*0.03*	*0.10*	*0.19*	*0.00*	*1.03*	*0.00*	*1.03*	*0.10*	*0.00*	*0.10*	*64*	*0.00*	*0.01*	*0.03*
Total	**0.10**	**0.29**	**0.59**	**0.00**	**2.98**	**0.01**	**2.99**	**0.29**	**0.01**	**0.30**	**191**	**0.01**	**0.02**	**0.09**

1. Miles per day for on-road construction equipment is based on on-road on-site activity estiamte in Data Tab (off-site activity emissions estaimted in Const Off-Site EMFAC On-Road EFs tab).
2. Emission factors based on EMFAC2017 aggregate fleet for year 2021 (earliest year of construction).
3. Includes emissions factors for tire wear and break wear (EMFAC), and fugitive re-entrained road dust emissions for paved roads (fugitive re=entrained road dust per AP-42,Section 13.2.2)

Assumptions	
Worker Trip length	16.8
Conversion Factors	
grams per pound	453.59237
pounds per ton	2000
pounds per metric ton	2204.62262
Global Warming Potential	
CO2	1
Ch4	25
N20	298
Note: GWP are the 100-year GWPs from the IPCC fourth assessment report (AR4), consistent with the California Air Resources Board 2019 GHG emissions inventory.	

Average Workdays/yr:	260
Months/Year	12
Fugitive Dust Control Efficiency	57%

Project Element	Construction Duration (years) Total	Site Work	Rail Work	Structures	Maximum Daily Emissions (lb/day) ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20	Daily Emissions (metric tons/day) CO2e
LODI STATION	1.2	1.00	0.08	0.50	0.10	0.29	0.59	0.00	6.94	0.69	190.95	0.01	0.02	0.09
LODI STATION - SOUTH ALTERNATIVE	1.2	1.00	0.08	0.50	0.10	0.29	0.59	0.00	6.94	0.69	190.95	0.01	0.02	0.09
ELK GROVE STATION ACCESS (New Intersection West of Existing)	1.2	1.00	0.00	0.50	0.07	0.16	0.44	0.00	3.79	0.38	122.32	0.00	0.02	0.06
ELK GROVE STATION ACCESS (Fourth Leg of Existing Intersection)	1.2	1.00	0.00	0.50	0.07	0.16	0.44	0.00	3.79	0.38	122.32	0.00	0.02	0.06
CITY COLLEGE STATION	0.7	0.33	0.33	0.25	0.07	0.38	0.05	0.13	0.33	0.00	3.15	0.01	3.16	0.31
MIDTOWN SACRAMENTO STATION	1.0	0.83	0.33	0.25	0.10	0.29	0.59	0.00	6.94	0.69	190.95	0.01	0.02	0.09
OLD NORTH SACRAMENTO STATION	1.2	0.83	0.33	0.50	0.10	0.29	0.59	0.00	6.94	0.69	190.95	0.01	0.02	0.09
NATOMAS / SACRAMENTO AIRPORT STATION	1.0	0.67	0.33	0.25	0.10	0.29	0.59	0.00	6.94	0.69	190.95	0.01	0.02	0.09
NATOMAS MAINTENANCE & LAYOVER FACILITY	2.5	1.17	0.67	2.00	0.10	0.29	0.59	0.00	6.94	0.69	190.95	0.01	0.02	0.09
TRACK CURVE RECONSTRUCTION EAST MARCH LN TO EAST SWAIN RD	0.1	0.04	0.04	0.00	0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06
TRACK CURVE RECONSTRUCTION NORTH OF NORTH NEW HOPE RD	0.1	0.04	0.04	0.00	0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06
TRACK CURVE RECONSTRUCTION SOUTH OF DESMOND RD	0.1	0.04	0.04	0.00	0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06
TRACK CURVE RECONSTRUCTION NORTH OF ELK GROVE STATION	0.1	0.04	0.04	0.00	0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06
HAMMER LANE SIDING UPGRADE	0.2	0.08	0.08	0.00	0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06
THORNTON SIDING UPGRADE & EXTENSION	0.3	0.17	0.17	0.00	0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06
PHILLIPS SIDING UPGRADE & EXTENSION	0.2	0.08	0.08	0.00	0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06
POLLOCK SIDING UPGRADE	0.2	0.08	0.08	0.00	0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06
SOUTH SACRAMENTO SIDING UPGRADE	0.3	0.08	0.25	0.00	0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06
DEL PASO SIDING UPGRADE & EXTENSION	1.0	0.50	0.50	0.50	0.10	0.29	0.59	0.00	6.94	0.69	190.95	0.01	0.02	0.09
LODI SIDING	0.7	0.33	0.33	0.00	0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06
ELK GROVE SIDING	0.7	0.25	0.25	0.33	0.10	0.29	0.59	0.00	6.94	0.69	190.95	0.01	0.02	0.09
NEW CROSSOVER	0.2	0.08	0.08	0.00	0.06	0.19	0.40	0.00	4.55	0.45	127.24	0.00	0.01	0.06

Project Element	Maximum Annual Emissions (tons/year) ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20	Total Emissions (metric tons) CO2e
LODI STATION	0.01	0.02	0.05	0.00	0.37	0.04	12.50	0.00	0.00	11.34
LODI STATION - SOUTH ALTERNATIVE	0.01	0.02	0.05	0.00	0.37	0.04	12.50	0.00	0.00	11.34
ELK GROVE STATION ACCESS (New Intersection West of Existing)	0.01	0.01	0.04	0.00	0.34	0.03	11.76	0.00	0.00	10.67
ELK GROVE STATION ACCESS (Fourth Leg of Existing Intersection)	0.01	0.01	0.04	0.00	0.34	0.03	11.76	0.00	0.00	10.67
CITY COLLEGE STATION	0.00	0.01	0.02	0.00	0.27	0.03	7.58	0.00	0.00	6.88
MIDTOWN SACRAMENTO STATION	0.01	0.02	0.04	0.00	0.37	0.04	11.39	0.00	0.00	10.34
OLD NORTH SACRAMENTO STATION	0.01	0.02	0.05	0.00	0.44	0.04	13.46	0.00	0.00	12.21
NATOMAS / SACRAMENTO AIRPORT STATION	0.01	0.01	0.03	0.00	0.34	0.03	10.12	0.00	0.00	9.18
NATOMAS MAINTENANCE & LAYOVER FACILITY	0.02	0.05	0.10	0.00	1.11	0.11	31.40	0.00	0.00	28.49
TRACK CURVE RECONSTRUCTION EAST MARCH LN TO EAST SWAIN RD	0.00	0.00	0.00	0.00	0.02	0.00	0.69	0.00	0.00	0.63
TRACK CURVE RECONSTRUCTION NORTH OF NORTH NEW HOPE RD	0.00	0.00	0.00	0.00	0.02	0.00	0.69	0.00	0.00	0.63
TRACK CURVE RECONSTRUCTION SOUTH OF DESMOND RD	0.00	0.00	0.00	0.00	0.02	0.00	0.69	0.00	0.00	0.63
TRACK CURVE RECONSTRUCTION NORTH OF ELK GROVE STATION	0.00	0.00	0.00	0.00	0.02	0.00	0.69	0.00	0.00	0.63
HAMMER LANE SIDING UPGRADE	0.00	0.00	0.00	0.00	0.05	0.00	1.38	0.00	0.00	1.25
THORNTON SIDING UPGRADE & EXTENSION	0.00	0.00	0.01	0.00	0.10	0.01	2.76	0.00	0.00	2.50
PHILLIPS SIDING UPGRADE & EXTENSION	0.00	0.00	0.00	0.00	0.05	0.00	1.38	0.00	0.00	1.25
POLLOCK SIDING UPGRADE	0.00	0.00	0.00	0.00	0.05	0.00	1.38	0.00	0.00	1.25
SOUTH SACRAMENTO SIDING UPGRADE	0.00	0.00	0.01	0.00	0.12	0.01	2.87	0.00	0.00	2.60
DEL PASO SIDING UPGRADE & EXTENSION	0.01	0.02	0.04	0.00	0.45	0.04	12.41	0.00	0.00	11.26
LODI SIDING	0.00	0.01	0.02	0.00	0.20	0.02	5.51	0.00	0.00	5.00
ELK GROVE SIDING	0.00	0.01	0.02	0.00	0.25	0.02	6.90	0.00	0.00	6.26
NEW CROSSOVER	0.00	0.00	0.00	0.00	0.05	0.00	1.38	0.00	0.00	1.25

Project Element	Mitigated Maximum Daily Emissions (lb/day) ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20	Daily Emissions (metric tons/day) CO2e
LODI STATION	0.10	0.29	0.59	0.002	2.99	0.30	190.95	0.01	0.02	0.09
LODI STATION - SOUTH ALTERNATIVE	0.10	0.29	0.59	0.002	2.99	0.30	190.95	0.01	0.02	0.09
ELK GROVE STATION ACCESS (New Intersection West of Existing)	0.07	0.16	0.44	0.001	1.64	0.17	122.32	0.00	0.02	0.06
ELK GROVE STATION ACCESS (Fourth Leg of Existing Intersection)	0.07	0.16	0.44	0.001	1.64	0.17	122.32	0.00	0.02	0.06
CITY COLLEGE STATION	0.10	0.29	0.59	0.002	2.99	0.30	190.95	0.01	0.02	0.09
MIDTOWN SACRAMENTO STATION	0.10	0.29	0.59	0.002	2.99	0.30	190.95	0.01	0.02	0.09
OLD NORTH SACRAMENTO STATION	0.10	0.29	0.59	0.002	2.99	0.30	190.95	0.01	0.02	0.09
NATOMAS / SACRAMENTO AIRPORT STATION	0.10	0.29	0.59	0.002	2.99	0.30	190.95	0.01	0.02	0.09
NATOMAS MAINTENANCE & LAYOVER FACILITY	0.10	0.29	0.59	0.002	2.99	0.30	190.95	0.01	0.02	0.09
TRACK CURVE RECONSTRUCTION EAST MARCH LN TO EAST SWAIN RD	0.06	0.19	0.40	0.001	1.96	0.20	127.24	0.00	0.01	0.06
TRACK CURVE RECONSTRUCTION NORTH OF NORTH NEW HOPE RD	0.06	0.19	0.40	0.001	1.96	0.20	127.24	0.00	0.01	0.06
TRACK CURVE RECONSTRUCTION SOUTH OF DESMOND RD	0.06	0.19	0.40	0.001	1.96	0.20	127.24	0.00	0.01	0.06
TRACK CURVE RECONSTRUCTION NORTH OF ELK GROVE STATION	0.06	0.19	0.40	0.001	1.96	0.20	127.24	0.00	0.01	0.06
HAMMER LANE SIDING UPGRADE	0.06	0.19	0.40	0.001	1.96	0.20	127.24	0.00	0.01	0.06
THORNTON SIDING UPGRADE & EXTENSION	0.06	0.19	0.40	0.001	1.96	0.20	127.24	0.00	0.01	0.06
PHILLIPS SIDING UPGRADE & EXTENSION	0.06	0.19	0.40	0.001	1.96	0.20	127.24	0.00	0.01	0.06
POLLOCK SIDING UPGRADE	0.06	0.19	0.40	0.001	1.96	0.20	127.24	0.00	0.01	0.06
SOUTH SACRAMENTO SIDING UPGRADE	0.06	0.19	0.40	0.001	1.96	0.20	127.24	0.00	0.01	0.06
DEL PASO SIDING UPGRADE & EXTENSION	0.10	0.29	0.59	0.002	2.99	0.30	190.95	0.01	0.02	0.09
LODI SIDING	0.06	0.19	0.40	0.001	1.96	0.20	127.24	0.00	0.01	0.06
ELK GROVE SIDING	0.10	0.29	0.59	0.002	2.99	0.30	190.95	0.01	0.02	0.09
NEW CROSSOVER	0.06	0.19	0.40	0.001	1.96	0.20	127.24	0.00	0.01	0.06

Project Element	Mitigated Maximum Annual Emissions (tons/year) ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20	Total Emissions (metric tons) CO2e
LODI STATION	0.007	0.016	0.047	0.000	0.160	0.017	12.504	0.0004	0.002	11.34
LODI STATION - SOUTH ALTERNATIVE	0.007	0.016	0.047	0.000	0.160	0.017	12.504	0.0004	0.002	11.34
ELK GROVE STATION ACCESS (New Intersection West of Existing)	0.007	0.015	0.045	0.000	0.145	0.015	11.761	0.0004	0.002	10.67
ELK GROVE STATION ACCESS (Fourth Leg of Existing Intersection)	0.007	0.015	0.045	0.000	0.145	0.015	11.761	0.0004	0.002	10.67
CITY COLLEGE STATION	0.004	0.011	0.023	0.000	0.119	0.012	7.584	0.0002	0.001	6.88
MIDTOWN SACRAMENTO STATION	0.006	0.016	0.040	0.000	0.158	0.016	11.394	0.0004	0.001	10.34
OLD NORTH SACRAMENTO STATION	0.007	0.019	0.046	0.000	0.191	0.020	13.464	0.0004	0.002	12.21
NATOMAS / SACRAMENTO AIRPORT STATION	0.005	0.014	0.034	0.000	0.145	0.015	10.124	0.0003	0.001	9.18
NATOMAS MAINTENANCE & LAYOVER FACILITY	0.016	0.046	0.100	0.000	0.478	0.049	31.401	0.0010	0.004	28.49
TRACK CURVE RECONSTRUCTION EAST MARCH LN TO EAST SWAIN RD	0.000	0.001	0.002	0.000	0.011	0.001	0.689	0.0000	0.000	0.63
TRACK CURVE RECONSTRUCTION NORTH OF NORTH NEW HOPE RD	0.000	0.001	0.002	0.000	0.011	0.001	0.689	0.0000	0.000	0.63
TRACK CURVE RECONSTRUCTION SOUTH OF DESMOND RD	0.000	0.001	0.002	0.000	0.011	0.001	0.689	0.0000	0.000	0.63
TRACK CURVE RECONSTRUCTION NORTH OF ELK GROVE STATION	0.000	0.001	0.002	0.000	0.011	0.001	0.689	0.0000	0.000	0.63
HAMMER LANE SIDING UPGRADE	0.001	0.002	0.004	0.000	0.021	0.002	1.378	0.0000	0.000	1.25
THORNTON SIDING UPGRADE & EXTENSION	0.001	0.004	0.009	0.000	0.042	0.004	2.757	0.0001	0.000	2.50
PHILLIPS SIDING UPGRADE & EXTENSION	0.001	0.002	0.004	0.000	0.021	0.002	1.378	0.0000	0.000	1.25
POLLOCK SIDING UPGRADE	0.001	0.002	0.004	0.000	0.021	0.002	1.378	0.0000	0.000	1.25
SOUTH SACRAMENTO SIDING UPGRADE	0.001	0.005	0.007	0.000	0.051	0.005	2.865	0.0001	0.000	2.60
DEL PASO SIDING UPGRADE & EXTENSION	0.006	0.019	0.038	0.000	0.195	0.020	12.412	0.0004	0.001	11.26
LODI SIDING	0.003	0.008	0.017	0.000	0.085	0.009	5.514	0.0002	0.001	5.00
ELK GROVE SIDING	0.003	0.010	0.021	0.000	0.109	0.011	6.896	0.0002	0.001	6.26
NEW CROSSOVER	0.001	0.002	0.004	0.000	0.021	0.002	1.378	0.0000	0.000	1.25

*Note that some locations do not include all phases, so formulas for maxikum daily emissions in above chart vary to not include emissions for phases with no activity at a specific location.
* To estimate maximum daily emissions, it is assumed that all construction phases could overlap at some point within the overal construction duration for each location.

Earth Moving & Demolition Emissions

Emission Factors

Earth Moving		Grading		Cut & Fill		Demolition	
PM10 (lb/hr)	PM2.5 (lb/hr)	PM10 (lb/acre)	PM2.5 (lb/acre)	PM10 (lb/cy)	PM2.5 (lb/cy)	PM10 (lb/sf)	PM2.5 (lb/sf)
0.7527%	0.4148%	0.5294	0.0476	0.00007	0.00001	0.00004	0.00001

Project Element	Maximum Phase Duration (Months)	% Time for Earthwork	Earthwork Days of Activity	% Time for Demolition	Demolition Days of Activity	# of Bulldozers	Use per Day (hrs)	Graded Area (acres)	Cut/Fill (cy)	Demolition (sf)
LODI STATION	12	15%	38.7	5%	12.9	4	6.5	9	16310	0
LODI STATION - SOUTH ALTERNATIVE	12	15%	38.7	5%	12.9	4	6.5	13	35990	0
ELK GROVE STATION ACCESS (New Intersection West of Existin)	12	15%	38.7	5%	12.9	4	6.5	16	51480	0
ELK GROVE STATION ACCESS (Fourth Leg of Existing Intersection)	12	15%	38.7	5%	12.9	4	6.5	14	45185	0
CITY COLLEGE STATION	4	15%	12.9	5%	4.3	4	6.5	1	2200	0
MIDTOWN SACRAMENTO STATION	10	15%	32.25	5%	10.75	4	6.5	2	3890	85000
OLD NORTH SACRAMENTO STATION	10	15%	32.25	5%	10.75	4	6.5	1	7850	155000
NATOMAS / SACRAMENTO AIRPORT STATION	8	15%	25.8	5%	8.6	4	6.5	4	18500	180000
NATOMAS MAINTENANCE & LAYOVER FACILITY	14	15%	45.15	5%	15.05	4	6.5	5	135190	155000
TRACK CURVE RECONSTRUCTION EAST MARCH LN TO EAST SWAIN RD	0.5	15%	1.6125	5%	0.5375	4	6.5	0	200	0
TRACK CURVE RECONSTRUCTION NORTH OF NORTH NEW HOPE RD	0.5	15%	1.6125	5%	0.5375	4	6.5	0	150	0
TRACK CURVE RECONSTRUCTION SOUTH OF DESMOND RD	0.5	15%	1.6125	5%	0.5375	4	6.5	0	250	0
TRACK CURVE RECONSTRUCTION NORTH OF ELK GROVE STATION	0.5	15%	1.6125	5%	0.5375	4	6.5	0	200	0
HAMMER LANE SIDING UPGRADE	1	15%	3.225	5%	1.075	4	6.5	0	0	1000
THORNTON SIDING UPGRADE & EXTENSION	2	15%	6.45	5%	2.15	4	6.5	5	38800	1400
PHILLIPS SIDING UPGRADE & EXTENSION	1	15%	3.225	5%	1.075	4	6.5	3	27900	1400
POLLOCK SIDING UPGRADE	1	15%	3.225	5%	1.075	4	6.5	0	0	1000
SOUTH SACRAMENTO SIDING UPGRADE	1	15%	3.225	5%	1.075	4	6.5	0	0	0
DEL PASO SIDING UPGRADE & EXTENSION	6	15%	19.35	5%	6.45	4	6.5	9	149200	9200
LODI SIDING	4	15%	12.9	5%	4.3	4	6.5	12	100000	10070
ELK GROVE SIDING	3	15%	9.675	5%	3.225	4	6.5	7	56940	2400
NEW CROSSOVER	1	15%	3.225	5%	1.075	4	6.5	0	0	1000

Emission (total tons)

Earth Moving		Grading		Cut & Fill		Demolition		*Total*	
PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	*PM10*	*PM2.5*
0.3787	0.2087	0.0024	0.0002	0.0006	0.0001	0.0000	0.0000	*0.3817*	*0.2090*
0.3787	0.2087	0.0034	0.0003	0.0013	0.0002	0.0000	0.0000	*0.3834*	*0.2092*
0.3787	0.2087	0.0042	0.0004	0.0019	0.0003	0.0000	0.0000	*0.3848*	*0.2094*
0.3787	0.2087	0.0037	0.0003	0.0016	0.0002	0.0000	0.0000	*0.3840*	*0.2093*
0.1262	0.0696	0.0003	0.0000	0.0001	0.0000	0.0000	0.0000	*0.1266*	*0.0696*
0.3156	0.1739	0.0005	0.0000	0.0001	0.0000	0.0015	0.0002	*0.3178*	*0.1742*
0.3156	0.1739	0.0001	0.0000	0.0003	0.0000	0.0027	0.0004	*0.3189*	*0.1744*
0.2525	0.1391	0.0011	0.0001	0.0007	0.0001	0.0032	0.0005	*0.2573*	*0.1398*
0.4418	0.2435	0.0013	0.0001	0.0049	0.0007	0.0027	0.0004	*0.4507*	*0.2447*
0.0158	0.0087	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	*0.0158*	*0.0087*
0.0158	0.0087	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	*0.0158*	*0.0087*
0.0158	0.0087	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	*0.0158*	*0.0087*
0.0158	0.0087	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	*0.0158*	*0.0087*
0.0316	0.0174	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	*0.0316*	*0.0174*
0.0631	0.0348	0.0013	0.0001	0.0014	0.0002	0.0000	0.0000	*0.0659*	*0.0351*
0.0316	0.0174	0.0008	0.0001	0.0010	0.0002	0.0000	0.0000	*0.0334*	*0.0176*
0.0316	0.0174	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	*0.0316*	*0.0174*
0.0316	0.0174	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	*0.0316*	*0.0174*
0.1894	0.1043	0.0024	0.0002	0.0054	0.0008	0.0002	0.0000	*0.1973*	*0.1054*
0.1262	0.0696	0.0032	0.0003	0.0036	0.0005	0.0002	0.0000	*0.1332*	*0.0704*
0.0947	0.0522	0.0018	0.0002	0.0021	0.0003	0.0000	0.0000	*0.0986*	*0.0527*
0.0316	0.0174	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	*0.0316*	*0.0174*

Emission (lbs/day)

Earth Moving		Grading		Cut & Fill		Demolition		*Total*	
PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	*PM10*	*PM2.5*
19.57	10.79	0.12	0.01	0.03	0.00	0.00	0.00	*19.72*	*10.80*
19.57	10.79	0.18	0.02	0.07	0.01	0.00	0.00	*19.82*	*10.81*
19.57	10.79	0.22	0.02	0.10	0.01	0.00	0.00	*19.89*	*10.82*
19.57	10.79	0.19	0.02	0.08	0.01	0.00	0.00	*19.85*	*10.82*
19.57	10.79	0.04	0.00	0.01	0.00	0.00	0.00	*19.62*	*10.78*
19.57	10.79	0.03	0.00	0.01	0.00	0.09	0.01	*19.71*	*10.80*
19.57	10.79	0.02	0.00	0.02	0.00	0.17	0.03	*19.77*	*10.81*
19.57	10.79	0.08	0.01	0.05	0.01	0.24	0.04	*19.95*	*10.84*
19.57	10.79	0.06	0.01	0.22	0.03	0.12	0.02	*19.97*	*10.84*
19.57	10.79	0.00	0.00	0.01	0.00	0.00	0.00	*19.58*	*10.79*
19.57	10.79	0.00	0.00	0.01	0.00	0.00	0.00	*19.58*	*10.79*
19.57	10.79	0.00	0.00	0.01	0.00	0.00	0.00	*19.58*	*10.79*
19.57	10.79	0.00	0.00	0.01	0.00	0.00	0.00	*19.58*	*10.79*
19.57	10.79	0.41	0.04	0.43	0.07	0.01	0.00	*20.42*	*10.89*
19.57	10.79	0.49	0.04	0.62	0.09	0.02	0.00	*20.70*	*10.93*
19.57	10.79	0.00	0.00	0.00	0.00	0.01	0.00	*19.58*	*10.79*
19.57	10.79	0.00	0.00	0.00	0.00	0.00	0.00	*19.57*	*10.79*
19.57	10.79	0.24	0.02	0.56	0.08	0.02	0.00	*20.39*	*10.89*
19.57	10.79	0.49	0.04	0.56	0.08	0.03	0.00	*20.65*	*10.92*
19.57	10.79	0.38	0.03	0.43	0.06	0.01	0.00	*20.39*	*10.89*
19.57	10.79	0.00	0.00	0.00	0.00	0.01	0.00	*19.58*	*10.79*

Mitigated Emission (total tons)

Earth Moving		Grading		Cut & Fill		Demolition		*Total*	
PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	*PM10*	*PM2.5*
0.1477	0.0814	0.0024	0.0002	0.0006	0.0001	0.0000	0.0000	*0.1507*	*0.0817*
0.1477	0.0814	0.0034	0.0003	0.0013	0.0002	0.0000	0.0000	*0.1524*	*0.0819*
0.1477	0.0814	0.0042	0.0004	0.0019	0.0003	0.0000	0.0000	*0.1538*	*0.0821*
0.1477	0.0814	0.0037	0.0003	0.0016	0.0002	0.0000	0.0000	*0.1530*	*0.0820*
0.0492	0.0271	0.0003	0.0000	0.0001	0.0000	0.0000	0.0000	*0.0496*	*0.0272*
0.1231	0.0678	0.0005	0.0000	0.0001	0.0000	0.0015	0.0002	*0.1252*	*0.0681*
0.1231	0.0678	0.0003	0.0000	0.0003	0.0000	0.0027	0.0004	*0.1263*	*0.0683*
0.1231	0.0678	0.0003	0.0000	0.0003	0.0000	0.0027	0.0004	*0.1263*	*0.0683*
0.0985	0.0543	0.0011	0.0001	0.0007	0.0001	0.0032	0.0005	*0.1033*	*0.0549*
0.1723	0.0950	0.0013	0.0001	0.0049	0.0007	0.0027	0.0004	*0.1812*	*0.0962*
0.0062	0.0034	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	*0.0062*	*0.0034*
0.0062	0.0034	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	*0.0062*	*0.0034*
0.0062	0.0034	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	*0.0062*	*0.0034*
0.0062	0.0034	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	*0.0062*	*0.0034*
0.0123	0.0068	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	*0.0123*	*0.0068*
0.0246	0.0136	0.0013	0.0001	0.0014	0.0002	0.0000	0.0000	*0.0274*	*0.0139*
0.0123	0.0068	0.0008	0.0001	0.0010	0.0002	0.0000	0.0000	*0.0141*	*0.0070*
0.0123	0.0068	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	*0.0123*	*0.0068*
0.0123	0.0068	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	*0.0123*	*0.0068*
0.0738	0.0407	0.0024	0.0002	0.0054	0.0008	0.0002	0.0000	*0.0818*	*0.0418*
0.0492	0.0271	0.0032	0.0003	0.0036	0.0005	0.0002	0.0000	*0.0562*	*0.0280*
0.0369	0.0203	0.0018	0.0002	0.0021	0.0003	0.0000	0.0000	*0.0409*	*0.0208*
0.0123	0.0068	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	*0.0123*	*0.0068*

Mitigated Emission (lbs/day)

Earth Moving		Grading		Cut & Fill		Demolition		*Total*	
PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	*PM10*	*PM2.5*
7.6330	4.2062	0.12	0.01	0.03	0.00	0.00	0.00	*7.79*	*4.23*
7.6330	4.2062	0.18	0.02	0.07	0.01	0.00	0.00	*7.88*	*4.23*
7.6330	4.2062	0.22	0.02	0.10	0.01	0.00	0.00	*7.95*	*4.24*
7.6330	4.2062	0.19	0.02	0.08	0.01	0.00	0.00	*7.91*	*4.24*
7.6330	4.2062	0.04	0.00	0.01	0.00	0.00	0.00	*7.69*	*4.21*
7.6330	4.2062	0.03	0.00	0.01	0.00	0.09	0.01	*7.77*	*4.22*
7.6330	4.2062	0.02	0.00	0.02	0.00	0.17	0.03	*7.84*	*4.24*
7.6330	4.2062	0.08	0.01	0.05	0.01	0.24	0.04	*8.01*	*4.26*
7.6330	4.2062	0.06	0.01	0.22	0.03	0.12	0.02	*8.03*	*4.26*
7.6330	4.2062	0.00	0.00	0.01	0.00	0.00	0.00	*7.64*	*4.21*
7.6330	4.2062	0.00	0.00	0.01	0.00	0.00	0.00	*7.64*	*4.21*
7.6330	4.2062	0.00	0.00	0.01	0.00	0.00	0.00	*7.64*	*4.21*
7.6330	4.2062	0.00	0.00	0.01	0.00	0.00	0.00	*7.64*	*4.21*
7.6330	4.2062	0.41	0.04	0.43	0.07	0.01	0.00	*8.48*	*4.31*
7.6330	4.2062	0.49	0.04	0.62	0.09	0.02	0.00	*8.76*	*4.35*
7.6330	4.2062	0.00	0.00	0.00	0.00	0.01	0.00	*7.64*	*4.21*
7.6330	4.2062	0.00	0.00	0.00	0.00	0.00	0.00	*7.63*	*4.21*
7.6330	4.2062	0.24	0.02	0.56	0.08	0.02	0.00	*8.45*	*4.32*
7.6330	4.2062	0.49	0.04	0.56	0.08	0.03	0.00	*8.71*	*4.34*
7.6330	4.2062	0.38	0.03	0.43	0.06	0.01	0.00	*8.45*	*4.31*
7.6330	4.2062	0.00	0.00	0.00	0.00	0.01	0.00	*7.64*	*4.21*

	$
Days of work per week:	
Average Workdays per Month:	21.5
Control Efficiency of Watering every 3 hours during Earth Moving activities*	61%
*Per SCAQMD Table X1-A	

Conversion Factors	
pounds per ton	2000

Paving and Architectural Coating Emissions

Project Element	Maximum Phase Duration (Months)	% Time for work	Area (ft^2)	ROG Emissions	
				Total (tons)	Daily (lb/day)
LODI STATION	6	50%	200000	0.01	0.1865
LODI STATION - SOUTH ALTERNATIVE	6	50%	230000	0.01	0.2145
ELK GROVE STATION ACCESS (New Intersection West of Existing)	6	50%	650000	0.02	0.6061
ELK GROVE STATION ACCESS (Fourth Leg of Existing Intersection)	6	50%	570000	0.02	0.5315
CITY COLLEGE STATION	3	50%	0	0.00	0.0000
MIDTOWN SACRAMENTO STATION	3	50%	150000	0.00	0.2798
OLD NORTH SACRAMENTO STATION	6	50%	210000	0.01	0.1958
NATOMAS / SACRAMENTO AIRPORT STATION	3	50%	238000	0.01	0.4439
NATOMAS MAINTENANCE & LAYOVER FACILITY	24	50%	315000	0.01	0.0734
TRACK CURVE RECONSTRUCTION EAST MARCH LN TO EAST SWAIN RD	0	50%	0	0.00	0.0000
TRACK CURVE RECONSTRUCTION NORTH OF NORTH NEW HOPE RD	0	50%	0	0.00	0.0000
TRACK CURVE RECONSTRUCTION SOUTH OF DESMOND RD	0	50%	0	0.00	0.0000
TRACK CURVE RECONSTRUCTION NORTH OF ELK GROVE STATION	0	50%	0	0.00	0.0000
HAMMER LANE SIDING UPGRADE	0	50%	0	0.00	0.0000
THORNTON SIDING UPGRADE & EXTENSION	2	50%	1400	0.00	0.0039 *
PHILLIPS SIDING UPGRADE & EXTENSION	1	50%	1400	0.00	0.0078 *
POLLOCK SIDING UPGRADE	0	50%	0	0.00	0.0000
SOUTH SACRAMENTO SIDING UPGRADE	0	50%	0	0.00	0.0000
DEL PASO SIDING UPGRADE & EXTENSION	6	50%	9200	0.00	0.0086
LODI SIDING	4	50%	10070	0.00	0.0141 *
ELK GROVE SIDING	4	50%	2400	0.00	0.0034
NEW CROSSOVER	0	50%	0	0.00	0.0000

*Assumed paving to occur during structures phase except where noted by *, in which it occurs during rail work phase.

Days of work per week: 5

Average Workdays per Month: 21.5

Offsite On-Raod ConstructionVehicle Emissions (Exhaust)

Vehicle Type	Trips / Day [1]	Miles / Day [2]	Emission Factors (g/mile) [3]												Daily Emissions (lb/day)											Daily Emissions (metric tons/day)
			ROG	CO	NOX	SO2	PM10 Fugitive Dust [4]	PM10 Exhaust	PM10 Total	PM2.5 Fugitive Dust [4]	PM2.5 Exhaust	PM2.5 Total	CO2	CH4	N2O	ROG	CO	NOX	SO2	PM10 Fugitive Dust	PM10 Exhaust	PM10 Total	PM2.5 Fugitive Dust	PM2.5 Exhaust	PM2.5 Total	CO2	CH4	N2O	CO2e
SITE WORK																													
RENTAL DUMP TRUCKS (50% onsite/50% offsite)	8	252	0.221	0.627	3.639	0.010	1.637	0.093	1.730	0.426	0.089	0.515	1072	0.010	0.169	0.123	0.348	2.022	0.006	0.909	0.052	0.961	0.236	0.049	0.286	596	0.006	0.094	0.270
Worker Trips	14	235.2	0.015	0.823	0.073	0.003	0.334	0.002	0.336	0.089	0.001	0.090	312	0.004	0.007	0.008	0.427	0.038	0.002	0.173	0.001	0.174	0.046	0.001	0.047	162	0.002	0.004	0.073
Phase Total																*0.131*	*0.775*	*2.060*	*0.007*	*1.082*	*0.053*	*1.135*	*0.282*	*0.050*	*0.333*	*757*	*0.008*	*0.097*	*0.344*
RAIL WORK																													
FLAT BED TRUCK (75% onsite/25% offsite)	2	21.875	0.026	1.151	0.133	0.004	1.539	0.002	1.541	0.385	0.001	0.386	432	0.006	0.011	0.001	0.055	0.006	0.000	0.074	0.000	0.074	0.019	0.000	0.019	21	0.000	0.001	0.009
PICKUPS (50% onsite/50% offsite)	6	105	0.018	0.948	0.099	0.003	0.334	0.002	0.336	0.089	0.001	0.090	346	0.004	0.008	0.004	0.219	0.023	0.001	0.077	0.000	0.078	0.021	0.000	0.021	80	0.001	0.002	0.036
FLAT BED TRACTOR (75% onsite/25% offsite)	2	8.75	0.221	0.627	3.639	0.010	1.637	0.093	1.730	0.426	0.089	0.515	1072	0.010	0.169	0.004	0.012	0.070	0.000	0.032	0.002	0.033	0.008	0.002	0.010	21	0.000	0.003	0.009
Worker Trips	38	638.4	0.015	0.823	0.073	0.003	0.334	0.002	0.336	0.089	0.001	0.090	312	0.004	0.007	0.022	1.158	0.103	0.004	0.470	0.002	0.472	0.125	0.002	0.127	439	0.005	0.010	0.199
Phase Total																*0.031*	*1.445*	*0.203*	*0.006*	*0.653*	*0.004*	*0.658*	*0.172*	*0.004*	*0.176*	*561*	*0.007*	*0.015*	*0.254*
STRUCTURES																													
FLAT BED TRUCK (75% onsite/25% offsite)	2	17.5	0.026	1.151	0.133	0.004	1.539	0.002	1.541	0.385	0.001	0.386	432	0.006	0.011	0.001	0.044	0.005	0.000	0.059	0.000	0.059	0.015	0.000	0.015	17	0.000	0.000	0.008
PICKUPS (50% onsite/50% offsite)	6	24.5	0.018	0.948	0.099	0.003	0.334	0.002	0.336	0.089	0.001	0.090	346	0.004	0.008	0.001	0.051	0.005	0.000	0.018	0.000	0.018	0.005	0.000	0.005	19	0.000	0.000	0.008
Worker Trips	40	672	0.015	0.823	0.073	0.003	0.334	0.002	0.336	0.089	0.001	0.090	312	0.004	0.007	0.023	1.219	0.109	0.005	0.495	0.002	0.497	0.132	0.002	0.134	462	0.005	0.010	0.210
Phase Total																*0.025*	*1.315*	*0.119*	*0.005*	*0.572*	*0.002*	*0.575*	*0.151*	*0.002*	*0.153*	*498*	*0.006*	*0.011*	*0.226*
																Total	0.187	3.535	2.382	0.018	2.308	0.059	2.368	0.606	0.057	0.662	1816	0.020	0.123	0.824

1. The number of worker trips is based upon the number of workers listed in the Data Tab for each phase subtract the workers accounted for in driving the other on-road equipment to/from the site.
2. Miles per day for on-road construction equipment is based on on-road off-site activity estiamte in Data Tab (on-site activity emissions estaimted in Const On-Site EMFAC On-Road EFs tab). Default worker trip length (based on CalEEMod default for San Joaquin County, which is longer than default for Sacramento County) (miles)
3. Emission factors based on EMFAC2017 aggregate fleet for year 2021 (earliest year of construction).
4. Includes emission factor for fugitive re-entrained road dust emissions for unpaved roads (AP-42,Section 13.2.1)

Assumptions	
Worker Trip length	16.8
Conversion Factors	
grams per pound	453.59237
pounds per ton	2000
pounds per metric ton	2204.62262
Global Warming Potential	
CO2	1
Ch4	25
N20	298

Note: GWP are the 100-year GWPs from the IPCC fourth assessment report (AR4), consistent with the California Air Resources Board 2019 GHG emissions inventory.

Average Workdays per Year:	260
Months per Year	12

Project Element	Construction Activity Duration (years)				Daily Emissions (lb/day)									Daily Emissions (metric tons/day)	Max Annual Emissions (tons/year)									Total Emissions (metric tons)
	Total	Site Work	Rail Work	Structures	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20	CO2e	ROG	CO	NOX	SO2	PM10	PM2.5	CO2	CH4	N20	CO2e
LODI STATION	1.2	1.00	0.08	0.50	0.19	3.53	2.38	0.02	2.31	0.06	2.37	0.61	0.06	0.66	0.02	0.20	0.28	0.00	0.19	0.06	136.88	0.00	0.01	124.18
LODI STATION - SOUTH ALTERNATIVE	1.2	1.00	0.08	0.50	0.19	3.53	2.38	0.02	2.31	0.06	2.37	0.61	0.06	0.66	0.02	0.20	0.28	0.00	0.19	0.06	136.88	0.00	0.01	124.18
ELK GROVE STATION ACCESS (New Intersection West of Existing)	1.2	1.00	0.00	0.50	0.16	2.09	2.18	0.01	1.65	0.05	1.71	0.43	0.05	0.49	0.02	0.19	0.28	0.00	0.18	0.05	130.80	0.00	0.01	118.66
ELK GROVE STATION ACCESS (Fourth Leg of Existing Intersection)	1.2	1.00	0.00	0.50	0.16	2.09	2.18	0.01	1.65	0.05	1.71	0.43	0.05	0.49	0.02	0.19	0.28	0.00	0.18	0.05	130.80	0.00	0.01	118.66
CITY COLLEGE STATION	0.7	0.33	0.33	0.25	0.19	3.53	2.38	0.02	2.31	0.06	2.37	0.61	0.06	0.66	0.01	0.14	0.10	0.00	0.10	0.03	73.29	0.00	0.01	66.49
MIDTOWN SACRAMENTO STATION	1.0	0.83	0.33	0.25	0.19	3.53	2.38	0.02	2.31	0.06	2.37	0.61	0.06	0.66	0.02	0.19	0.24	0.00	0.17	0.05	122.52	0.00	0.01	111.15
OLD NORTH SACRAMENTO STATION	1.2	0.83	0.33	0.50	0.19	3.53	2.38	0.02	2.31	0.06	2.37	0.61	0.06	0.66	0.02	0.23	0.24	0.00	0.19	0.05	138.69	0.00	0.01	125.82
NATOMAS / SACRAMENTO AIRPORT STATION	0.8	0.67	0.17	0.25	0.19	3.53	2.38	0.02	2.31	0.06	2.37	0.61	0.06	0.66	0.01	0.14	0.19	0.00	0.13	0.04	93.96	0.00	0.01	85.24
NATOMAS MAINTENANCE & LAYOVER FACILITY	2.5	1.17	0.67	2.00	0.19	3.53	2.38	0.02	2.31	0.06	2.37	0.61	0.06	0.66	0.03	0.58	0.36	0.00	0.38	0.11	292.83	0.00	0.02	265.65
TRACK CURVE RECONSTRUCTION EAST MARCH LN TO EAST SWAIN RD	0.1	0.04	0.04	0.00	0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.01	0.01	0.00	0.01	0.00	7.14	0.00	0.00	6.48
TRACK CURVE RECONSTRUCTION NORTH OF NORTH NEW HOPE RD	0.1	0.04	0.04	0.00	0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.01	0.01	0.00	0.01	0.00	7.14	0.00	0.00	6.48
TRACK CURVE RECONSTRUCTION SOUTH OF DESMOND RD	0.1	0.04	0.04	0.00	0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.01	0.01	0.00	0.01	0.00	7.14	0.00	0.00	6.48
TRACK CURVE RECONSTRUCTION NORTH OF ELK GROVE STATION	0.1	0.04	0.04	0.00	0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.01	0.01	0.00	0.01	0.00	7.14	0.00	0.00	6.48
HAMMER LANE SIDING UPGRADE	0.2	0.08	0.08	0.00	0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.02	0.02	0.00	0.02	0.01	14.28	0.00	0.00	12.95
THORNTON SIDING UPGRADE & EXTENSION	0.3	0.17	0.17	0.00	0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.05	0.05	0.00	0.04	0.01	28.56	0.00	0.00	25.91
PHILLIPS SIDING UPGRADE & EXTENSION	0.2	0.08	0.08	0.00	0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.02	0.02	0.00	0.02	0.01	14.28	0.00	0.00	12.95
POLLOCK SIDING UPGRADE	0.2	0.08	0.08	0.00	0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.02	0.02	0.00	0.02	0.01	14.28	0.00	0.00	12.95
SOUTH SACRAMENTO SIDING UPGRADE	0.3	0.08	0.25	0.00	0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.06	0.03	0.00	0.03	0.01	26.43	0.00	0.00	23.98
DEL PASO SIDING UPGRADE & EXTENSION	1.0	0.50	0.50	0.50	0.19	3.53	2.38	0.02	2.31	0.06	2.37	0.61	0.06	0.66	0.01	0.23	0.15	0.00	0.15	0.04	118.02	0.00	0.01	107.07
LODI SIDING	0.7	0.33	0.33	0.00	0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.01	0.10	0.10	0.00	0.08	0.02	57.12	0.00	0.00	51.82
ELK GROVE SIDING	0.7	0.25	0.25	0.33	0.19	3.53	2.38	0.02	2.31	0.06	2.37	0.61	0.06	0.66	0.01	0.13	0.08	0.00	0.08	0.02	64.40	0.00	0.00	58.42
NEW CROSSOVER	0.2	0.08	0.08	0.00	0.16	2.22	2.26	0.01	1.74	0.06	1.79	0.45	0.05	0.51	0.00	0.02	0.02	0.00	0.02	0.01	14.28	0.00	0.00	12.95

*Note that some locations do not include all phases, so formulas for maximum daily emissions in above chart vary to not include emissions for phases with no activity at a specific location.
* To estimate maximum daily emissions, it is assumed that all construction phases could overlap at some point within the overal construction duration for each location.

	Construction Phase Duration (months)		
Total	Site Work	Rail Work	Structures
14	12	1	6
14	12	1	6
14	12	0	6
14	12	0	6
8	4	4	3
12	10	4	3
14	10	4	6
14	12	3	6
10	8	2	3
10	6	1	3
30	14	8	18
30	14	8	24
1	0.5	0.5	0
1	0.5	0.5	0
1	0.5	0.5	0
1	0.5	0.5	0
2	1	1	0
4	2	2	0
2	1	1	0
2	1	1	0
4	1	3	0
12	6	6	6
8	4	4	0
8	3	3	4
2	1	1	0