

APPENDIX F

Air Quality Modeling Results

PHASE 2 NLIP Emissions Summary

Unmitigated 2008 Emissions

Sutter County							Sacramento County						
Worst-Case lb/day			Tons/year				Worst-Case lb/day			Tons/year			
	ROG	NOX	PM10	ROG	NOX	PM10		ROG	NOX	PM10	ROG	NOX	PM10
NCC	58	317	184	4	22	80	East Levee	12	62	389	1	3	21
East Levee	110	555	3499	5	28	189	Elkhorn Canal	27	118	180	1	6	4
TOTAL	168.9	871.7	3683.0	9.3	49.7	269.2	TOTAL	39.3	180.0	568.9	1.8	9.2	25.1

Mitigated 2008 Emissions

Sutter County							Sacramento County						
Worst-Case lb/day			Tons/year				Worst-Case lb/day			Tons/year			
	ROG	NOX	PM10	ROG	NOX	PM10		ROG	NOX	PM10	ROG	NOX	PM10
% Reduction	5%	20%	75%	5%	20%	75%	% Reduction	5%	20%	75%	5%	20%	75%
TOTAL	160.4	697.4	920.7	8.8	39.8	67.3	TOTAL	37.3	144.0	142.2	1.7	7.4	6.3
Threshold	25	25	80	25	25	-		-	85	-	25	25	100
Significant?	Y	Y	Y	N	Y	-		-	Y	Y*	N	N	N

Unmitigated 2010 Emissions

No Phase 2 NCC work would occur in 2010, 15% of all other Phase 2 work could occur in 2010 in Sutter County and 15% could occur in Sacramento County

Sutter County							Sacramento County						
Worst-Case lb/day			Tons/year				Worst-Case lb/day			Tons/year			
	ROG	NOX	PM10	ROG	NOX	PM10		ROG	NOX	PM10	ROG	NOX	PM10
NCC	0	0	0	0	0	0	East Levee	2	9	58	0	0	3
East Levee	17	83	525	1	4	28	Elkhorn Canal	4	18	27	0	1	1
TOTAL	16.6	83.2	524.8	0.8	4.2	28.4	TOTAL	5.9	27.0	85.3	0.3	1.4	3.8

Mitigated 2010 Emissions

Sutter County							Sacramento County						
Worst-Case lb/day			Tons/year				Worst-Case lb/day			Tons/year			
	ROG	NOX	PM10	ROG	NOX	PM10		ROG	NOX	PM10	ROG	NOX	PM10
% Reduction	5%	20%	75%	5%	20%	75%	% Reduction	5%	20%	75%	5%	20%	75%
TOTAL	15.7	66.6	131.2	0.7	3.3	7.1	TOTAL	5.6	21.6	21.3	0.2	1.1	0.9

PHASE 2 NLIP Emissions Summary

Unmitigated 2008 Emissions

Sutter County							Sacramento County						
Worst-Case lb/day			Tons/year				Worst-Case lb/day			Tons/year			
	ROG	NOX	PM10	ROG	NOX	PM10		ROG	NOX	PM10	ROG	NOX	PM10
NCC	58	317	184	4	22	80	East Levee	12	62	389	1	3	21
East Levee	110	555	3499	5	28	189	Elkhorn Canal	27	118	180	1	6	4
TOTAL	168.9	871.7	3683.0	9.3	49.7	269.2	TOTAL	39.3	180.0	568.9	1.8	9.2	25.1

Mitigated 2008 Emissions

Sutter County							Sacramento County						
Worst-Case lb/day			Tons/year				Worst-Case lb/day			Tons/year			
	ROG	NOX	PM10	ROG	NOX	PM10		ROG	NOX	PM10	ROG	NOX	PM10
% Reduction	5%	20%	75%	5%	20%	75%	% Reduction	5%	20%	75%	5%	20%	75%
TOTAL	160.4	697.4	920.7	8.8	39.8	67.3	TOTAL	37.3	144.0	142.2	1.7	7.4	6.3
Threshold	25	25	80	25	25	-		-	85	-	25	25	100
Significant?	Y	Y	Y	N	Y	-		-	Y	Y*	N	N	N

Unmitigated 2010 Emissions

No Phase 2 NCC work would occur in 2010, 15% of all other Phase 2 work could occur in 2010 in Sutter County and 15% could occur in Sacramento County

Sutter County							Sacramento County						
Worst-Case lb/day			Tons/year				Worst-Case lb/day			Tons/year			
	ROG	NOX	PM10	ROG	NOX	PM10		ROG	NOX	PM10	ROG	NOX	PM10
NCC	0	0	0	0	0	0	East Levee	2	9	58	0	0	3
East Levee	17	83	525	1	4	28	Elkhorn Canal	4	18	27	0	1	1
TOTAL	16.6	83.2	524.8	0.8	4.2	28.4	TOTAL	5.9	27.0	85.3	0.3	1.4	3.8

Mitigated 2010 Emissions

Sutter County							Sacramento County						
Worst-Case lb/day			Tons/year				Worst-Case lb/day			Tons/year			
	ROG	NOX	PM10	ROG	NOX	PM10		ROG	NOX	PM10	ROG	NOX	PM10
% Reduction	5%	20%	75%	5%	20%	75%	% Reduction	5%	20%	75%	5%	20%	75%
TOTAL	15.7	66.6	131.2	0.7	3.3	7.1	TOTAL	5.6	21.6	21.3	0.2	1.1	0.9

SEL Phase 4a

*2010 calendar year comprises reach 10-15 work to occur over 8 months (April - Nov)

ALL WORK FOR SEL 10-15 TO OCCUR IN SACRAMENTO COUNTY

	ROG	NOX	PM10	CO2	Unit	Quantity	Unit	ROG	NOX	PM10	CO2	Unit	Distance (miles/round- trip)	# of Haul Loads	Total Miles Traveled	Total Miles Traveled/Day	Time frame	Conversion Factor	
[1]Site Preparation (concurrent with 2,3)						0	yd3						1.0	0.0	540.0	10.0	54.0	days	
<u>Mobile Sources</u>																			
Haul Truck(s)	1.10	14.47	0.56	1855.42	g/mile	10	trucks	1.3	17.2	0.7	2208.9	lb/yr							0.00220462 lb/gram
Haul Truck(s)	11.78	8.18	0.02	223.55	g/trip	540	trips	14.0	9.7	0.0	266.1	lb/yr							0.00220462 lb/gram
Water Truck(s)	0.10	1.27	0.05	163.47	lb/day	2		10.8	137.2	5.4	17654.8	lb/yr							
Scraper(s)	0.46	4.36	0.18	409.54	lb/day	6		150.5	1413.0	57.1	132692.2	lb/yr							
Loader(s)	0.43	3.33	0.19	307.16	lb/day	2		46.2	359.7	20.8	33173.0	lb/yr							
Grader(s)	0.49	3.79	0.22	346.97	lb/day	2		52.8	409.8	23.7	37473.2	lb/yr							
Chipper(s)	0.63	4.94	0.28	443.67	lb/day	4		135.9	1067.0	61.3	95833.2	lb/yr							
Crawler Tractor(s)	0.52	4.87	0.20	369.73	lb/day	2		56.3	526.2	22.0	39930.5	lb/yr							
Employee Trips	0.02	0.03	0.00	39.26	lb/day/emp	68	employees	84.5	106.5	14.7	144144.4	lb/yr							
<u>Fugitive Sources</u>																			
Travel on unpaved roads	-	-	0.90	-	lb/VMT	0	trucks	-	-	-	-	lb/yr							
Travel on paved roads	-	-	0.28	-	lb/VMT	10	trucks	-	-	-	82,340.7	lb/yr							
Total								552.2	4046.3	82546.3	503376.3	lb/yr							2000 lb/ton
Total								10.2	74.9	1528.6	9321.8	lb/day							
[2]Removal of Landside Structures and Other Facilities (concurrent with 1,3)						0	yd3						1.0	0.0	1152.0	24.0	48.0	days	

*assumes haul load=14 yd3 *assumes haul trucks drive length of levee each day

NCC Phase 4a

*2010 calendar year comprises reach 10-15 work to occur over 8 months (April - Nov)

ALL WORK FOR NCC TO OCCUR IN SUTTER COUNTY

Phases 1-7: Cutoff Wall Construction, Phases 8-11: Levee Raise Construction

	ROG	NOX	PM10	CO2	Unit	Quantity	Unit	ROG	NOX	PM10	CO2	Unit	Distance (miles/round-trip)	# of Haul Loads	Total Miles Traveled	Total Miles Traveled/Day	Time frame	Conversion Factor	
[1] Site Preparation						0	yd3						1.0	0.0	2.0	1.0	2.0	days	
Mobile Sources																			
Haul Truck(s)	1.10	14.47	0.56	1855.42	g/mile	1	trucks	0.0	0.1	0.0	8.2	lb/yr							0.00220462 lb/gram
Haul Truck(s)	11.78	8.18	0.02	223.55	g/trip	2	trips	0.1	0.0	0.0	1.0	lb/yr							0.00220462 lb/gram
Water Truck(s)	0.10	1.27	0.05	163.47	lb/day	1		0.2	2.5	0.1	326.9	lb/yr							
Scraper(s)	0.46	4.36	0.18	409.54	lb/day	1		0.9	8.7	0.4	819.1	lb/yr							
Loader(s)	0.43	3.33	0.19	307.16	lb/day	1		0.9	6.7	0.4	614.3	lb/yr							
Employee Trips	0.02	0.03	0.00	39.26	lb/day/emp 15		employees	0.7	0.9	0.1	1177.7	lb/yr							
Fugitive Sources																			
Travel on unpaved roads	-	-	0.90	-	lb/VMT	1	trucks	-	-	1.8	-	lb/yr							
Travel on paved roads	-	-	0.28	-	lb/VMT	1	trucks	-	-	1.1	-	lb/yr							
Total								2.7	18.9	3.9	2947.2	lb/yr							2000 lb/ton
Total								1.4	9.4	1.9	1473.6	lb/day							
[2] Levee Degrading						0	yd3						1.0	0.0	0.0	0.0	3.0	days	
Mobile Sources																			
Scraper(s)	0.46	4.36	0.18	409.54	lb/day	1		1.4	13.1	0.5	1228.6	lb/yr							
Bulldozers	0.46	4.06	0.17	335.60	lb/day	1		1.4	12.2	0.5	1006.8	lb/yr							
Loader(s)	0.43	3.33	0.19	307.16	lb/day	1		1.3	10.0	0.6	921.5	lb/yr							
Employee Trips	0.02	0.03	0.00	39.26	lb/day/emp 15		employees	1.0	1.3	0.2	1766.5	lb/yr							
Total								5.1	36.6	1.8	4923.4	lb/yr							2000 lb/ton
Total								1.7	12.2	0.6	1641.1	lb/day							
[3] Pipeline Removal						0	yd3						4.0	0.0	12.0	4.0	3.0	days	
Mobile Sources																			
Haul Truck(s)	1.10	14.47	0.56	1855.42	g/mile	1	trucks	0.0	0.4	0.0	49.1	lb/yr							0.00220462 lb/gram
Haul Truck(s)	11.78	8.18	0.02	223.55	g/trip	2	trips	0.1	0.0	0.0	1.0	lb/yr							0.00220462 lb/gram
Excavator(s)	0.42	3.22	0.19	324.22	lb/day	1		1.3	9.7	0.6	972.7	lb/yr							
Employee Trips	0.02	0.03	0.00	39.26	lb/day/emp 15		employees	1.0	1.3	0.2	1766.5	lb/yr							
Fugitive Sources																			
Travel on unpaved roads	-	-	0.90	-	lb/VMT	6	VMT/yr	-	-	5.4	-	lb/yr							*assumes that material hauling is along 50% paved and 50% unpaved haul routes, scraper hauling is on 100% unpaved routes
Travel on paved roads	-	-	0.28	-	lb/VMT	6	VMT/yr	-	-	3.4	-	lb/yr							*assumes that material hauling is along 50% paved and 50% unpaved haul routes
Total								2.4	11.4	9.5	2789.2	lb/yr							2000 lb/ton
Total								0.8	3.8	3.2	929.7	lb/day							
[4] Cutoff Wall Construction						0	yd3						4.0	267.9	1071.4	89.3	12.0	days	
Mobile Sources																			
Haul Truck(s)	1.10	14.47	0.56	1855.42	g/mile	1	trucks	3.4	44.4	1.7	5697.5	lb/yr							0.00220462 lb/gram
Haul Truck(s)	11.78	8.18	0.02	223.55	g/trip	279	trips	7.2	5.0	0.0	137.3	lb/yr							0.00220462 lb/gram
Loader(s)	0.43	3.33	0.19	307.16	lb/day	1		5.1	40.0	2.3	3685.9	lb/yr							
Pallet Loader(s) [Forklifts]	0.66	4.01	0.37	341.29	lb/day	1		8.0	48.1	4.4	4095.4	lb/yr							
Generator(s)	0.29	3.78	0.11	420.92	lb/day	2		6.9	90.8	2.7	10102.1	lb/yr							
Pump(s)	0.76	4.91	0.40	420.92	lb/day	2		18.3	117.9	9.5	10102.1	lb/yr							
Pickup(s)	0.02	0.03	0.00	39.26	lb/day	3		0.8	1.0	0.1	1413.2	lb/yr							
Excavator(s)	0.42	3.22	0.19	324.22	lb/day	1		5.1	38.7	2.3	3890.7	lb/yr							
Employee Trips	0.02	0.03	0.00	39.26	lb/day/emp 15		employees	4.1	5.2	0.7	7065.9	lb/yr							
Fugitive Sources																			
Travel on unpaved roads	-	-	0.90	-	lb/VMT	536	VMT/yr	-	-	480.9	-	lb/yr							
Travel on paved roads	-	-	0.28	-	lb/VMT	536	VMT/yr	-	-	151.3	-	lb/yr							
Total								59.0	391.1	656.1	46190.0	lb/yr							2000 lb/ton
Total								4.9	32.6	54.7	3849.2	lb/day							
[5] Levee Crown Reconstruction						0	yd3						4.0	0.0	0.0	0.0	6.0	days	
Mobile Sources																			
Water Truck(s)	0.10	1.27	0.05	163.47	lb/day	1		0.6	7.6	0.3	980.8	lb/yr							
Scraper(s)	0.46	4.36	0.18	409.54	lb/day	1		2.8	26.2	1.1	2457.3	lb/yr							
Roller(s)	0.65	3.99	0.35	318.53	lb/day	2		7.8	47.8	4.2	3822.4	lb/yr							
Employee Trips	0.02	0.03	0.00	39.26	lb/day/emp 15		employees	2.1	2.6	0.4	3533.0	lb/yr							
Total								13.3	84.2	5.9	10793.4	lb/yr							2000 lb/ton
Total								2.2	14.0	1.0	1798.9	lb/day							
[6] Borrow Site Excavation						0	yd3						4.0	0.0	72.0	12.0	6.0	days	
Mobile Sources																			
Haul Truck(s)	1.10	14.47	0.56	1855.42	g/mile	3	trucks	0.2	2.3	0.1	294.5	lb/yr							0.00220462 lb/gram
Haul Truck(s)	11.78	8.18	0.02	223.55	g/trip	18	trips	0.5	0.3	0.0	8.9	lb/yr							0.00220462 lb/gram
Water Truck(s)	0.10	1.27	0.05	163.47	lb/day	1		0.6	7.6	0.3	980.8	lb/yr							
Excavator(s)	0.42	3.22	0.19	324.22	lb/day	1		2.5	19.3	1.2	1945.3	lb/yr							
Employee Trips	0.02	0.03	0.00	39.26	lb/day/emp 15		employees	2.1	2.6	0.4	3533.0	lb/yr							
Fugitive Sources																			
Travel on unpaved roads	-	-	1.10	-	lb/VMT	36	VMT/yr	-	-	39.7	-	lb/yr							*assumes that material hauling is along 50% paved and 50% unpaved haul routes, scraper hauling is on 100% unpaved routes
Travel on paved roads	-	-	0.52	-	lb/VMT	36	VMT/yr	-	-	37.5	-	lb/yr							*assumes that material hauling is along 50% paved and 50% unpaved haul routes
Total								5.9	32.2	79.1	6762.5	lb/yr							2000 lb/ton
Total								1.0	5.4	13.2	1127.1	lb/day							

NCC Phase 4a

*2010 calendar year comprises reach 10-15 work to occur over 8 months (April - Nov)

ALL WORK FOR NCC TO OCCUR IN SUTTER COUNTY

Phases 1-7: Cutoff Wall Construction, Phases 8-11: Levee Raise Construction

	ROG	NOX	PM10	CO2	Unit	Quantity	Unit	ROG	NOX	PM10	CO2	Unit	Distance (miles/round-trip)	# of Haul Loads	Total Miles Traveled	Total Miles Traveled/Day	Time frame	Conversion Factor	
[7]Site Restoration/Demobilization						0	yd3						4.0	1.0	8.0	4.0	2.0	days	
Mobile Sources																			
Haul Truck(s)	1.10	14.47	0.56	1855.42	g/mile	1	trucks	0.0	0.3	0.0	32.7	lb/yr						0.00220462	lb/gram
Haul Truck(s)	11.78	8.18	0.02	223.55	g/trip	2	trips	0.1	0.0	0.0	1.0	lb/yr						0.00220462	lb/gram
Off-Highway Truck(s)	0.30	2.76	0.10	324.22	lb/day	2		1.2	11.0	0.4	1296.9	lb/yr							
Water Truck(s)	0.10	1.27	0.05	163.47	lb/day	1		0.2	2.5	0.1	326.9	lb/yr							
Employee Trips	0.02	0.03	0.00	39.26	lb/day/emp	15	employees	0.7	0.9	0.1	1177.7	lb/yr							
Fugitive Sources																			
Travel on unpaved roads	-	-	1.10	-	lb/VMT	8	VMT/yr	-	-	8.8	-	lb/yr							
Travel on paved roads	-	-	0.52	-	lb/VMT	0	VMT/yr	-	-	-	-	lb/yr							
Total								3.3	25.8	9.5	2835.2	lb/yr							2000
Total								1.7	12.9	4.7	1417.6	lb/day							
[8]Levee Raising (Levee Raise Component)						0	yd3						1.0	0.0	0.0	0.0	10.0	85.0	days
Mobile Sources																			
Water Truck(s)	0.10	1.27	0.05	163.47	lb/day	1		1.0	12.7	0.5	1634.7	lb/yr							
Loader(s)	0.43	3.33	0.19	307.16	lb/day	1		4.3	33.3	1.9	3071.6	lb/yr							
Roller(s)	0.65	3.99	0.35	318.53	lb/day	4		220.8	1355.7	117.9	108301.5	lb/yr							
Bulldozer(s)	0.46	4.06	0.17	335.60	lb/day	1		38.9	345.0	14.7	28525.8	lb/yr							
Employee Trips	0.02	0.03	0.00	39.26	lb/day/emp	20	employees	39.1	49.3	6.8	66733.5	lb/yr							0.00220462
Fugitive Sources																			
Travel on unpaved roads	-	-	0.90	-	lb/VMT	4714	VMT/yr	-	-	4,232.1	-	lb/yr							
Travel on paved roads	-	-	0.28	-	lb/VMT	4714	VMT/yr	-	-	1,331.2	-	lb/yr							
Material Handling																			
Material loading at borrow	-	-	0.04	-	lb/ton	-		-	-	1,674.3	-	lb/yr		1.25	3437.50				
Material unloading at levee	-	-	0.005	-	lb/ton	-		-	-	216.6	-	lb/yr		1.25	3437.50				
Bulldozing	-	-	0.41	-	lb/hr	8	hrs/day	-	-	39.43	-	lb/yr							
Total								101.5	452.8	7511.3	59030.0	lb/yr							2000
Total								8.5	37.7	625.9	4919.2	lb/day							
[10] Finish Grading (Levee Raise Component)						0	yd3						0.0	0.0	0.0	0.0	2.0	days	
Mobile Sources																			
Off-Highway Truck(s)	0.30	2.76	0.10	324.22	lb/day	1		0.6	5.5	0.2	648.4	lb/yr							
Grader(s)	0.49	3.79	0.22	346.97	lb/day	1		1.0	7.6	0.4	693.9	lb/yr							
Water Truck(s)	0.10	1.27	0.05	163.47	lb/day	1		0.2	2.5	0.1	326.9	lb/yr							
Employee Trips	0.02	0.03	0.00	39.26	lb/day/emp	20	employees	0.9	1.2	0.2	1570.2	lb/yr							
Fugitive Sources																			
Travel on unpaved roads	-	-	1.10	-	lb/VMT	20	VMT/yr	-	-	22.1	-	lb/yr							
Travel on paved roads	-	-	0.52	-	lb/VMT	20	VMT/yr	-	-	10.4	-	lb/yr							
Total								2.7	16.8	0.9	3239.5	lb/yr							2000
Total								1.3	8.4	0.5	1619.8	lb/day							
[11] Operating Road Construction (Levee Raise Component)						0	yd3						4.0	10.0	40.0	20.0	2.0	days	
Mobile Sources																			
Haul Truck(s)	1.10	14.47	0.56	1855.42	g/mile	5	trucks	0.1	1.3	0.0	163.6	lb/yr							0.00220462
Haul Truck(s)	11.78	8.18	0.02	223.55	g/trip	10	trips	0.3	0.2	0.0	4.9	lb/yr							0.00220462
Compactor(s)	0.29	1.80	0.09	244.59	lb/day	2		1.1	7.2	0.3	978.4	lb/yr							
Grader(s)	0.49	3.79	0.22	346.97	lb/day	1		1.0	7.6	0.4	693.9	lb/yr							
Employee Trips	0.02	0.03	0.00	39.26	lb/day/emp	20	employees	0.9	1.2	0.2	1570.2	lb/yr							0.00220462
Fugitive Sources																			
Travel on unpaved roads	-	-	1.10	-	lb/VMT	20	VMT/yr	-	-	22.1	-	lb/yr							
Travel on paved roads	-	-	0.52	-	lb/VMT	20	VMT/yr	-	-	10.4	-	lb/yr							
Total								3.4	17.4	33.5	3411.1	lb/yr							2000
Total								1.7	8.7	16.7	1705.5	lb/day							
2010 calendar year																			
Total from NCC								0.3	1.4	4.2	175.6	TPY							to occur during 2010 calendar year
Total from NCC								12.0	58.9	627.6	-	Worst-case lb/day							*assumes some phases will be conducted concurrently

*These calculations represent worst-case emissions from construction activities associated with South Natomas Cross Canal work

Riverside Canal Phase 4a

*2010 calendar year comprises reach 10-15 work to occur over 8 months (April - Nov)

ALL WORK FOR RIVERSIDE CANAL TO OCCUR IN SACRAMENTO COUNTY

	ROG	NOX	PM10	CO2	Unit	Quantity	Unit	ROG	NOX	PM10	CO2	Unit	Distance (miles/round-trip)	# of Haul Loads	Total Miles Traveled	Total Miles Traveled/Day	Time frame	Conversion Factor
[1] Clearing, Grubbing, Stripping						90000	yd3						1.0	6428.6	6428.6	214.3	30.0	days
Mobile Sources														*assumes haul load=14 yd3				
Haul Truck(s)	1.10	14.47	0.56	1855.42	g/mile	25	trucks	15.6	205.0	8.0	26296.1	lb/yr						0.00220462 lb/gram
Haul Truck(s)	11.78	8.18	0.02	223.55	g/trip	6429	trips	167.0	115.9	0.2	3168.3	lb/yr						0.00220462 lb/gram
Water Truck(s)	0.10	1.27	0.05	163.47	lb/day	2		6.0	76.2	3.0	9808.2	lb/yr						
Bulldozers	0.46	4.06	0.17	335.60	lb/day	4		54.9	487.0	20.8	40271.7	lb/yr						
Loader(s)	0.43	3.33	0.19	307.16	lb/day	4		51.3	399.7	23.1	36858.9	lb/yr						
Employee Trips	0.02	0.03	0.00	39.26	lb/day/emr	40	employees	27.6	34.8	4.8	47106.0	lb/yr						
Total								139.8	997.7	51.7	134044.9	lb/yr						2000 lb/ton
Total								4.7	33.3	1.7	4468.2	lb/day						
[2] Water Control Facility Construction						0	yd3						0.0	0.0	0.0	0.0	17.0	days
Mobile Sources														*assumes haul load=14 yd3				
Compactor(s)	0.29	1.80	0.09	244.59	lb/day	2		9.7	61.1	2.9	8316.0	lb/yr						
Backhoe(s)	0.21	1.38	0.07	312.85	lb/day	2		7.0	46.8	2.2	10636.8	lb/yr						
Generator(s)	0.29	3.78	0.11	420.92	lb/day	2		9.8	128.6	3.9	14311.3	lb/yr						
Pump(s)	0.76	4.91	0.40	420.92	lb/day	1		13.0	83.5	6.7	7155.6	lb/yr						
Off-Highway Truck(s)	0.30	2.76	0.10	324.22	lb/day	4		20.2	187.8	7.1	22047.1	lb/yr						
Employee Trips	0.02	0.03	0.00	39.26	lb/day/emr	40	employees	15.6	19.7	2.7	26693.4	lb/yr						
Total								75.3	527.5	25.5	89160.2	lb/yr						2000 lb/ton
Total								4.4	31.0	1.5	5244.7	lb/day						
[3] Embankment and Access Road Construction						Fishermans Lake 410000	yd3	Transported by haul truck					4.0	29285.7	117142.9	1802.2	65.0	days
Mobile Sources																		
Haul Truck(s)	1.10	14.47	0.56	1855.42	g/mile	30	trucks	284.9	3736.2	145.4	479173.0	lb/yr						0.00220462 lb/gram
Haul Truck(s)	11.78	8.18	0.02	223.55	g/trip	29286	trips	760.6	528.1	1.0	14433.3	lb/yr						0.00220462 lb/gram
Roller(s)	0.65	3.99	0.35	318.53	lb/day	4		168.9	1036.7	90.2	82818.8	lb/yr						
Bulldozers	0.46	4.06	0.17	335.60	lb/day	2		59.5	527.6	22.5	43627.7	lb/yr						
Grader(s)	0.49	3.79	0.22	346.97	lb/day	2		63.6	493.3	28.6	45106.7	lb/yr						
Water Truck(s)	0.10	1.27	0.05	163.47	lb/day	2		13.0	165.1	6.5	21251.1	lb/yr						
Employee Trips	0.02	0.03	0.00	39.26	lb/day/emr	40	employees	59.8	75.4	10.4	102063.0	lb/yr						
Fugitive Sources																		
Travel on unpaved roads	-	-	0.90	-	lb/VMT	58571	VMT/yr	-	-	52580.3	-	lb/yr						*assumes that material hauling is along 50% paved and 50% unpaved haul routes, scraper hauling is on 100% unpaved routes
Travel on paved roads	-	-	0.28	-	lb/VMT	58571	VMT/yr	-	-	33078.3	-	lb/yr						*assumes that material hauling is along 50% paved and 50% unpaved haul routes
Material Handling														Tons/yd3 (gravel/sand)	Tons/day			
Material loading at borrow	-	-	0.04	-	lb/ton	-	-	-	-	20802.3	-	lb/yr		1.25	7884.62			
Material unloading at levee	-	-	0.005	-	lb/ton	-	-	-	-	0.0	-	lb/yr		1.25	7884.62			
Bulldozing	-	-	0.41	-	lb/hr	8	hrs/day	-	-	213.6	-	lb/yr						
Total								1410.2	6562.4	106979.1	788473.6	lb/yr						2000 lb/ton
Total								21.7	101.0	1645.8	12130.4	lb/day						
[4] Canal Lining						Fisherman's Lake 0	yd3						4.0	0.0	0.0	0.0	3.0	days
						Commercial Source 100	yd3						30.0	7.1	214.3	71.4	3.0	days
Mobile Sources														*assumes haul load=14 yd3				
Haul Truck(s)	1.10	14.47	0.56	1855.42	g/mile	2	trucks	0.5	6.8	0.3	876.5	lb/yr						0.00220462 lb/gram
Haul Truck(s)	11.78	8.18	0.02	223.55	g/trip	7	trips	0.2	0.1	0.0	3.5	lb/yr						0.00220462 lb/gram
Pump(s)	0.76	4.91	0.40	420.92	lb/day	2		4.6	29.5	2.4	2525.5	lb/yr						
Off-Highway Truck(s)	0.30	2.76	0.10	324.22	lb/day	4		3.6	33.1	1.2	3890.7	lb/yr						
Employee Trips	0.02	0.03	0.00	39.26	lb/day/emr	40	employees	2.8	3.5	0.5	4710.6	lb/yr						
Fugitive Sources																		
Travel on unpaved roads	-	-	0.90	-	lb/VMT	107	VMT/yr	-	-	96.2	-	lb/yr						*assumes that material hauling is along 50% paved and 50% unpaved haul routes
Travel on paved roads	-	-	0.28	-	lb/VMT	107	VMT/yr	-	-	30.3	-	lb/yr						*assumes that material hauling is along 50% paved and 50% unpaved haul routes
Total								11.6	73.1	130.8	12006.8	lb/yr						2000 lb/ton
Total								3.9	24.4	43.6	4002.3	lb/day						

Riverside Canal Phase 4a

*2010 calendar year comprises reach 10-15 work to occur over 8 months (April - Nov)

ALL WORK FOR RIVERSIDE CANAL TO OCCUR IN SACRAMENTO COUNTY

	ROG	NOX	PM10	CO2	Unit	Quantity	Unit	ROG	NOX	PM10	CO2	Unit	Distance (miles/round-trip)	# of Haul Loads	Total Miles Traveled	Total Miles Traveled/Day	Time frame	Conversion Factor		
[5.6.7] Irrigation Interconnections, Erosion Control, Irrigation Canal Abandonment	Fisherman's Lake 0							yd3						1.0	0.0	0.0	0.0	20.0	days	
Grader(s)	0.49	3.79	0.22	346.97	lb/day	5		48.9	379.4	22.0	34697.4	lb/yr								
Water Truck(s)	0.10	1.27	0.05	163.47	lb/day	8		16.0	203.2	8.0	26155.2	lb/yr								
Excavator(s)	0.42	3.22	0.19	324.22	lb/day	10		84.9	644.9	38.4	64844.4	lb/yr								
Off-Highway Truck(s)	0.30	2.76	0.10	324.22	lb/day	3		17.8	165.7	6.2	19453.3	lb/yr								
Loader(s)	0.43	3.33	0.19	307.16	lb/day	2		17.1	133.2	7.7	12286.3	lb/yr								
Compactor(s)	0.29	1.80	0.09	244.59	lb/day	2		11.4	71.9	3.4	9783.5	lb/yr								
Employee Trips	0.02	0.03	0.00	39.26	lb/day/emt	40	employees	18.4	23.2	3.2	31404.0	lb/yr								
Total								214.5	1621.6	88.9	198624.2	lb/yr							2000 lb/ton	
Total								10.7	81.1	4.4	9931.2	lb/day								
[8]Site Restoration/Demobilization	Commercial Source 10800							yd3						30.0	771.4	23142.9	680.7	34.0	days	
<u>Mobile Sources</u>	*assumes haul load=14 yd3 *assumes trucks drive 5 miles/day																			
Haul Truck(s)	1.10	14.47	0.56	1855.42	g/mile	5	trucks	56.3	738.1	28.7	94665.9	lb/yr							0.00220462 lb/gram	
Haul Truck(s)	11.78	8.18	0.02	223.55	g/trip	771	trips	20.0	13.9	0.0	380.2	lb/yr							0.00220462 lb/gram	
Loader(s)	0.43	3.33	0.19	307.16	lb/day	1		14.5	113.2	6.5	10443.4	lb/yr								
Water Truck(s)	0.10	1.27	0.05	163.47	lb/day	1		3.4	43.2	1.7	5558.0	lb/yr								
Employee Trips	0.02	0.03	0.00	39.26	lb/day/emt	40	employees	31.3	39.4	5.4	53386.8	lb/yr								
<u>Fugitive Sources</u>																				
Travel on unpaved roads	-	-	0.90	-	lb/VMT	11571	VMT/yr	-	-	10,387.8	-	lb/yr								
Travel on paved roads	-	-	0.28	-	lb/VMT	11571	VMT/yr	-	-	3,267.5	-	lb/yr								
Total								140.1	1061.2	13704.3	164434.2	lb/yr							2000 lb/ton	
Total								4.1	31.2	403.1	4836.3	lb/day								
2010 calendar year																				
Total from Riverside Canal								1.0	5.4	60.5	693.4	TPY	to occur during 2010 calendar year							
Total from Riverside Canal								21.7	101.0	1645.8	-	Worst-case lb/day								

*These calculations represent worst-case emissions from construction activities associated with Riverside Canal work

Pump Plant Work

*2010 calendar year comprises reach 10-15 work to occur over 8 months (April - Nov)

ALL WORK FOR PUMPING PLANTS TO OCCUR IN SACRAMENTO COUNTY

Riverside, Plant 3, and Plant 5

	ROG	NOX	PM10	CO2	Unit	Quantity	Unit	ROG	NOX	PM10	CO2	Unit	Distance (miles/round-trip)	# of Haul Loads	Total Miles Traveled	Total Miles Traveled/Day	Time frame	Conversion Factor		
[1] Riverside Pipeline Relocation, Pumping House Relocation, Channel Realignment					Fisherman's Lake	0	yd3						1.0	0.0	0.0	0.0	40.0	days		
Grader(s)	0.49	3.79	0.22	346.97	lb/day	5		97.9	758.9	43.9	69394.9	lb/yr								
Water Truck(s)	0.10	1.27	0.05	163.47	lb/day	8		32.0	406.4	16.0	52310.4	lb/yr								
Excavator(s)	0.42	3.22	0.19	324.22	lb/day	10		169.7	1289.9	76.8	129688.8	lb/yr								
Off-Highway Truck(s)	0.30	2.76	0.10	324.22	lb/day	3		35.6	331.4	12.4	38906.7	lb/yr								
Loader(s)	0.43	3.33	0.19	307.16	lb/day	2		34.2	266.5	15.4	24572.6	lb/yr								
Compactor(s)	0.29	1.80	0.09	244.59	lb/day	2		22.9	143.9	6.8	19567.1	lb/yr								
Employee Trips	0.02	0.03	0.00	39.26	lb/day/employ	15	employees	13.8	17.4	2.4	23553.0	lb/yr								
Total								406.1	3214.3	173.8	357993.4	lb/yr							2000 lb/ton	
Total								10.2	80.4	4.3	8949.8	lb/day								
[2] #3 Pipeline Relocation, Pumping House Relocation, Channel Realignment					Fisherman's Lake	0	yd3						1.0	0.0	0.0	0.0	40.0	days		
Grader(s)	0.49	3.79	0.22	346.97	lb/day	5		97.9	758.9	43.9	69394.9	lb/yr								
Water Truck(s)	0.10	1.27	0.05	163.47	lb/day	8		32.0	406.4	16.0	52310.4	lb/yr								
Excavator(s)	0.42	3.22	0.19	324.22	lb/day	10		169.7	1289.9	76.8	129688.8	lb/yr								
Off-Highway Truck(s)	0.30	2.76	0.10	324.22	lb/day	3		35.6	331.4	12.4	38906.7	lb/yr								
Loader(s)	0.43	3.33	0.19	307.16	lb/day	2		34.2	266.5	15.4	24572.6	lb/yr								
Compactor(s)	0.29	1.80	0.09	244.59	lb/day	2		22.9	143.9	6.8	19567.1	lb/yr								
Employee Trips	0.02	0.03	0.00	39.26	lb/day/employ	15	employees	13.8	17.4	2.4	23553.0	lb/yr								
Total								406.1	3214.3	173.8	357993.4	lb/yr								2000 lb/ton
Total								10.2	80.4	4.3	8949.8	lb/day								
[3] #5 Pipeline Relocation, Pumping House Relocation, Channel Realignment					Fisherman's Lake	0	yd3						1.0	0.0	0.0	0.0	40.0	days		
Grader(s)	0.49	3.79	0.22	346.97	lb/day	5		97.9	758.9	43.9	69394.9	lb/yr								
Water Truck(s)	0.10	1.27	0.05	163.47	lb/day	8		32.0	406.4	16.0	52310.4	lb/yr								
Excavator(s)	0.42	3.22	0.19	324.22	lb/day	10		169.7	1289.9	76.8	129688.8	lb/yr								
Off-Highway Truck(s)	0.30	2.76	0.10	324.22	lb/day	3		35.6	331.4	12.4	38906.7	lb/yr								
Loader(s)	0.43	3.33	0.19	307.16	lb/day	2		34.2	266.5	15.4	24572.6	lb/yr								
Compactor(s)	0.29	1.80	0.09	244.59	lb/day	2		22.9	143.9	6.8	19567.1	lb/yr								
Employee Trips	0.02	0.03	0.00	39.26	lb/day/employ	15	employees	13.8	17.4	2.4	23553.0	lb/yr								
Total								406.1	3214.3	173.8	357993.4	lb/yr								2000 lb/ton
Total								10.2	80.4	4.3	8949.8	lb/day								
2010 calendar year																				
Total from Pumping Plants								0.6	4.8	0.3	537.0	TPY							to occur during 2010 calendar year	
Total from Pumping Plants								20.3	160.7	8.7	-								Worst-case lb/day	

Borrow Site Excavation

*2010 calendar year comprises reach 10-15 work to occur over 8 months (April - Nov)

ALL WORK FOR BORROW SITES TO OCCUR IN SACRAMENTO COUNTY

Fisherman's Lake, I-5 Area, Habitat Conservation and Restoration

	ROG	NOX	PM10	CO2	Unit	Quantity	Unit	ROG	NOX	PM10	CO2	Unit	Distance (miles/round-trip)	# of Haul Loads	Total Miles Traveled	Total Miles Traveled/Day	Time frame	Conversion Factor	
					Fisherman's Lake	500	acres						0.0	0.0	0.0	0.0	140.0	days	
[1] Borrow Site Excavation					I-5 Area	452	acres											**all hauling accounted for under other components of Phase 4a.	
<u>Mobile Sources</u>																			
Water Truck(s)	0.10	1.27	0.05	163.47	lb/day	2		28.0	355.6	14.0	45771.6	lb/yr							
Loader(s)	0.43	3.33	0.19	307.16	lb/day	2		119.7	932.6	53.9	86004.1	lb/yr							
Bulldozer(s)	0.46	4.06	0.17	335.60	lb/day	2		128.2	1136.4	48.5	93967.4	lb/yr							
Excavator(s)	0.42	3.22	0.19	324.22	lb/day	2		118.8	902.9	53.8	90782.1	lb/yr							
Employee Trips	0.02	0.03	0.00	39.26	lb/day/employ	20	employees	64.4	81.2	11.2	109914.0	lb/yr							
<u>Fugitive Sources</u>																			
Disturbed Acreage	-	-	10.00	-	lb/acre	68	lb/day	-	-	9,520.0	-	lb/yr							
<u>Material Handling</u>																			
Bulldozing	-	-	0.41	-	lb/hr	8	hrs/day	-	-	459.99	-	lb/yr							
Total								459.1	3408.8	10161.3	426439.3	lb/yr						2000 lb/ton	
Total								3.3	24.3	72.6	3046.0	lb/day							
					Fisherman's Lake	0	yd3						0.0	0.0	0.0	0.0	30.0	days	
[2] Habitat Conservation, Borrow Site Restoration																			
Bulldozer(s)	0.46	4.06	0.17	335.60	lb/day	1		13.7	121.8	5.2	10067.9	lb/yr							
Water Truck(s)	0.10	1.27	0.05	163.47	lb/day	1		3.0	38.1	1.5	4904.1	lb/yr							
Excavator(s)	0.42	3.22	0.19	324.22	lb/day	1		12.7	96.7	5.8	9726.7	lb/yr							
Off-Highway Truck(s)	0.30	2.76	0.10	324.22	lb/day	1		8.9	82.8	3.1	9726.7	lb/yr							
Employee Trips	0.02	0.03	0.00	39.26	lb/day/employ	10	employees	6.9	8.7	1.2	11776.5	lb/yr							
Total								45.3	348.1	16.8	46201.9	lb/yr						2000 lb/ton	
Total								1.5	11.6	0.6	1540.1	lb/day							
2010 calendar year																			
Total from Borrow Site Work								0.3	1.9	5.1	236.3	TPY	to occur during 2010 calendar year						
Total from Borrow Site Work								3.3	24.3	72.6	-	Worst-case lb/day							

Phase 4a Summary

*2010 calendar year comprises reach 10-15 work to occur over 8 months (April - Nov)

Fishermans Lake, I-5 Area, Habitat Conservation and Restoration

	ROG	NOX	PM10	CO2	Unit	
Total from SEL	9.8	56.9	811.6	6436.4	TPY	to occur during 2010 calendar year
Total from SEL	153.3	909.6	8442.2	-	Worst-case lb/day	*assumes some phases will be conducted concurrently
Total from NCC	0.3	1.4	4.2	175.6	TPY	to occur during 2010 calendar year
Total from NCC	12.0	58.9	627.6	-	Worst-case lb/day	*assumes some phases will be conducted concurrently
Total from Riverside Canal	1.0	5.4	60.5	693.4	TPY	to occur during 2010 calendar year
Total from Riverside Canal	21.7	101.0	1645.8	-	Worst-case lb/day	
Total from Pumping Plants	0.6	4.8	0.3	537.0	TPY	to occur during 2010 calendar year
Total from Pumping Plants	20.3	160.7	8.7	-	Worst-case lb/day	
Total from Borrow Site Work	0.3	1.9	5.1	236.3	TPY	to occur during 2010 calendar year
Total from Borrow Site Work	3.3	24.3	72.6	-	Worst-case lb/day	
Total Phase 4a Sac Co	11.7	69.0	877.4	7903.0	TPY	to occur during 2010 calendar year
Total Phase 4a Sac Co	198.6	1195.6	10169.3	-	Worst-case lb/day	
Total Phase 4a Sut Co	0.3	1.4	4.2	175.6	TPY	to occur during 2010 calendar year
Total Phase 4a Sut Co	12.0	58.9	627.6	-	Worst-case lb/day	
Total Phase 4a	11.9	70.4	881.7	8078.6	TPY	to occur during 2010 calendar year
Total Phase 4a	210.6	1254.5	10796.9	-	Worst-case lb/day	
Mitigation Reductions	5%	20%	75%	-		
Mitigated Phase 4a Sac Co	11.1	55.2	219.4	7903.0	TPY	to occur during 2010 calendar year
Mitigated Phase 4a Sac Co	188.7	956.5	2542.3	-	Worst-case lb/day	
Mitigated Phase 4a Sut Co	0.2	1.2	1.1	175.6	TPY	to occur during 2010 calendar year
Mitigated Phase 4a Sut Co	11.4	47.1	156.9	-	Worst-case lb/day	
Total Mitigated Phase 4a	11.3	56.3	220.4	8078.6	TPY	to occur during 2010 calendar year
Total Mitigated Phase 4a	200.1	1003.6	2699.2	-	Worst-case lb/day	

Phase 4a Alternative Comparison Summary

Alternative 1

Total Phase 4a Sac Co	11.7	69.0	877.4	7903.0	TPY	to occur during 2010 calendar year
Total Phase 4a Sac Co	198.6	1195.6	10169.3	-	Worst-case lb/day	
Total Phase 4a Sut Co	0.3	1.4	4.2	175.6	TPY	to occur during 2010 calendar year
Total Phase 4a Sut Co	12.0	58.9	627.6	-	Worst-case lb/day	
Total Phase 4a	11.9	70.4	881.7	8078.6	TPY	to occur during 2010 calendar year
Total Phase 4a	210.6	1254.5	10796.9	-	Worst-case lb/day	
Mitigation Reductions	5%	20%	75%	-		
Mitigated Phase 4a Sac Co	11.1	55.2	219.4	7903.0	TPY	to occur during 2010 calendar year
Mitigated Phase 4a Sac Co	188.7	956.5	2542.3	-	Worst-case lb/day	
Mitigated Phase 4a Sut Co	0.2	1.2	1.1	175.6	TPY	to occur during 2010 calendar year
Mitigated Phase 4a Sut Co	11.4	47.1	156.9	-	Worst-case lb/day	
Total Mitigated Phase 4a	11.3	56.3	220.4	8078.6	TPY	to occur during 2010 calendar year
Total Mitigated Phase 4a	200.1	1003.6	2699.2	-	Worst-case lb/day	

Alternative 2

Total Phase 4a Sac Co	10.1	61.6	756.2	7038.3	TPY	to occur during 2010 calendar year
Total Phase 4a Sac Co	176.4	1093.1	8362.0	0.0	Worst-case lb/day	
Total Phase 4a Sut Co	0.3	1.4	4.2	175.6	TPY	to occur during 2010 calendar year
Total Phase 4a Sut Co	12.0	58.9	627.6	-	Worst-case lb/day	
Total Phase 4a	10.3	63.0	760.4	7213.9	TPY	to occur during 2010 calendar year
Total Phase 4a	188.5	1152.0	8989.6	-	Worst-case lb/day	
Mitigation Reductions	5%	20%	75%	-		
Mitigated Phase 4a Sac Co	9.6	49.3	189.0	7038.3	TPY	to occur during 2010 calendar year
Mitigated Phase 4a Sac Co	167.6	874.5	2090.5	-	Worst-case lb/day	
Mitigated Phase 4a Sut Co	0.2	1.2	1.1	175.6	TPY	to occur during 2010 calendar year
Mitigated Phase 4a Sut Co	11.4	47.1	156.9	-	Worst-case lb/day	
Total Mitigated Phase 4a	9.8	50.4	190.1	7213.9	TPY	to occur during 2010 calendar year
Total Mitigated Phase 4a	179.0	921.6	2247.4	-	Worst-case lb/day	

TIPS FOR USE:

1. For both residential and non-residential acreage entries EXCLUDE ONLY undisturbed (not graded) Open Space.
2. Append this calculation sheet to the environmental document.
3. Unmitigated NOx (lbs/day) and duration (days) should be consistent with URBEMIS results.

Construction Emissions Mitigation Fee Calculation						
PART 1: PROJECT INFORMATION						
Project Name:	SAFCA - Phase 4 - 2010 NLIP Construction Emissions within SMAQMD's Jurisdiction					
Control/Application #:						
Single Family Dwelling Units:		<i>Note: Enter information only in blue bordered cells</i>				
Multi Family Dwelling Units:		Total Residential Acreage:				
Non-residential Square Feet:		Total Non-residential Acreage:				
PART 2: EMISSIONS INFORMATION						
Year	Activity Phase	NOx (lbs/day) unmitigated	NOx (lbs/day) mitigated*	NOx over threshold (lbs/day)	duration (days)	Total significant NOx (lbs)
2010	SEL	909.57	727.65	642.65	140	89971.36
2010	Riverside	100.96	80.77	0	65	0.00
2010	Pumping Plants	160.71	128.57	43.57	40	1742.85
2010	Borrow Site Activity	24.35	19.48	0	30	0.00
<i>Total project Nox over threshold (lbs)</i>			91714.21			
<i>Total project Nox over threshold (tons)</i>			45.86			
PART 3: MITIGATION FEE RESULTS						
TOTAL MITIGATION FEE (\$16,000/TON)**		\$733,714				
Administrative Fee (5%)		\$36,686				
TOTAL MITIGATION FEE		\$770,399				
>>> <i>Fee is to be paid to the SMAQMD prior to any ground disturbance either in total or on a by acre basis.</i>						
Mitigation Fee (\$/acre)			-			
<p>* Assumes a construction mitigation plan which achieves a 20% reduction in NOx from on-site, off-road equipment.</p> <p>** Or the \$/ton of NOx cost-effectiveness value in effect at the time the fee is collected.</p>						

Conformity: Regionally Significant Thresholds Calculations

2006 Estimated Annual Average Emissions

SACRAMENTO COUNTY

ROG	CO	NOX	PM10	
64.4	365.95	81.78	44.43	ton/day
23506.00	133571.8	29849.70	16216.95	tpy
2350.60	13357.18	2984.97	1621.70	10% of total

SUTTER COUNTY

ROG	CO	NOX	PM10	
10.34	43.06	20.27	14.45	ton/day
3774.10	15716.90	7398.55	5274.25	tpy
377.41	1571.69	739.86	527.43	10% of total

Equipment Type	Emission Rates for Year 2009					Unit	ROG	NOX	PM10	CO2	Unit
	ROG	NOX	PM10	CO2	Unit						
Employee Light-Duty Trucks	0.026	0.033	0.004	39.231	lb/day/employee						
Haul Trucks	1.19	15.82	0.62	1847.96	g/mile	12.14	8.36	0.02	229.92	g/trip	
Backhoes	0.2213	1.4909	0.0779	312.8458	lb/day						
Bore/Drill Rigs	0.2148	2.7743	0.0877	426.6079	lb/day						
Concrete/Industrial Saws	0.5200	3.3866	0.2001	415.2317	lb/day						
Cranes	0.2729	2.6974	0.1045	244.5885	lb/day						
Crawler Tractors	0.5212	4.8719	0.2034	369.7268	lb/day						
Crushing/Proc. Equipment	0.6892	5.4543	0.3030	443.6719	lb/day						
Dozer	0.4924	4.4337	0.1889	335.5979	lb/day						
Excavator	0.4846	3.7349	0.2166	324.2221	lb/day						
Forklifts, Rough Terrain	0.7685	4.5324	0.4144	341.2863	lb/day						
Grader	0.5486	4.2871	0.2425	346.9745	lb/day						
Loaders, Rubber Tired	0.4801	3.7667	0.2122	307.1577	lb/day						
Off-Highway Trucks	0.3245	3.1661	0.1170	324.2222	lb/day						
Other Construction Equip.	0.6859	4.3122	0.3678	352.6626	lb/day						
Pavers	0.9293	5.4283	0.4711	352.6623	lb/day						
Paving Equipment	0.7885	4.6169	0.3992	301.4696	lb/day						
Rollers	0.7364	4.4281	0.3800	318.5338	lb/day						
Scraper	0.5061	4.8366	0.1955	409.5437	lb/day						
Signal Boards	2.0363	4.6463	0.4849	443.6722	lb/day						
Skid Steer Loaders	1.2375	3.1296	0.3184	312.8459	lb/day						
Surfacing Equipment	0.2415	2.6507	0.0953	255.9647	lb/day						
Tractors	0.2213	1.4909	0.0779	312.8458	lb/day						
Trenchers	1.1030	6.5422	0.5508	426.6081	lb/day						
Water Trucks	0.11	1.39	0.05	162.82	lb/day						
Fugitive Dust			10		lb/acre/day						
Assumptions: Emission factors from the Road Construction Emissions Model, Version 6.3 (SMAQMD 2008) for model year 2009 which assumes equipment operates 8hrs/day											
Equipment Type	Emission Rates for Year 2010					Unit	ROG	NOX	PM10	CO2	Unit
	ROG	NOX	PM10	CO2	Unit						
Employee Light-Duty Trucks	0.023	0.029	0.004	39.255	lb/day/employee						
Haul Trucks	1.10	14.47	0.56	1855.42	g/mile	11.78	8.18	0.02	223.55	g/trip	
Backhoes	0.2057	1.3752	0.0650	312.8457	lb/day						
Bore/Drill Rigs	0.2041	2.3385	0.0841	426.6076	lb/day						
Compactor	0.2862	1.7983	0.0856	244.5886	lb/day						
Concrete/Industrial Saws	0.5051	3.2230	0.1580	415.2317	lb/day						
Cranes	0.2472	2.4061	0.0929	244.5885	lb/day						
Crawler Tractors	0.5212	4.8719	0.2034	369.7268	lb/day						
Crushing/Proc. Equipment	0.6290	4.9396	0.2837	443.6723	lb/day						
Dozer	0.4579	4.0586	0.1731	335.5978	lb/day						
Excavator	0.4244	3.2247	0.1920	324.2219	lb/day						
Forklifts, Rough Terrain	0.6643	4.0071	0.3701	341.2864	lb/day						
Generator	0.2894	3.7816	0.1139	420.9198	lb/day						
Grader	0.4893	3.7944	0.2197	346.9744	lb/day						
Loaders, Rubber Tired	0.4274	3.3309	0.1924	307.1577	lb/day						
Off-Highway Trucks	0.2966	2.7615	0.1037	324.2222	lb/day						
Other Construction Equip.	0.5774	3.7753	0.3236	352.6627	lb/day						
Pavers	0.8357	4.9393	0.4357	352.6628	lb/day						
Paving Equipment	0.7097	4.2031	0.3702	301.4698	lb/day						
Pump	0.7626	4.9115	0.3956	420.9197	lb/day						
Rollers	0.6495	3.9873	0.3469	318.5338	lb/day						
Scraper	0.4645	4.3611	0.1762	409.5438	lb/day						
Signal Boards	1.8307	4.5214	0.4462	443.6723	lb/day						
Skid Steer Loaders	0.9654	3.0209	0.2663	312.8459	lb/day						
Surfacing Equipment	0.2142	2.3732	0.0856	255.9648	lb/day						
Tractors	0.2057	1.3752	0.0650	312.8457	lb/day						
Trenchers	0.9928	5.9689	0.5107	426.6079	lb/day						
Water Trucks	0.10	1.27	0.05	163.47	lb/day						
Fugitive Dust			10		lb/acre/day						
Assumptions: Emission factors from the Road Construction Emissions Model, Version 6.3 (SMAQMD 2008) for model year 2010 which assumes equipment operates 8hrs/day											
Travel on Unpaved Haul Roads (Heavy Duty Trucks):											
$E(\text{lbs/VMT}) = (k)(s/12)^a (W/3)^b$ *AP-42 12/03, 13.2.2-4 eq 1a											
Where:											
k =Particle Size Multiplier:	1.5	*AP-42 12/03 Table 13.2.2-2; PM10 emissions; industrial roads									
s =Silt Content:	4.3	*AP-42 12/03 Table 13.2.2-1, service road									
empirical constants											
a	0.9	*AP-42 12/03 Table 13.2.2-2; PM10 emissions; industrial roads									
b	0.45	*AP-42 12/03 Table 13.2.2-2; PM10 emissions; industrial roads									
W =Vehicle Weight:	11.375	$((2+1.25 T/cy)^{15} cy \text{ truck capacity}) + 2)/2$ (average weight of loaded and unloaded haul truck; assumed empty truck weighs 2 tons)									
	1.08	lbs/VMT									
$E(\text{ext}) = E[(365-P)/365]$											
Where:											
P =# days/yr with ≥ 0.01 in. precip	63	CALIFORNIA (June 2005)									
	0.90	lbs/VMT									
Travel on Paved Haul Roads (Heavy Duty Trucks):											
$E(\text{lbs/VMT}) = (k)(sL/2)^{0.65} (W/3)^{1.5}$ *AP-42 12/03, 13.2.1-4 eq 1											
Where:											
k =Particle Size Multiplier (lb/VMT)	0.016	*AP-42 12/03 Table 13.2.1-1; PM10 emissions; industrial roads									
sL =road surface silt loading (g/m ²)	8.2	*AP-42 12/03 Table 13.2.1-4; quarry roads									
W =Vehicle Weight:	11.375	$((2+1.25 T/cy)^{15} cy \text{ truck capacity}) + 2)/2$ (average weight of loaded and unloaded haul truck; assumed empty truck weighs 2 tons)									
C =exhaust, break, tire wear (lb/VMT)	0.00047	*AP-42 12/03 Table 13.2.1-2; PM10 emissions									
	0.30	lbs/VMT									
$E(\text{ext}) = E[1-(P/4N)]$											
Where:											
P =# days/yr with ≥ 0.01 in. precip	63	*AP-42 12/03 Figure 13.2.2-1 for Sacramento Co/NOAA Technical Memorandum NWS WR-272; CLIMATE OF SACRAMENTO.									
N =number of days in averaging period	365										
	0.28	lbs/VMT									
Fugitive Dust Source Emissions											
(lb/acre/day)											
Disturbance Area											
	60.71										
Assumptions: SMAQMD emission factor of 60.71 lbs/acre/day (SMAQMD 1994).											
Aggregate Storage Piles											
piles, 4. loadout of material through batch or drop operations (AP-42 12/03, chapt. 13.2.4).											
$E(\text{lb/ton}) = (k)(0.0032)(U/5)^{1.3} (M/2)^a$ *AP-42 12/03, 13.2.4-3 eq 1											
Where:											
k =Particle Size Multiplier:	0.35	*AP-42 12/03 13.2.4-3; PM10 emissions									
U =mean wind speed (mph)	8	(http://www.wrcc.dri.edu/htmlfiles/westwind.final.html#CALIFORNIA)									
M =moisture content (%):	2.4	*AP-42 7/98 Table 11.9-3, haul truck									
	0.002	lbs/ton									
Batch Loading at Borrow Area											
$E(\text{TSP}<15 \text{ um}) = (1.19/(M^{0.9}))$ *AP-42 7/98, Table 11.9-1											
Where:											
M =moisture content (%):	2.4	*AP-42 7/98 Table 11.9-3, haul truck									
	0.05	lb/ton									
$E(\text{TSP}<10 \text{ um}) = E(\text{TSP}<15 \text{ um}) * S$ *AP-42 7/98, Table 11.9-1											
S =scaling factor	0.75	*AP-42 7/98 Table 11.9-3, haul truck									
	0.04	lb/ton									
Truck Unloading											
$E(\text{TSP}<15 \text{ um})$											
	0.007	lb/ton *AP-42 7/98 Table 11.9-4, end dump truck unloading (batch drop)									
Where:											
$E(\text{TSP}<10 \text{ um}) = E(\text{TSP}<15 \text{ um}) * S$ *AP-42 7/98, Table 11.9-1											
S =scaling factor	0.75	*AP-42 7/98 Table 11.9-1, haul truck									
	0.005	lb/ton									
Bulldozing											
$E(\text{TSP}<15 \text{ um}) = (18.6(s)^{1.5})/(M^{1.4})$ *AP-42 7/98, Table 11.9-1											
Where:											
M =moisture content (%):	7.9	*AP-42 7/98 Table 11.9-3, bulldozer									
s =silt content (%):	6.9	*AP-42 7/98 Table 11.9-3, bulldozer									
	18.67	lb/hr									
$E(\text{TSP}<10 \text{ um}) = E(\text{TSP}<15 \text{ um}) * S$ *AP-42 7/98, Table 11.9-1											
S =scaling factor	0.75	*AP-42 7/98 Table 11.9-1, bulldozer									
	14.00	lb/hr									
Scraper Unloading											
$E(\text{TSP}<15 \text{ um})$											
	0.04	lb/ton *AP-42 7/98 Table 11.9-4, scraper unloading									
Where:											
$E(\text{TSP}<10 \text{ um}) = E(\text{TSP}<15 \text{ um}) * S$ *AP-42 7/98, Table 11.9-1											
S =scaling factor	0.75	*AP-42 7/98 Table 11.9-1, bulldozer/haul truck									
	0.03	lb/ton									