US Army Corps
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Los Angeles District

Los Angeles River Ecosystem Restoration Feasibility Study

DRAFT – APPENDIX F
Air Quality

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LOS ANGELES RIVER ECOSYSTEM RESTORATION FEASIBILITY STUDY

AIR QUALITY APPENDIX

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This technical appendix presents a detailed analysis of potential air quality impact from the proposed project.

1. OVERVIEW OF METHODOLOGY

1.1 California Environmental Quality Act (CEQA)

To determine whether or not air quality impacts from the proposed project are significant for CEQA, impacts will be evaluated and compared with the significance criteria in Table 1. If impacts equal or exceed any of the criteria in Table 1, they will be considered significant. Significance determinations for construction impacts are based on the maximum or peak daily emissions during the construction period, which provides a "worst-case" analysis of the construction emissions. Similarly, significance determinations for operational emissions are based on the maximum or peak daily allowable emissions during the operational phase.

Regional and localized emissions were calculated using the South Coast Air Quality Management District (SCAQMD)-approved California Emissions Estimator Model (CalEEMod)[1]. The model was developed by the SCAQMD, in collaboration with other air districts in California, to estimate criteria air pollutant and greenhouse gas emissions from various land use development projects. It can be used to estimate air quality impact analysis for compliance with regulations, such as CEQA, National Environmental Policy Act of 1969 (NEPA), and local air quality rules and regulations.

In addition to the CalEEMod model, the SCAQMD's localized significance threshold (LST) methodology is used to analyze localized construction emissions for each of the three alternatives. The LST methodology uses look-up thresholds for projects that disturb five acres or less per day. Since each of the four alternatives will disturb approximately one acre per day, the look-up thresholds were used.

1.2 NEPA

To determine whether or not air quality impacts from the proposed project are significant for NEPA, the Environmental Protection Agency (EPA) establishes a threshold for screening purposes. If a proposed project results in any criteria air pollutant emissions of 50 tons per year or less, then the project is deemed insignificant.

[1] South Coast Air Quality Management District, www.caleemod.com

2. AIR QUALITY IMPACTS FROM CONSTRUCTION

2.1 Regional Impacts

Impacts on regional air quality from the project construction activities are evaluated in this section. Construction emissions are expected from the following equipment and processes:

- Onsite Fugitive Dust Associated with Site Construction Activities
- Onsite Construction Equipment (dump trucks, backhoes, graders, etc.)
- Onsite and Offsite Vehicle Emissions, including Delivery Trucks and Worker Vehicles

Table 2.1 Air Quality Significance Thresholds

Mass Daily Thresholds[a]		
Pollutant	**Construction[b]**	**Operation[c]**
Nitrogen Oxide (NOx)	100 lbs/day	55 lbs/day
Reactive Organic Gas (ROG)	75 lbs/day	55 lbs/day
Particle Pollution (PM_{10})	150 lbs/day	150 lbs/day
Particle Pollution ($PM_{2.5}$)	55 lbs/day	55 lbs/day
Sulfur Oxides (SOx)	150 lbs/day	150 lbs/day
Carbon Monoxide (CO)	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day
Toxic Air Contaminants (TACs), Odor, and Greenhouse Gas (GHG) Thresholds		
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk> 10 in 1 million Chronic and Acute Hazard Index > 1.0 (project increment) Cancer Burden > 0.5 excess cancer cases (in areas > 1 in 1 million)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	
GHG	10,000 MT/yr Carbon Dioxide (CO_2) eq for industrial facilities	
Ambient Air Quality for Criteria Pollutants[d]		
NOx1-hour average annual average	In attainment; significant if project causes or contributes to an exceedance of any standard: 0.18 ppm (state) 0.03 ppm (state) and 0.0534 ppm (federal)	
PM_{10}, 24-hour annual average	10.4 μg/m^3 (construction)[e] and 2.5 μg/m^3 (operation) 1.0 μg/m^3	
$PM_{2.5}$, 24-hour average	10.4 μg/m^3 (construction)[e] and 2.5 μg/m^3 (operation)	
SO_2, 1-hour average 24-hour average	0.255 ppm (state) and 0.075 ppm federal - 99th percentile) 0.04 ppm (state)	
Sulfate 24-hour average	25 μg/m^3 (state)	
CO, 1-hour average 8-hour average	In attainment; significant if project causes or contributes to an exceedance of any standard: 20 ppm (state) and 35 ppm (federal) 9.0 ppm (state/federal)	

Ambient Air Quality for Criteria Pollutants[d]	
Lead 30-day average Rolling 3-month average Quarterly average	1.5 μg/m^3 (state) 0.15 μg/m^3 (federal) 1.5 μg/m^3 (federal)
a) Source: SCAQMD CEQA Handbook (SCAQMD, 1993) b) Construction thresholds apply to both the South Coast Air Basin (SCAB) and Coachella Valley (Salton Sea and Mojave Desert Air Basin) c) For Coachella Valley; the mass daily thresholds for operation are the same as the construction thresholds. d) Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303. Table A-2 unless otherwise stated. e) Ambient air quality threshold based on SCAQMD Rule 403. KEY: ppm = parts per million; μg/m^3 = microgram per cubic meter; lbs/day = pounds per day; MT/yr C02eq = metric tons per year of CO_2 equivalents.	

The CalEEMod model divides the construction processes into phases, including demolition, mass site grading, fine site grading, trenching, building construction, architectural coating and paving. These model settings can be modified to fit applicable features of a specific project. Each construction phase could generate the following emissions:

(1) Fugitive dust emissions resulting from soil disturbance activity

Construction activities at the site, including grading, trenching, and truck filling/dumping generates dust emissions. Vehicles and trucks traveling on paved and unpaved roads are also a source of fugitive emissions during the construction period. Table 2.2 shows the anticipated soil acreage disturbed for each alternative.

During construction, the proposed project would be subject to SCAQMD Rules 403 (Fugitive Dust). Rule 403 reduces man-made fugitive dust and requires implementing control measures to prevent, reduce, or mitigate fugitive dust emissions and includes a performance standard that prohibits visible emissions from crossing any property line.[2] Dust control measures, such as water application on dry soil and reduced vehicles travelling on unpaved roads, are standard mitigation techniques. Implementing dust suppression techniques can reduce the fugitive dust generation (and thus the PM_{10} component) by 50 percent or more. Therefore, the estimation of fugitive dust emissions during project construction assumes Rule 403 compliance.

(2) Emissions of air pollutants from fuel combustion in construction equipment

On-site construction equipment will be a source of combustion emissions. Construction equipment is expected to include excavator, tractor, loader, scraper, crane, water truck grader, paver, and compactor. The equipment is assumed to be operational eight hours per day. Table 2.2 shows the typical construction equipment mix by alternative.

[2] South Coast Air Quality Management District Rule 403, http://www.aqmd.gov/rules/reg/reg04/r403.pdf

Table 2.2 Construction Data

	Alternative			
	10	**13**	**16**	**20**
Total Acreage	489	539	576	621
Daily Acreage	3.04	1.91	0.92	0.86
Excavated Material, Cubic Yards	797,762	948,303	2,704,335	3,851,974
Concrete Demolition, Cubic Yards		16,674	56,013	43,219
Spalls Removal, Cubic Yards		19,723	79,771	68,241
Grouted Riprap Demolition, Cubic Yards			38,932	34,932
Riprap Demolition, Cubic Yards			5,166	10,567
Asphalt Demolition, Cubic Yards			2,594	3,726
Worker Trips (Daily)	24	29	90	107
Total Truck Trips (12-CY) - Demolition	11,785	24,810	57,559	58,173
Total Truck Trips (16-CY) - Excavation	54,459	70,623	207,418	288,091
Daily Truck Trips (12-CY)	73	88	92	80
Daily Truck Trips (16-CY)	338	250	332	397

Equipment Mix for All Alternatives		
Equipment	**Hours per day**	**Types**
Hydraulic Excavator	8	2 to 3 cy excavator
Tractor	8	135-HP dozer
Loader	8	3.5-cy front end loader
Scraper	8	28-cy scraper
Cranes	8	50 to 150 ton cranes
Water Truck	8	3,000-gal truck
Grader	8	14' blade grader
Paver	8	10-ft wide paver
Compactor	8	2.7-ton roller

(3) Emissions of air pollutants from fuel combustion in vehicles and trucks

Vehicles used for worker commute, trucks for delivering material to the site, and trucks for hauling construction debris disposal will be sources of combustion emissions. Primary emissions generated will include combustion emissions from engines during idling and while operating. Emissions are based on the estimated number of trips per day and the round trip travel distances. Table 2.2 provides the worker commute and haul truck information.

The worker commute and haul truck data were input into the CalEEMod model. Construction activities associated with the four alternatives could result in emissions of CO, VOC, NOx, SOx, PM_{10}, and $PM_{2.5}$. Construction emissions are summarized in Tables 2.3, 2.4, 2.5 and 2.6 for Alternatives 10, 13, 16 and 20, respectively, together with the SCAQMD's daily construction significance threshold levels. Results are as follows:

- For Alternative 10, the construction phase of the proposed project is expected to exceed the regional significance thresholds for ROG and NOx. It is a large-scaled development project with size of 489 acres. Therefore, unmitigated air quality impacts associated with construction activities are considered significant due to ROG and NOx emissions.

- For Alternatives 13, 16 and 20, the construction phase of the proposed project is expected to exceed the regional significance thresholds for ROG, NOx and CO. Each alternative is a large-scaled development project and each has size exceeding 500 acres. Therefore, unmitigated air quality impacts associated with construction activities are considered significant due to ROG, NOx and CO emissions.

The CalEEMod model files are available upon request.

2.2 Localized Impacts

In addition to the SCAQMD's regional significant threshold, the SCAQMD also has developed localized significant thresholds (LSTs) that identify daily emissions levels at a project construction site that could cause or contribute to adverse localized air quality impacts to the nearest sensitive receptors.

For projects with a daily construction footprint larger than five acres, SCAQMD recommends that the localized air quality impact analysis be performed using an appropriate air dispersion model and has developed the LST methodology to determine localized impacts. Since the maximum daily construction footprint for each of the four alternatives would be less than five acres, the LST methodology would be applicable. This LST methodology consists of mass emission rate lookup tables. If the calculated emissions for the construction activity are below the emission level found in the LST lookup tables, the construction activity is not considered significant. The screening tables were developed using conservative assumptions, including the worst meteorological conditions. If localized emissions exceed the values in the lookup tables, more precise dispersion modeling may be performed. LSTs apply only to the following criteria pollutants: NOx, CO, PM_{10}, and $PM_{2.5}$ and apply only to emissions generated on site.

Table 2.3 Construction Emissions and CEQA Thresholds for Alternative 10

Alternative 10	Localized Emissions (lbs/day)						Regional Emissions (lbs/day)					
	ROG	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**	**ROG**	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**
R1	3.74	24.32	22.76	0.04	1.62	1.62	3.98	26.92	24.42	0.04	1.72	1.72
R2	0	0	0	0	0	0	0	0	0	0	0	0
R3	5.8	42.42	32.44	0.06	2.16	2.16	6.36	45.32	37.8	0.06	2.32	2.32
R4	31.72	232.54	163.52	0.32	12.24	12.24	34.92	263.16	187.12	0.32	13.48	13.48
R5	5.8	42.42	32.44	0.06	2.16	2.16	6.36	45.32	37.8	0.06	2.32	2.32
R6	17.43	133.51	67.21	0.16	6.14	6.14	18.67	146.65	75.78	0.16	6.65	6.65
R7	2.9	21.21	16.22	0.03	1.08	1.08	3.18	22.66	18.9	0.03	1.16	1.16
R8	15.42	121.98	64.35	0.15	4.92	4.92	16.5	133.68	71.82	0.15	5.37	5.37
Truck Trips							22.32	201.45	125.25	0.38	20.74	13.52
Max Daily Emissions	49.15	366.05	230.73	0.48	18.38	18.38	98.23	812.71	513.4	1.24	61.61	47.17
SCAQMD Threshold	-	46	231	-	4	3	75	100	550	150	150	55
Exceed Threshold?		Yes	No		Yes	Yes	Yes	Yes	No	No	No	No

Table 2.4 Construction Emissions and CEQA Thresholds for Alternative 13

Alternative 13	Localized Emissions (lbs/day)						Regional Emissions (lbs/day)					
	ROG	NOx	CO	SO2	PM10	PM2.5	ROG	NOx	CO	SO2	PM10	PM2.5
R1	19.04	125.16	107.76	0.2	7.44	7.44	19.52	130.36	111.08	0.2	7.64	7.64
R2	0	0	0	0	0	0	0	0	0	0	0	0
R3	79.6	560.68	429.92	0.84	29.12	29.12	83.92	607.48	459.8	0.84	30.92	30.92
R4	82.72	581.64	451.16	0.88	30.24	30.24	87.52	633.64	484.36	0.88	32.24	32.24
R5	5.8	42.42	32.44	0.06	2.16	2.16	6.04	45.02	34.1	0.06	2.26	2.26
R6	47.96	352.96	213.56	0.38	18.32	18.32	52.28	399.76	243.44	0.38	20.12	20.12
R7	83.52	639.92	366.02	0.84	29.46	29.46	88.32	691.92	399.22	0.84	31.46	31.46
R8	20.56	162.64	85.8	0.2	6.56	6.56	22	178.24	95.76	0.2	7.16	7.16
Truck Trips	16.71	159.09	94.51	0.33	7.92	7.92						
Max Daily Emissions	139.97	1099.11	761.51	1.57	51.92	51.92	131.18	1025.82	703.52	1.24	47.2	47.2
SCAQMD Threshold	-	46	231	-	4	3	75	100	550	150	150	55
Exceed Threshold?	-	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes	No	No	No

Table 2.5 Construction Emissions and CEQA Thresholds for Alternative 16

Alternative 16	Localized Emissions (lbs/day)						Regional Emissions (lbs/day)					
	ROG	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**	**ROG**	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**
R1	19.04	125.16	107.76	0.2	7.44	7.44	19.52	130.36	111.08	0.2	7.64	7.64
R2	0	0	0	0	0	0	0	0	0	0	0	0
R3	79.6	560.68	429.92	0.84	29.12	29.12	83.92	607.48	459.8	0.84	30.92	30.92
R4	44.64	331.32	235.64	0.48	15.36	15.36	48.48	372.92	262.2	0.48	16.96	16.96
R5	218.02	1502.98	1202.6	2.02	84.76	84.76	234.1	1677.18	1313.82	2.02	91.46	91.46
R6	36.76	266.68	168.32	0.3	14.36	14.36	40.12	303.08	191.56	0.3	15.76	15.76
R7	93.8	721.24	408.92	0.94	32.74	32.74	99.32	781.04	447.1	0.94	35.04	35.04
R8	228.52	1685.62	1115.54	2.3	80.64	80.64	244.12	1854.62	1223.44	2.3	87.14	87.14
Truck Trips	6.24	41.92	42.48	0.08	2.24	2.24						
Max Daily Emissions	311.82	2224.22	1611.52	2.96	117.5	117.5	346.96	2583.99	1839.59	3.23	139.96	136.19
SCAQMD Threshold	-	46	231	-	4	3	75	100	550	150	150	55
Exceed Threshold?		Yes	Yes		Yes	Yes	Yes	Yes	Yes	No	No	Yes

Table 2.6 Construction Emissions and CEQA Thresholds for Alternative 20

Alternative 20	Localized Emissions (lbs/day)						Regional Emissions (lbs/day)					
	ROG	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**	**ROG**	**NOx**	**CO**	**SO2**	**PM10**	**PM2.5**
R1	19.04	125.16	107.76	0.2	7.44	7.44	19.52	130.36	111.08	0.2	7.64	7.64
R2	193.08	1356.48	1006.82	2.04	74.98	74.98	205.32	1489.08	1091.48	2.04	80.08	80.08
R3	148.94	1073.96	742.18	1.44	54.24	54.24	158.54	1177.96	808.58	1.44	58.24	58.24
R4	82.72	581.64	451.16	0.88	30.24	30.24	87.52	633.64	484.36	0.88	32.24	32.24
R5	218.02	1502.98	1202.6	2.02	84.76	84.76	234.1	1677.18	1313.82	2.02	91.46	91.46
R6	36.76	266.68	168.32	0.3	14.36	14.36	40.12	303.08	191.56	0.3	15.76	15.76
R7	62.26	416.98	355.02	0.66	24.04	24.04	64.9	445.58	373.28	0.66	25.14	25.14
R8	228.52	1685.62	1115.54	2.3	80.64	80.64	244.12	1854.62	1223.44	2.3	87.14	87.14
Truck Trips	43.6	354.2	161.4	0.4	13.6	13.6						
Max Daily Emissions	267.72	1837.32	1497.1	2.58	103.12	103.12	311.74	2264.42	1769.14	3.05	130.07	125.83
SCAQMD Threshold	-	46	231	-	4	3	75	100	550	150	150	55
Exceed Threshold?		Yes	Yes		Yes	Yes	Yes	Yes	Yes	No	No	Yes

LSTs represent the maximum on-site emissions from a project that is not expected to cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standards and are developed based on the ambient concentrations of that pollutant in that area.

Table 2.3 toTable 2.6 summarize the localized impacts from the construction activities for the four alternatives, together with the SCAQMD's daily construction significance threshold levels. Results are as follows:

- For Alternative 10, the construction phase of the proposed project is expected to exceed the localized significance thresholds for NOx, PM_{10} and $PM_{2.5}$. Therefore, unmitigated air quality impacts associated with construction activities are considered significant due to NOx, PM_{10} and $PM_{2.5}$.emissions.

- For Alternatives 13, 16 and 20, the construction phase of the proposed project is expected to exceed the localized significance thresholds for CO, NOx, PM_{10} and $PM_{2.5}$. Therefore, unmitigated air quality impacts associated with construction activities are considered significant due to CO, NOx, PM_{10} and $PM_{2.5}$ emissions.

The CalEEMod model files are available upon request.

Table 2.7 to Table 2.10 summarize the impacts from the construction activities for the four alternatives, together with the NEPA significance threshold levels. Results are as follows:

- For Alternatives 10 and 13, the construction phase of the proposed project is expected to exceed the NEPA significance thresholds for NOx and CO. Therefore, unmitigated air quality impacts associated with construction activities are considered significant due to NOx and CO emissions.

- For Alternatives 16 and 20, the construction phase of the proposed project is expected to exceed the NEPA significance thresholds for ROG, NOx and CO. Therefore, unmitigated air quality impacts associated with construction activities are considered significant due to ROG, NOx and CO emissions.

Table 2.11 presents the types of sensitive receptors that are located near the four alternatives. The receptors are located within 1,000 feet of the Los Angeles River.

Table 2.7 Construction Emissions and NEPA Thresholds for Alternative 10

	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$
Max. Overlapping Emissions, tons/yr	17.9	148.3	93.7	0.2	8.6	8.6
NEPA Emissions Threshold, tons/yr	50	50	50	50	50	50
Exceed Threshold?	No	Yes	Yes	No	No	No

Table 2.8 Construction Emissions and NEPA Thresholds for Alternative 13

	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$
Max. Overlapping Emissions, tons/yr	23.9	187.2	128.5	0.2	8.6	8.6
NEPA Emissions Threshold, tons/yr	50	50	50	50	50	50
Exceed Threshold?	No	Yes	Yes	No	No	No

Table 2.9 Construction Emissions and NEPA Thresholds for Alternative 16

	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$
Max. Overlapping Emissions, tons/yr	63.3	471.5	335.7	0.58	25.5	24.9
NEPA Emissions Threshold, tons/yr	50	50	50	50	50	50
Exceed Threshold?	Yes	Yes	Yes	No	No	No

Table 2.10 Construction Emissions and NEPA Thresholds for Alternative 20

	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$
Max. Overlapping Emissions, tons/yr	56.9	413.2	332.9	0.56	23.7	23
NEPA Emissions Threshold, tons/yr	50	50	50	50	50	50
Exceed Threshold?	Yes	Yes	Yes	No	No	No

Table 2.11 Receptor Types

Alternative	Location	Receptors
C-10, C-13, C-16 and C-20	Reach 1 - Riverside Drive	• School • Residential • Commercial • Park
	Reach 2 - Victory Blvd	• Residential • Commercial • Park
	Reach 3 - Zoo Drive	• Residential • Commercial • Park
	Reach 4 - Brazil Street	• Church • Commercial • Park
	Reach 4 - Colorado Street	• Resident • Commercial • Park • Industry (wastewater treatment plant)
	Reach 5 - Los Feliz Blvd	• School • Residential • Commercial • Park
	Reach 5 - Hyperion Avenue	• Residential • Commercial
	Reach 6 - Fletcher Drive	• Residential • Commercial • Park
	Reach 6 - San Fernando Road	• Residential • Commercial • Park
	Reach 7 - San Fernando Road	• Residential • Commercial • Park
	Reach 7 - North Broadway	• Church • Residential • Commercial
	Reach 8 - Main Street	• School • Residential • Commercial
	Reach 8 - North Mission Drive	• Industry (Piggyback Yard)
	Reach 8 - E. Cesar E Chavez Avenue	• School • Residential • Commercial

2.3 Construction Greenhouse Gas Impacts

For purposes of this analysis, it is considered reasonable and is consistent with criteria pollutant calculations to consider that project-related GHG emissions result from the incremental increase in using on-road mobile vehicles, electricity, and natural gas upon implementing the project. In addition, since potential impacts resulting from GHG emissions are long-term rather than acute, GHG emissions are calculated annually.

Not all GHGs exhibit the same ability to induce climate change; as a result, GHG contributions are commonly quantified in the equivalent mass of CO_2, denoted as CO_2e. Mass emissions are calculated by converting pollutant-specific emissions to CO_2e emissions through applying the proper global warming potential (GWP) value.[3] There are three types of GHG from fuel combustion: carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). GHG emissions are presented as carbon dioxide equivalents (CO_2e), which are computed based on global warming equivalence. The CH_4 global warming equivalence is 21 times that of CO_2, and the N_2O global warming equivalence is 310 times that of CO_2.

Mathematically, the CO_2e can be represented by the following equation:

$$CO_2e \text{ Emissions} = CO_2 \text{ Emissions} + 21 \times CH_4 \text{ Emissions} + 310 \times N_2O \text{ Emissions}$$

The CalEEMod model was used to estimate the GHG emissions during the construction phases of the proposed project. For this project, the major source of GHG is the combustion of fuel in construction equipment, vehicles used to haul materials, and vehicles used by workers commuting to/from the site. Based on the construction schedule, types and quantities of construction equipment, and numbers of haul trucks, etc., the maximum CO_2e emissions were estimated.

The SCAQMD's threshold for greenhouse emissions is 10,000 metric tons (MT) per year for industrial facilities. For construction GHGs, SCAQMD allows the emissions to be amortized over the life of the project. To do this, the SCAQMD guidelines recommend calculating the total greenhouse gas emissions for the construction activities, dividing it by the project life (i.e., 50 years for residential projects and 25 years for commercial projects) then adding that number to the annual operational phase GHG emissions. The threshold is 3,000 MT per year if this amortized method is used.

The expected life of the proposed project is assumed, conservatively, to be at least 30 years. Table 2.12 compares the GHGs emissions from the project construction activities with the SCAQMD's GHG emissions threshold. As shown, the GHG emissions from the project construction activities results are less than significant.

[3] CO_2e was developed by the Intergovernmental Panel on Climate Change (IPCC), and published in its Second Assessment Report (SAR) 1996.

Table 2.12 Construction Greenhouse Gases

Alternative	10	13	16	20
Total CO_{2e} (MT/year)	3,475	9,588	22,072	31,879
Amortized to 30 year (MT/year)	116	320	736	1,062
SCAQMD Threshold (MT/year)	3,000	3,000	3,000	3,000
Exceeds Threshold	No	No	No	No

2.4 Construction-Related Odors

Potential sources that may emit odors during construction activities may include architectural coatings and solvents and diesel powered on- and off-road equipment. SCAQMD Rule 1113 limits the amount of volatile organic compounds from architectural coatings and solvents, which lower the emissions of odorous compounds. Due to the nature of the construction activities and the relatively small footprint of the various construction sites, few pieces of diesel powered equipment will be operating simultaneously. Therefore, construction activities are predicted to create a less than significant impact with respect to odors. As such, overall project-related odor impacts during construction would be less than significant.

3. AIR QUALITY IMPACTS FROM PROJECT OPERATION

3.1 Regional and Localized Impacts

During operations, project activity would be limited to general maintenance. Regional air pollutant emissions associated with proposed project operations would be generated primarily by maintenance vehicles. Operation and maintenance using one or two light duty trucks as needed is assumed. Also, long-term low to moderate adverse air quality impacts are expected from potential increased traffic within the project areas, with the additional visitors to proposed new parks and open space. On-road vehicles associated with potential increased traffic would contribute to emissions of air pollutants. Regardless, the proposed mixed land use along the river bank, as well as developing pedestrian and bike opportunities, is expected to reduce the rate of growth in the use of motor vehicles within the project area. This would result in indirect long-term beneficial air quality impacts that could help offset potential adverse impacts.

3.2 Greenhouse Gases

Long-term operation of the project would generate emissions of GHGs due to engine exhausts from maintenance vehicles and also from increased traffic to the project areas.

Establishing more green vegetation in the river channel and developing parks, green streets, paseos, and promenades in the River Corridor could have long-term beneficial improvements on ambient air quality. Many of these measures include enhanced pedestrian access, which could help reduce vehicle emissions. Also, increasing the amount of green open space and adding trees along streets could help reduce levels of greenhouse gases, such as CO_2, and reduce greenhouse gas emissions as required by the State's Global Warming Solutions Act of 2006.

3.3 Operational Related Odors

According to the SCAQMD *CEQA Air Quality Handbook*, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. The proposed project would not include any uses identified by the SCAQMD as being associated with odors. As the operational activities will include standard refuse handling processes, they are not expected to be a source of off-site odor complaints. Therefore, implementing the project would have a less than significant impact.

4. CONSISTENCY WITH REGIONAL AIR QUALITY PLAN

Pursuant to the Federal Clean Air Act, the SCAQMD is required to reduce emissions of certain pollutants for which the Basin is in non-attainment (i.e., ozone and PM_{10}). The project would be subject to the SCAQMD's Air Quality Management Plan (AQMP). The AQMP contains a comprehensive list of pollution control strategies directed at reducing emissions and achieving ambient air quality standards. These strategies are developed, in part, based on regional population, housing, and employment projections prepared by the Southern California Association of Governments (SCAG).

SCAG is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino and Imperial Counties and serves as a forum for regional issues relating to transportation, the economy, community development, and the environment. SCAG serves as the federally designated metropolitan planning organization (MPO) for the southern California region. As regards air quality planning, SCAG has prepared the Regional Comprehensive Plan and Guide (RCPG), which includes Growth Management and Regional Mobility chapters that form the basis for the land use and transportation control portions of the AQMP and are used to prepare air quality forecasts and consistency analyses included in the AQMP. The RCPG and AQMP strategies incorporate population and employment projections from local planning documents.

To determine AQMP consistency primarily concerns the long-term influence of the project on air quality in the Basin. During construction, the regional and localized impacts are significant. Nevertheless, the impacts are short-term. During operation, the regional and localized impacts are less than significant. The project would comply with SCAQMD Rule 403 and would implement all feasible mitigation measures for control of PM_{10} and $PM_{2.5}$; the project would be consistent with the goals and policies of the AQMP for control of fugitive dust. Because the proposed project would not result in a change in dwelling units or occupants or activities, it is not in conflict with AQMP. The project's long-term influence also would be consistent with the goals and policies of the AQMP. The project is, therefore, considered consistent with the SCAQMD's AQMP.

5. CUMULATIVE IMPACTS

5.1 Construction

With respect to the project's construction-period air quality emissions and cumulative Basin-wide conditions, the SCAQMD has developed strategies to reduce regional-impact pollutant emissions, as outlined in the AQMP pursuant to Federal Clean Air Act mandates. As such, the proposed project would comply with SCAQMD Rule 403 requirements and implement all feasible mitigation measures. In addition, the proposed project would comply with adopted AQMP emissions control measures. Per SCAQMD rules and mandates, as well as the CEQA requirement that significant impacts be mitigated to the extent feasible, these same requirements (i.e., complying with Rule 403, implementing all feasible mitigation measures, and complying with adopted AQMP emissions control measures) also would be imposed on construction projects Basin-wide. Nevertheless, construction-period localized emissions associated with the proposed project are already projected to result in a significant impact to air quality. As such, cumulative impacts to air quality during construction also would be significant.

5.2 Operation

The SCAQMD's approach for assessing cumulative impacts related to operations is based on attaining ambient air quality standards according to the requirements of the Federal and State Clean Air Acts. As discussed earlier, the SCAQMD has developed a comprehensive plan—the 2007 AQMP—which addresses the region's cumulative air quality condition.

A significant impact may occur if a project would add a cumulative contribution of a federal or state non-attainment pollutant. Because the Basin is currently in non-attainment for ozone, PM_{10} and $PM_{2.5}$, related projects could either exceed an air quality standard or contribute to an existing or projected air quality exceedance. Cumulative impacts to air quality are evaluated under two sets of thresholds for CEQA and the SCAQMD. In particular, CEQA Guidelines Sections 15064(h)(3) provides guidance in determining the significance of cumulative impacts. Section 15064(h)(3) states in part that:

> *"A lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program which provides specific requirements that will avoid or substantially lessen the cumulative problem (e.g., water quality control plan, air quality plan, integrated waste management plan) within the geographic area in which the project is located. Such plans or programs must be specified in law or adopted by the public agency with jurisdiction over the affected resources through a public review process to implement, interpret, or make specific the law enforced or administered by the public agency…"*

For purposes of the cumulative air quality analysis regarding CEQA Guidelines, Section 15064(h)(3), the project's incremental contribution to cumulative air quality impacts is determined based on compliance with the SCAQMD's adopted 2007 Air Quality Management Plan (AQMP).

The proposed project would not conflict with or obstruct implementing the AQMP. A project is deemed inconsistent with air quality plans if it results in population and/or employment growth that exceeds growth estimates in the applicable air quality plan. In turn, the AQMP relies upon growth projections adopted by the SCAG, which in turn relies upon adopted General Plan growth projections. Consequently, compliance with the County's General Plan typically results in compliance with the AQMP.

As the proposed project is not part of an ongoing regulatory program, the SCAQMD recommends that project-specific air quality impacts be used to determine the potential cumulative impacts to regional air quality. As discussed above, peak daily emissions of operation-related pollutants would not exceed SCAQMD regional significance thresholds. By applying SCAQMD's cumulative air quality impact methodology, implementing the proposed project would not add pollutants such that considerable cumulative impacts, in conjunction with related projects in the region, would occur. Therefore, the emissions of non-attainment pollutants and precursors generated by project operation exceeding the SCAQMD project-level thresholds would be less than significant.

6. BEST MANAGEMENT PRACTICES AND IMPACT AVOIDANCE MEASURES

The project will be required to comply with regional rules that assist in reducing air pollutant emissions. SCAQMD Rule 403 requires that fugitive dust be controlled with best available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. In addition, SCAQMD Rule 402 requires implementing dust suppression techniques to prevent fugitive dust from creating a nuisance off site. Implementing these dust suppression techniques will reduce the fugitive dust generation (and thus the PM_{10} component).

These recommended mitigation measures would reduce impacts, but not to a level that is below the threshold of significance. Applicable dust suppression techniques include the following:

- AQ-1 Water-active sites. Locations where grading occurs will be watered before earth moving activities.

- AQ-2 All trucks hauling dirt, sand, soil, or other loose materials are to be covered or should maintain at least two feet of freeboard, according to the requirements of California Vehicle Code (CVC) section 23114 (freeboard means vertical space between the top of the load and top of the trailer).

- AQ-3 During construction, off-road equipment, vehicles, and trucks shall not idle more than five minutes in any one hour.

- AQ-4 The off-road construction equipment drivers shall have proper training operating the equipment efficiently, taking into account ways to reduce the hours of equipment operation and/or operating equipment at a lower load factor.

- AQ-5 Pave construction access roads at least 100 feet onto the site from main road.

- AQ-6 Traffic speeds on all unpaved roads shall not exceed 15 mph.

CESPL-PD-RL **September 6, 2013**

Memorandum for Record
Subject: Estimated Mobile Source Lead Emissions for the Los Angeles River Ecosystem Restoration Feasibility Study

1.0 INTRODUCTION

This memorandum evaluates mobile emissions of lead (Pb) associated with Alternatives 10, 13, 16, and 20 for both off-road and on-road diesel-powered equipment. The results are compared to the General Conformity Rule de minimis threshold for lead (25 tons/year).

In general, data on lead emissions associated with diesel engines is not readily available since the use of lead additives have been phased out. Therefore, this evaluation utilized lead emission factor for internal combustion diesel engines (0.0083 lb/1000 gal) per Ventura County Air Pollution Control District's AB 2588 Combustion Emissions Factors. See Attachment A. Note that the lead emission factor is associated with stationary diesel engines such as emergency diesel generators. However, lacking lead emission data for mobile diesel sources, the emission factor for stationary diesel engines is utilized for both on-road and off-road diesel-powered vehicles and equipment.

2.0 METHODOLOGY

In general, a number of quantitative assumptions were made regarding equipment use as detailed in Section 2.1 and 2.2 below. The resulting figures were multiplied by the fuel consumption rate, lead emission rate, and conversion factor from pounds to tons. Results are given in tons of lead per year.

Lead emissions for on-road and off-road vehicles were calculated separately. Emission calculations for off-road vehicles were set up to estimate maximum lead emissions. The estimated maximum lead emissions for off-road vehicles were assumed to be the same for all alternatives. In contrast, emission calculations for on-road vehicles were tailored to each alternative based on the daily trips required to transport fill.

2.1 Off-Road Vehicles

The calculations were based on the following assumptions:

- All alternatives would utilize the same number and hours of off-road construction equipment.
- All nine off-road construction equipment listed in Table 2.2 of Appendix F will be utilized simultaneously for eight hours a day for 250 workdays during the year.
- All off-road construction equipment will utilize 500 hp diesel engines.

- All 500 hp, off-road diesel engines will utilize approximately 12,037 gallons of fuel per year USEPA Construction Fleet Inventory Guide. See Attachment B.
- Lead emission rate of 0.0083 lbs./1,000 gallons is utilized.

Formula:

$$\text{9 pieces of off-road equipment} \times 12{,}037\ \frac{\text{gallons}}{\text{year}} \times \frac{\text{0.0083 lb. of Pb}}{\text{1,000 gallons}} \times \frac{\text{1 ton}}{\text{2000 lb}} = 0.0004\ \frac{\text{ton Pb}}{\text{year}}$$

2.2 On-Road Vehicles

The calculations were based on the following assumptions:

- All alternatives would differ in the amount of on road diesel emissions due to the differences in the amount of excavated and demolished materials to be transported.
- Daily truck trips from Table 2.2 of Appendix F which distinguished the number of trips between 12 cy and 16 cy dump trucks were combined.
- Daily trips will occur for each of the 250 workdays during the year.
- Each trip is equal to a distance of 30 miles.
- Dump trucks, regardless of size, will consume approximately 400 gallons of diesel per 1,000 miles per USDOT fuel consumption by vehicle weight class table. See Attachment C.
- Lead emission rate of 0.0083 lbs./1,000 gallons is utilized.

Formulas:

Alternative 10:

$$250\ \frac{\text{days}}{\text{year}} \times 411\ \frac{\text{trips}}{\text{days}} \times 30\ \frac{\text{miles}}{\text{trip}} \times \frac{\text{400 gallons}}{\text{1000 miles}} \times \frac{\text{0.0083 lb. of Pb}}{\text{1,000 gallons}} \times \frac{\text{1 ton}}{\text{2000 lb}} = 0.005\ \frac{\text{ton Pb}}{\text{year}}$$

Alternative 13:

$$250\ \frac{\text{days}}{\text{year}} \times 338\ \frac{\text{trips}}{\text{days}} \times 30\ \frac{\text{miles}}{\text{trip}} \times \frac{\text{400 gallons}}{\text{1000 miles}} \times \frac{\text{0.0083 lb. of Pb}}{\text{1,000 gallons}} \times \frac{\text{1 ton}}{\text{2000 lb}} = 0.004\ \frac{\text{ton Pb}}{\text{year}}$$

Alternative 16:

$$250\ \frac{\text{days}}{\text{year}} \times 424\ \frac{\text{trips}}{\text{days}} \times 30\ \frac{\text{miles}}{\text{trip}} \times \frac{\text{400 gallons}}{\text{1000 miles}} \times \frac{\text{0.0083 lb. of Pb}}{\text{1,000 gallons}} \times \frac{\text{1 ton}}{\text{2000 lb}} = 0.005\ \frac{\text{ton Pb}}{\text{year}}$$

Alternative 20:

$$250\ \frac{\text{days}}{\text{year}} \times 477\ \frac{\text{trips}}{\text{days}} \times 30\ \frac{\text{miles}}{\text{trip}} \times \frac{\text{400 gallons}}{\text{1000 miles}} \times \frac{\text{0.0083 lb. of Pb}}{\text{1,000 gallons}} \times \frac{\text{1 ton}}{\text{2000 lb}} = 0.006\ \frac{\text{ton Pb}}{\text{year}}$$

3.0 RESULTS

Total lead emissions for all alternatives are shown in Table 1 below. Relative to other alternatives, Alternative 13 would emit the least amount of lead per year; in contrast, Alternative 20 would emit the most amount of lead per year. Alternatives 10 and 16 would emit equal amount of lead per year.

Relative to the General Conformity Rule de minimis threshold, lead emissions associated with all alternatives are substantially below the threshold.

Table 1: Estimated Total Lead Emissions by Alternative

	Total Lead Emissions (tons/year)	General Conformity de minimis threshold (tons/year)
Alt. 10	0.0054	25
Alt. 13	0.0044	25
Alt. 16	0.0054	25
Alt. 20	0.0064	25

4.0 DISCUSSION

The results provide a rough estimate of lead emissions relative to the General Conformity de minmis threshold. As stated above, lead emission data for mobile diesel sources are not readily available since the use of lead in fuels has been phased out. Therefore, this evaluation utilized lead emission factor for stationary diesel engines. As a result, the accuracy of results is limited. It is likely that lead emission estimates for all alternatives are smaller than the results reported above.

Kenneth Wong
Chief, Regional Planning Section

5.0 SOURCES

Harrington, W., Krupnick, A. (2012). Improving Fuel Economy in Heavy-Duty Vehicles

U.S. Environmental Protection Agency (2010). Construction Fleet Inventory Guide.

Ventura County Air Pollution Control District (2001). AB 2588 Combustion Emissions Factors.

Attachment A: Diesel Emission Factor for Lead (Pb)

Diesel Combustion Factors

Diesel (#1, #2 fuel oil) combustion factors were developed for listed substances identified by the CARB as significant components of diesel fuel combustion emissions (2) and for federal HAPs for which data was available.

Diesel Combustion Factors

	external combustion	internal combustion
Pollutant	Emissions (lb/1000 gal)	
benzene	0.0044	0.1863
formaldehyde	0.3506	1.7261
PAH's (including naphthalene)	0.0498	0.0559
naphthalene	0.0053	0.0197
acetaldehyde	0.3506	0.7833
acrolein	0.3506	0.0339
1,3-butadiene	0.0148	0.2174
chlorobenzene	0.0002	0.0002
dioxins	ND	ND
furans	ND	ND
propylene	0.0100	0.4670
hexane	0.0035	0.0269
toluene	0.0044	0.1054
xylenes	0.0016	0.0424
ethyl benzene	0.0002	0.0109
hydrogen chloride	0.1863	0.1863
arsenic	0.0016	0.0016
beryllium	ND	ND
cadmium	0.0015	0.0015
total chromium	0.0006	0.0006
hexavalent chromium	0.0001	0.0001
copper	0.0041	0.0041
lead	0.0083	0.0083
manganese	0.0031	0.0031
mercury	0.0020	0.0020
nickel	0.0039	0.0039
selenium	0.0022	0.0022
zinc	0.0224	0.0224

ND - not detected

Attachment B: USEPA Fuel Consumption for Off-Road Equipment

Horsepower Range	Fuel Consumption (gallons/year)
3 < HP <= 6	154
6 < HP <= 11	240
11 < HP <= 16	395
16 < HP <= 25	603
25 < HP <= 40	950
40 < HP <= 50	1,290
50 < HP <= 75	1,762
75 < HP <= 100	2,471
100 < HP <= 175	3,626
175 < HP <= 300	6,616
300 < HP <= 600	12,037
600 < HP <= 750	19,939
750 < HP <= 1000	24,831
1000 < HP <= 1200	32,262
1200 < HP <= 2000	48,312
2000 < HP <= 3000	71,679

Table 1. Vehicle Weight Classes Defined by U.S. Department of Transportation

Class	Description/examples	Empty weight range	Gross weight range	Typical fuel intensities	
		Tons	Tons	Gallons per thousand miles	Gallons per thousand ton-miles
1c	Passenger cars	1.2–2.5	<3	30–40	67
1t	Small light-duty trucks	1.6–2.2	<3	40–50	58
2a	Standard pickups, large SUVs	2.2–3	3–4.25	50	39
2b	Large pickups, utility vans	2.5–3.2	4.25–5	67–100	39
3	Utility vans, minibuses	3.8–4.4	5–7	77–125	33
4	Delivery vans	3.8–4.4	7–8	83–140	24
5	Large delivery vans, bucket trucks	9.2–10.4	8–9.75	83–166	26
6	School buses, large delivery vans	5.8–7.2	9.75–13	83–200	20
7	City bus, refrigerated truck, fire engine	5.8–7.2	13–16.5	125–250	18
8a	Dump/refuse trucks, city buses, fire engines	10–17	16.5–40	160–400	9
8b	Large tractor trailers, bulk tankers	11.6–17	16.5–40	133–250	7

The potential fuel economy savings available from current technologies are specific to a truck's design and how it is used. For a class 8 combination tractor, for example, the potential savings from better aerodynamics is far more important than for other trucks because so much energy is expended in highway driving. For HDVs primarily used in urban or off-road settings, aerodynamics will be much less important. But in all HDVs, the engine is the largest user of energy, and fuel-savings technologies for engines will be important.

According to a 2010 National Research Council report, current technologies are capable of reducing energy use in HDVs by around 45–50 percent in 2015–2020, although the estimated costs and cost-effectiveness of various technology options are highly variable.[4]

Complex Industry, Complex Products

Several features of the HDV manufacturing industry complicate regulation of fuel consumption rates.

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[4] National Research Council 2010. *Technologies and Approaches to Reducing the Fuel Consumption of Medium- and Heavy-Duty Vehicles.* Washington, DC: National Academies Press.