

APPENDIX I

Air Quality and Greenhouse Gas Emissions Technical Appendix

Freshwater Alternative

LA-5

	ROG	NOX	CO	PM10	PM2.5	CO2e
Mobilization	0.72	8.07	3.69	0.33	0.26	31
Site Preparation	3.95	28.50	15.72	1.04	0.93	282
Vegetation Clearing	9.53	156.77	44.11	5.08	3.73	1,147
Sediment Removal	64.43	553.39	276.08	37.05	27.42	2,027
Construct Inlet Weir	5.78	43.65	25.53	2.00	1.81	13
Infrastructure Improvements	1.65	13.57	6.45	0.47	0.39	192
Worker Commutes	0.03	0.31	0.72	0.05	0.03	26
Maximum Daily Emissions	66.12	567.26	283.25	37.57	27.84	
Total Annual Emissions						3,687

Overdredge

	ROG	NOX	CO	PM10	PM2.5	CO2e
Mobilization	0.72	8.07	3.69	0.33	0.26	31
Site Preparation	3.95	28.50	15.72	1.04	0.93	587
Vegetation Clearing	9.53	156.77	44.11	5.08	3.73	1,147
Sediment Removal	46.83	410.83	198.18	32.22	22.98	1,916
Construct Inlet Weir	5.78	43.65	25.53	2.00	1.81	13
Infrastructure Improvements	1.65	13.57	6.45	0.47	0.39	192
Worker Commutes	0.01	0.13	0.30	0.02	0.01	23
Maximum Daily Emissions	48.49	424.53	204.93	32.71	23.38	
Total Annual Emissions						3,878

Saltwater Alternative

LA-5

	ROG	NOX	CO	PM10	PM2.5	CO2e
Mobilization	0.72	8.07	3.69	0.33	0.26	1
Site Preparation	3.95	28.50	15.72	1.04	0.93	414
Vegetation Clearing	9.54	156.80	44.12	5.08	3.73	1,876
Sediment Removal	64.43	553.39	276.08	37.05	27.42	2,740
Construct Inlet Channel Guide	4.11	29.06	19.20	1.50	1.38	98
Infrastructure Improvements	10.26	92.00	45.44	3.85	3.27	752
Worker Commutes	0.03	0.31	0.72	0.05	0.03	38
Maximum Daily Emissions	74.72	645.69	322.23	40.96	30.72	
Total Annual Emissions						5,918

Overdredge

	ROG	NOX	CO	PM10	PM2.5	CO2e
Mobilization	0.72	8.07	3.69	0.33	0.26	1
Site Preparation	3.96	28.63	16.02	1.06	0.95	789
Vegetation Clearing	9.55	156.93	44.42	5.10	3.74	1,906
Sediment Removal	46.84	410.96	198.48	32.24	22.99	2,362
Construct Inlet Channel Guide	4.12	29.19	19.50	1.53	1.40	181
Infrastructure Improvements	10.26	92.00	45.44	3.85	3.27	752
Worker Commutes	0.01	0.13	0.30	0.02	0.01	30
Maximum Daily Emissions	57.11	503.08	244.21	36.12	26.28	
Total Annual Emissions						6,020

Hybrid Alternative**LA-5**

	ROG	NOX	CO	PM10	PM2.5	CO2e
Mobilization	0.72	8.07	3.69	0.33	0.26	1
Site Preparation	3.95	28.50	15.72	1.04	0.93	393
Vegetation Clearing	9.54	157.01	44.15	5.08	3.74	1,320
Sediment Removal	64.43	553.39	276.08	37.05	27.42	2,903
Construct Inlet Weir/Channel Guide	19.11	167.76	84.43	7.07	6.17	135
Infrastructure Improvements	10.26	92.00	45.44	3.85	3.27	752
Worker Commutes	0.03	0.31	0.72	0.05	0.03	36
Maximum Daily Emissions	74.72	645.69	322.23	40.96	30.72	
Total Annual Emissions						5,540

Overdredge

	ROG	NOX	CO	PM10	PM2.5	CO2e
Mobilization	0.72	8.07	3.69	0.33	0.26	1
Site Preparation	3.95	28.50	15.72	1.04	0.93	712
Vegetation Clearing	9.54	157.01	44.15	5.08	3.74	1,320
Sediment Removal	46.67	410.82	197.90	32.20	22.96	2,094
Construct Inlet Weir/Channel Guide	19.11	167.76	84.43	7.07	6.17	135
Infrastructure Improvements	10.26	92.00	45.44	3.85	3.27	752
Worker Commutes	0.01	0.13	0.30	0.02	0.01	28
Maximum Daily Emissions	56.94	502.95	243.64	36.07	26.24	
Total Annual Emissions						5,041

Mobilization/Demobilization - All Alternatives

Off-Road Construction Equipment

Equipment Category	Equipment Type	Number	Usage Factor	Unit	Emissions Summary (lbs/day)					Emissions Summary (tons per phase)					Total GHG Emissions (MT CO2e)
					ROG	NOx	CO	PM10	PM2.5	ROG	NOx	CO	PM10	PM2.5	
Graders Composite	Grader	1	1	hrs/day	0.11	0.80	0.58	0.04	0.04	0.00	0.02	0.01	0.00	0.00	
Rubber Tired Dozers Composite	Rubber Tired Dozer	1	1	hrs/day	0.25	1.95	0.93	0.08	0.07	0.00	0.04	0.02	0.00	0.00	
Tractors/Loaders/Backhoes Composite	Loader	1	1	hrs/day	0.06	0.37	0.37	0.02	0.02	0.00	0.01	0.01	0.00	0.00	
Cranes Composite	Crane	1	1	hrs/day	0.11	0.86	0.42	0.04	0.03	0.00	0.02	0.01	0.00	0.00	
Tractors/Loaders/Backhoes Composite	Backhoe	1	1	hrs/day	0.06	0.37	0.37	0.02	0.02	0.00	0.01	0.01	0.00	0.00	
					0.58	4.35	2.66	0.20	0.18	0.01	0.09	0.05	0.00	0.00	11.57

Note: Assumes that construction equipment would operate a few hours per day to mobilize/demobilize in staging areas.

On Road Construction Emissions

	Trips Per Day	Distance	Average Daily Mileage	Total Mileage	Emissions Summary (lbs/day)					Emissions Summary (tons per phase)					Total GHG Emissions (MT CO2e)
					ROG	NO _x	CO	PM10	PM2.5	ROG	NO _x	CO	PM10	PM2.5	
Heavy-Duty Trucks	20	12	240	9,600	0.12	3.51	0.55	0.10	0.06	0.002	0.070	0.011	0.002	0.001	16
Total			240	9,600	0.12	3.51	0.55	0.10	0.06	0.00	0.07	0.01	0.00	0.00	15.85

Note: Assumes 2 heavy-duty trucks trip (one trip each direction) per piece of construction equipment, including dredge and pumps.

	Total Trips Per Day	Distance	Average Daily Mileage	Total Mileage	Emissions Summary (lbs/day)					Emissions Summary (tons per phase)					Total GHG Emissions (MT CO2e)
					ROG	NO _x	CO	PM10	PM2.5	ROG	NO _x	CO	PM10	PM2.5	
Worker Trips	16	16.8	269	10,752	0.02	0.20	0.48	0.04	0.02	0.00	0.00	0.01	0.00	0.00	3.42

Note: Assumes a total of 40 workers per day and 20 visitors per day, consistent with the traffic report for the proposed project.

					Emissions Summary (lbs/day)					Emissions Summary (tons per phase)					Total GHG Emissions (MT CO2e)
					ROG	NO _x	CO	PM10	PM2.5	ROG	NO _x	CO	PM10	PM2.5	
Total					0.72	8.07	3.69	0.33	0.26	0.01	0.16	0.07	0.01	0.01	30.84

Global Warming Potential

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)
Carbon Dioxide	50-200	1
Methane	12 ± 3	28
Nitrous Oxide	120	265

IPCC, Second Assessment Report, 1995.

Number of Construction Days

Construction Method 1 - Fines to LA-5		Freshwater Alternative				Unit	Miles Per Day	Total Miles	Remarks
		Horse-power Rating (HP)	Equipment Quantity per Day	Hours per Day per Equipment	Number of Days per Equipment				
Site Access, Haul Roads, Staging Area Maintenance									
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader	250	1	4.0	199	Day/Equipment			
Motor Grader	Motor grader	150	1	4.0	199	Day/Equipment			
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe	290	1	4.0	199	Day/Equipment			
T7-Tractor	Dump truck (12 CY)	300	1	4.0	199	Day/Equipment	40	7940	Assumed onsite speed equal to 10 mph
T7-Tractor	Water truck	175	1	4.0	199	Day/Equipment	40	7940	Assumed onsite speed equal to 10 mph
Prepare Dredge Launch Area									
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe	290	1	8.0	12	Day/Equipment			1 launch area/basin
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader	250	1	8.0	12	Day/Equipment			
T7-Tractor	Dump truck (16.5 CY)	375	1	8.0	12	Day/Equipment	80	960	Assumed onsite speed equal to 10 mph
Remove Vegetation and Stockpile									
Other Material Handling Equipment	Amphibious harvester	100	1	8.0	74	Day/Equipment			
Rubber Tired Dozers Composite	Bulldozer	375	2	8.0	74	Day/Equipment			
					129,000	Total CY			
					1,750	CY/Day			
Load and Transport Vegetation to Sycamore Landfill - 72 miles round trip									
Tractors/Loaders/Backhoes Composite	Front-end loader	250	3	8.0	74	Day/Equipment			
T7-Tractor	Dump truck (16.5 CY)	375	27	8.0	74	Day/Equipment	216	15984	Assumed onsite speed equal to 10 mph
					129,000	Total CY			
					1,750	CY/Day			
	Offsite								
T7-Tractor	Dump Truck				7,818	Total Trips			
					106	Trips/day	7607	562909.0909	
Excavate Sediment with Dredge									
	Dredge (18") with pump	1,350	1	8.0	117	Day/Equipment			Ellicott Dredge 1270
	Dredge support vessel	200	1	4.0	117	Day/Equipment			
	Boat - survey crew for lagoon	150	1	0.8	117	Day/Equipment			8 hours/10 days
					562,000	Total CY			
					4,800	CY/Day			
Transport Dredged Sand to Oceanside Beach with Pipeline									
Booster Pumps	Booster pump	1,000	2	8.0	10	Day/Equipment			
					49,000	Total CY			
					4,800	CY/Day			
Spread Sand along Beach									
Rubber Tired Dozers Composite	Bulldozer	300	3	8.0	10	Day/Equipment			
Scrapers Composite	Scraper	150	1	8.0	10	Day/Equipment			
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader	250	1	8.0	10	Day/Equipment			
LDA-LDT	Truck - survey crew for beach	150	1	0.8	10	Day/Equipment	8	80	Assumed onsite speed equal to 10 mph
	Fugitive Dust				49,000	Total CY			
					4,800	CY/Day			
Transport Dredged Sand (70-80%) to Nearshore with Pipeline									
Booster Pumps	Booster pump	1,000	2	8.0	6	Day/Equipment			
	Boat	200	1	4.0	6	Day/Equipment			
	Boat - survey crew for nearshore	150	1	0.8	6	Day/Equipment			8 hours/10 days
					30,000	Total CY			
					4,800	CY/Day			
Transport Dredged Fine Grained Sediment to Barge with Pipeline									
Booster Pumps	Booster pump	1,000	2	8.0	101	Day/Equipment			
	Barge (idle)				101	Day/Equipment			
	Crew boat (from/to Oceanside Harbor)	200	1	2.0	101	Day/Equipment			
					483,000	Total CY			
					4,800	CY/Day			
Transport Fine Grained Sediment by Barge to LA-5 ODMDS (30% solids)									
	Barge		2	10.0	101	Day/Equipment			1500 cy capacity
	Tug	2,000	2	10.0	101	Day/Equipment			
	Skiff	150	2	10.0	101	Day/Equipment			
	Boat - survey crew for LA-5	150	1	0.8	101	Day/Equipment			8 hrs every 10 days
					483,000	Total CY			
					4,800	CY/Day			
					11	Total Trips - Barge			
					11	Total Trips - Tug			
Construct Inlet Weir									
Cranes Composite	Crawler Crane - install and remove cofferdam piles	300	1	5.0	2	Day/Equipment			
Compressor	Compressor - drive and remove cofferdam piles	100	1	8.0	2	Day/Equipment			
Pumps > 50 and <= 120	Pump	100	2	8.0	6	Day/Equipment			
					300	Total LF			
					150	LF/Day			
Install weir (1 to 1.5 ft thick)									
T7-Tractor	Truck (16.5 CY) - import material (steel & concrete)	375	2	6.0	1	Day/Equipment	120	120	Assumed onsite speed equal to 10 mph
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe (3 CY) - build weir	290	1	8.0	4	Day/Equipment			
Cranes Composite	Crawler crane	300	1	4.0	4	Day/Equipment			
					100	Total LF			
					20	LF/Day			
	Offsite								
	Truck				2	Trips/Day	40	40	
Demolish existing weir									
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe	290	1	8.0	2	Day/Equipment			
T7-Tractor	Truck - transport demolished material to landfill	375	1	8.0	1	Day/Equipment	80	80	Assumed onsite speed equal to 10 mph
	Offsite								
	Truck				2	Trips/Day	40	40	
Worker Trips									
LDA-LDT	Worker Trips		12		199	Day/Equipment	403.2	80236.8	

Construction Method 1 - Fines to LA-5	
<i>Site Access, Haul Roads, Staging Area Maintenance</i>	
Tractors/Loaders/Backhoes > 175 and <= 250	0.10 0.69 0.35 0.02 0.02 172 0.01 lb/hr
Motor Grader	0.11 0.78 0.73 0.04 0.04 124 0.01 lb/hr
Tractors/Loaders/Backhoes > 250 and <= 500	0.19 1.23 0.69 0.04 0.04 345 0.02 lb/hr
T7-Tractor	0.00 0.01 0.00 0.00 0.00 3.63 0.00 lb/mile
T7-Tractor	0.00 0.01 0.00 0.00 0.00 3.63 0.00 lb/mile
<i>Prepare Dredge Launch Area</i>	
Tractors/Loaders/Backhoes > 250 and <= 500	0.19 1.23 0.69 0.04 0.04 345 0.02 lb/hr
Tractors/Loaders/Backhoes > 175 and <= 250	0.10 0.69 0.35 0.02 0.02 172 0.01 lb/hr
T7-Tractor	0.00 0.01 0.00 0.00 0.00 3.63 0.00 lb/mile
<i>Remove Vegetation and Stockpile</i>	
Other Material Handling Equipment	0.09 0.27 0.33 0.02 0.02 30 0.01 lb/hr
Rubber Tired Dozers Composite	0.25 1.95 0.93 0.08 0.07 239 0.02 lb/hr
<i>Load and Transport Vegetation to Sycamore Landfill - 7</i>	
Tractors/Loaders/Backhoes Composite	0.06 0.37 0.37 0.02 0.02 67 0.01 lb/hr
T7-Tractor	0.00 0.01 0.00 0.00 0.00 3.63 0.00 lb/mile
<i>Excavate Sediment with Dredge</i>	
T7-Tractor	0.00 0.01 0.00 0.00 0.00 3.63 0.00 lb/mile
<i>Transport Dredged Sand to Oceanside Beach with Pipe Booster Pumps</i>	
Booster Pumps	0.25 2.74 1.07 0.08 0.08 571 0.02 lb/hr
<i>Spread Sand along Beach</i>	
Rubber Tired Dozers Composite	0.25 1.95 0.93 0.08 0.07 239 0.02 lb/hr
Scrapers Composite	0.23 1.75 0.87 0.07 0.07 262 0.02 lb/hr
Tractors/Loaders/Backhoes > 175 and <= 250	0.10 0.69 0.35 0.02 0.02 172 0.01 lb/hr
LDA-LDT	0.00 0.00 0.00 0.00 0.00 0.70 0.00 lb/mile
<i>Transport Dredged Sand (70-80%) to Nearshore with P Booster Pumps</i>	
Booster Pumps	0.25 2.74 1.07 0.08 0.08 571 0.02 lb/hr
T7-Tractor	0.04 0.00 0.07 0.01 0.01 0.55 0.00 lb/hr
<i>Transport Dredged Fine Grained Sediment to Barge with Booster Pumps</i>	
Booster Pumps	0.25 2.74 1.07 0.08 0.08 571 0.02 lb/hr
T7-Tractor	0.04 0.00 0.07 0.01 0.01 0.55 0.00 lb/hr
<i>Transport Fine Grained Sediment by Barge to LA-5 OD</i>	
LDA-LDT	0.04 0.00 0.07 0.01 0.01 0.55 0.00 lb/hr
LDA-LDT	0.04 0.00 0.07 0.01 0.01 0.55 0.00 lb/hr
<i>Construct Inlet Weir</i>	
Cranes Composite	0.11 0.86 0.42 0.04 0.03 129 0.01 lb/hr
Compressor	0.06 0.37 0.31 0.03 0.03 47 0.01 lb/hr
Pumps > 50 and <= 120	0.08 0.57 0.48 0.04 0.04 78 0.01 lb/hr
<i>Install weir (1 to 1.5 ft thick)</i>	
T7-Tractor	0.00 0.01 0.00 0.00 0.00 3.63 0.00 lb/mile
Tractors/Loaders/Backhoes > 250 and <= 500	0.19 1.23 0.69 0.04 0.04 345 0.02 lb/hr
Cranes Composite	0.11 0.86 0.42 0.04 0.03 129 0.01 lb/hr
<i>Demolish existing weir</i>	
Tractors/Loaders/Backhoes > 250 and <= 500	0.19 1.23 0.69 0.04 0.04 345 0.02 lb/hr
T7-Tractor	0.00 0.01 0.00 0.00 0.00 3.63 0.00 lb/mile
LDA-LDT	0.00 0.01 0.00 0.00 0.00 3.63 0.00 lb/mile
<i>Worker Trips</i>	
LDA-LDT	0.00 0.00 0.00 0.00 0.00 0.70 0.00 lb/mile

Emission Factors							
ROG	NOX	CO	PM10	PM2.5	CO2	CH4	Units
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.11	0.78	0.73	0.04	0.04	124	0.01	lb/hr
0.19	1.23	0.69	0.04	0.04	345	0.02	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.19	1.23	0.69	0.04	0.04	345	0.02	lb/hr
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.09	0.27	0.33	0.02	0.02	30	0.01	lb/hr
0.25	1.95	0.93	0.08	0.07	239	0.02	lb/hr
0.06	0.37	0.37	0.02	0.02	67	0.01	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.25	2.74	1.07	0.08	0.08	571	0.02	lb/hr
0.25	1.95	0.93	0.08	0.07	239	0.02	lb/hr
0.23	1.75	0.87	0.07	0.07	262	0.02	lb/hr
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.00	0.00	0.00	0.00	0.00	0.70	0.00	lb/mile
0.25	2.74	1.07	0.08	0.08	571	0.02	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.25	2.74	1.07	0.08	0.08	571	0.02	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.11	0.86	0.42	0.04	0.03	129	0.01	lb/hr
0.06	0.37	0.31	0.03	0.03	47	0.01	lb/hr
0.08	0.57	0.48	0.04	0.04	78	0.01	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.19	1.23	0.69	0.04	0.04	345	0.02	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.00	0.00	0.00	0.00	0.00	0.70	0.00	lb/mile

Daily Emissions (lb/Day)							
ROG	NOX	CO	PM10	PM2.5	CO2	CH4	
0.39	2.75	1.40	0.09	0.08	686.95	0.03	
0.45	3.11	2.92	0.17	0.16	485.69	0.04	
0.75	4.93	2.74	0.18	0.16	1379.41	0.07	
0.02	0.59	0.09	0.02	0.01	145.12	0.00	
0.02	0.59	0.09	0.02	0.01	145.12	0.00	
1.51	9.85	5.49	0.35	0.32	2758.83	0.14	
0.77	5.51	2.81	0.18	0.17	1373.90	0.07	
0.04	1.17	0.18	0.03	0.02	290.25	0.00	
0.69	2.15	2.63	0.17	0.16	242.68	0.06	
3.94	31.21	14.88	1.27	1.17	3825.42	0.36	
1.34	8.83	8.80	0.53	0.49	1603.13	0.12	
0.10	3.16	0.49	0.09	0.05	783.67	0.00	
3.46	111.41	17.31	3.01	1.86	27598.52	0.09	
8.39	71.02	37.50	2.45	2.26	6280.06		
0.16	0.01	0.28	0.02	0.02	2.20	0.00	
0.03	0.00	0.06	0.00	0.00	0.44	0.00	
3.97	43.80	17.13	1.32	1.21	9131.22	0.36	
5.92	46.82	22.32	1.91	1.76	5738.13	0.53	
1.81	13.99	6.97	0.57	0.53	2099.91	0.16	
0.77	5.51	2.81	0.18	0.17	1373.90	0.07	
0.00	0.01	0.01	0.00	0.00	5.58	0.00	
18.07	9.96						
3.97	43.80	17.13	1.32	1.21	9131.22	0.36	
0.16	0.01	0.28	0.02	0.02	2.20	0.00	
0.03	0.00	0.06	0.00	0.00	0.44	0.00	
3.97	43.80	17.13	1.32	1.21	9131.22	0.36	
0.08	0.00	0.14	0.01	0.01	1.10	0.00	
34.33	284.59	152.82	9.73	8.95	25322.82		
0.81	0.03	1.39	0.11	0.11	10.99	0.00	
0.03	0.00	0.06	0.00	0.00	0.44	0.00	
0.54	4.31	2.08	0.18	0.16	643.14	0.05	
0.45	2.94	2.50	0.23	0.22	375.60	0.04	
1.22	9.14	7.68	0.64	0.59	1247.19	0.11	
0.05	1.76	0.27	0.05	0.03	435.37	0.00	
1.51	9.85	5.49	0.35	0.32	2758.83	0.14	
0.43	3.45	1.86	0.14	0.13	514.51	0.04	
0.02	0.59	0.09	0.02	0.01	145.12	0.00	
1.51	9.85	5.49	0.35	0.32	2758.83	0.14	
0.04	1.17	0.18	0.03	0.02	290.25	0.00	
0.02	0.59	0.09	0.02	0.01	145.12	0.00	
0.03	0.31	0.72	0.05	0.03	281.25	0.03	

Construction Method 1 - Fines to LA-5	
<i>Site Access, Haul Roads, Staging Area Maintenance</i>	
Tractors/Loaders/Backhoes > 175 and <= 250	
Motor Grader	
Tractors/Loaders/Backhoes > 250 and <= 500	
T7-Tractor	
T7-Tractor	
<i>Prepare Dredge Launch Area</i>	
Tractors/Loaders/Backhoes > 250 and <= 500	
Tractors/Loaders/Backhoes > 175 and <= 250	
T7-Tractor	
<i>Remove Vegetation and Stockpile</i>	
Other Material Handling Equipment	
Rubber Tired Dozers Composite	
<i>Load and Transport Vegetation to Sycamore Landfill - 7</i>	
Tractors/Loaders/Backhoes Composite	
T7-Tractor	
T7-Tractor	
<i>Excavate Sediment with Dredge</i>	
<i>Transport Dredged Sand to Oceanside Beach with Pipe Booster Pumps</i>	
Booster Pumps	
<i>Spread Sand along Beach</i>	
Rubber Tired Dozers Composite	
Scrapers Composite	
Tractors/Loaders/Backhoes > 175 and <= 250	
LDA-LDT	
<i>Transport Dredged Sand (70-80%) to Nearshore with P Booster Pumps</i>	
Booster Pumps	
<i>Transport Dredged Fine Grained Sediment to Barge w/ Booster Pumps</i>	
Booster Pumps	
<i>Transport Fine Grained Sediment by Barge to LA-5 OD</i>	
<i>Construct Inlet Weir</i>	
Cranes Composite	
Compressor	
Pumps > 50 and <= 120	
<i>Install weir (1 to 1.5 ft thick)</i>	
T7-Tractor	
Tractors/Loaders/Backhoes > 250 and <= 500	
Cranes Composite	
<i>Demolish existing weir</i>	
Tractors/Loaders/Backhoes > 250 and <= 500	
T7-Tractor	
<i>Worker Trips</i>	
LDA-LDT	

Annual Emissions (Tons per Year)							
ROG	NOX	CO	PM10	PM2.5	CO2	CH4	Total GHG Emissions (MT)
0.04	0.27	0.14	0.01	0.01	68.18	0.00	62.13
0.05	0.31	0.29	0.02	0.02	49.20	0.00	44.87
0.07	0.49	0.27	0.02	0.02	136.91	0.01	124.76
0.00	0.06	0.01	0.00	0.00	14.40	0.00	13.11
0.00	0.06	0.01	0.00	0.00	14.40	0.00	13.11
0.01	0.06	0.03	0.00	0.00	16.55	0.00	15.08
0.00	0.03	0.02	0.00	0.00	8.24	0.00	7.51
0.00	0.01	0.00	0.00	0.00	1.74	0.00	1.58
0.03	0.08	0.10	0.01	0.01	8.98	0.00	8.23
0.15	1.15	0.55	0.05	0.04	141.54	0.01	129.14
0.05	0.33	0.33	0.02	0.02	59.32	0.00	54.09
0.00	0.12	0.02	0.00	0.00	29.00	0.00	26.39
0.13	4.12	0.64	0.11	0.07	1021.15	0.00	929.32
0.49	4.15	2.19	0.14	0.13	367.38	0.00	334.32
0.01	0.00	0.02	0.00	0.00	0.13	0.00	0.12
0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.02
0.02	0.22	0.09	0.01	0.01	45.66	0.00	41.59
0.03	0.23	0.11	0.01	0.01	28.69	0.00	26.18
0.01	0.07	0.03	0.00	0.00	10.50	0.00	9.58
0.00	0.03	0.01	0.00	0.00	6.87	0.00	6.26
0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03
				0.09	0.05		
0.01	0.13	0.05	0.00	0.00	27.39	0.00	24.96
0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.20	2.21	0.87	0.07	0.06	461.13	0.02	420.09
0.00	0.00	0.01	0.00	0.00	0.06	0.00	0.05
1.73	14.37	7.72	0.49	0.45	1278.80	0.00	1163.71
0.04	0.00	0.07	0.01	0.01	0.56	0.00	0.51
0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02
0.00	0.00	0.00	0.00	0.00	0.64	0.00	0.59
0.00	0.00	0.00	0.00	0.00	0.38	0.00	0.34
0.00	0.03	0.02	0.00	0.00	3.74	0.00	3.41
0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.20
0.00	0.02	0.01	0.00	0.00	5.52	0.00	5.03
0.00	0.01	0.00	0.00	0.00	1.03	0.00	0.94
0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.13
0.00	0.01	0.00	0.00	0.00	2.07	0.00	1.89
0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.13
							0.00
0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.13
0.00	0.03	0.07	0.01	0.00	27.98	0.00	25.53

Construction Method 1 - Fines to LA-5		Saltwater Alternative							Miles Per Day	Total Miles	Remarks
		Horse-power Rating (HP)	Equipment Quantity per Day	Hours per Day per Equipment	Number of Days per Equipment	Unit					
Site Access, Haul Roads, Staging Area Maintenance											
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader	250	1	4.0	300	Day/Equipment					
Motor Grader	Motor grader	150	1	4.0	300	Day/Equipment					
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe	290	1	4.0	300	Day/Equipment					
T7-Tractor	Dump truck (12 CY)	300	1	4.0	300	Day/Equipment	40	12000	Assumed onsite speed equal to 10 mph		
T7-Tractor	Water truck	175	1	4.0	300	Day/Equipment	40	12000	Assumed onsite speed equal to 10 mph		
Prepare Dredge Launch Area											
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe	290	1	8.0	12	Day/Equipment				1 launch area/basin	
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader	250	1	8.0	12	Day/Equipment					
T7-Tractor	Dump truck (16.5 CY)	375	1	8.0	12	Day/Equipment	80	960	Assumed onsite speed equal to 10 mph		
Remove Vegetation and Stockpile											
Other Material Handling Equipment	Amphibious harvester	100	1	8.0	121	Day/Equipment					
Rubber Tired Dozers Composite	Bulldozer	375	2	8.0	121	Day/Equipment					
					211,000	Total CY					
					1,750	CY/Day					
Load and Transport Vegetation to Sycamore Landfill - 72 miles round trip											
Tractors/Loaders/Backhoes Composite	Front-end loader	250	3	8.0	121	Day/Equipment					
T7-Tractor	Dump truck (16.5 CY)	375	27	8.0	121	Day/Equipment	216	26136	Assumed onsite speed equal to 1 mph		
					211,000	Total CY					
					1,750	CY/Day					
	Offsite										
T7-Tractor	Dump Truck				12,788	Total Trips					
					106	Trips/day	7609	920727.2727			
Excavate Sediment with Dredge											
	Dredge (18") with pump	1,350	1	8.0	163	Day/Equipment				Ellicott Dredge 1270	
	Dredge support vessel	200	1	4.0	163	Day/Equipment					
	Boat - survey crew for lagoon	150	1	0.8	163	Day/Equipment				8 hours/10 days	
					781,500	Total CY					
					4,800	CY/Day					
Transport Dredged Sand to Oceanside Beach with Pipeline											
Booster Pumps	Booster pump	1,000	2	8.0	23	Day/Equipment					
					110,000	Total CY					
					4,800	CY/Day					
Spread Sand along Beach											
Rubber Tired Dozers Composite	Bulldozer	300	3	8.0	23	Day/Equipment					
Scrapers Composite	Scraper	150	1	8.0	23	Day/Equipment					
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader	250	1	8.0	23	Day/Equipment					
LDT2	Truck - survey crew for beach	150	1	0.8	163	Day/Equipment	8	1304	Assumed onsite speed equal to 10 mph		
	Fugitive Dust				110,000	Total CY					
					4,800	CY/Day					
Transport Dredged Sand (70-80%) to Nearshore with Pipeline											
Booster Pumps	Booster pump	1,000	2	8.0	10	Day/Equipment					
	Boat	200	1	4.0	10	Day/Equipment					
	Boat - survey crew for nearshore	150	1	0.8	10	Day/Equipment				8 hours/10 days	
					49,000	Total CY					
					4,800	CY/Day					
Transport Dredged Fine Grained Sediment to Barge with Pipeline											
Booster Pumps	Booster pump	1,000	2	8.0	130	Day/Equipment					
	Barge (idle)										
	Crew boat (from/to Oceanside Harbor)	200	1	2.0	130	Day/Equipment					
					622,500	Total CY					
					4,800	CY/Day					
Transport Fine Grained Sediment by Barge to LA-5 ODMDS (30% solids)											
	Barge		2	10.0	130	Day/Equipment				1500 cy capacity	
	Tug	2,000	2	10.0	130	Day/Equipment					
	Skiff	150	2	10.0	130	Day/Equipment					
	Boat - survey crew for LA-5	150	1	0.8	130	Day/Equipment				8 hrs every 10 days	
					622,500	Total CY					
					4,800	CY/Day					
					11	Total Trips - Barge					
					11	Total Trips - Tug					
Construct Inlet Channel Guide											
Cranes Composite	Crawler Crane - install and remove cofferdam piles	300	1	5.0	3	Day/Equipment					
Compressor	Compressor - drive and remove cofferdam piles	100	1	8.0	3	Day/Equipment					
Pumps > 50 and <= 120	Pump	100	2	8.0	17	Day/Equipment					
					400	Total LF					
					150	LF/Day					
Site preparation/excavation											
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe (3 CY) - build weir	290	1	8.0	2	Day/Equipment					
Install Channel Guide											
T7-Tractor	Truck (16.5 CY) - import armor materi	375	12	8.0	12	Day/Equipment	960	11520	Assumed onsite speed equal to 10 mph		
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe (3 CY) - place material	290	2	8.0	12	Day/Equipment					
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader (5 CY) - place materi	250	2	6.0	12	Day/Equipment					
Cranes Composite	Crawler crane	250	1	8.0	12	Day/Equipment					
	Armor Material (rock)				9,000	Total Tons					
	Armor Material (rock)				800	Tons/Day					
	Offsite										
	Truck				556	Total Trips					
					46	Trips/Day	927	11120			
Worker Trips											
LDA-LDT	Worker Trips		12		300	Day/Equipment	403.2	120960			

Construction Method 1 - Fines to LA-5	
<i>Site Access, Haul Roads, Staging Area Maintenance</i>	
Tractors/Loaders/Backhoes > 175 and <= 250	
Motor Grader	
Tractors/Loaders/Backhoes > 250 and <= 500	
T7-Tractor	
T7-Tractor	
<i>Prepare Dredge Launch Area</i>	
Tractors/Loaders/Backhoes > 250 and <= 500	
Tractors/Loaders/Backhoes > 175 and <= 250	
T7-Tractor	
<i>Remove Vegetation and Stockpile</i>	
Other Material Handling Equipment	
Rubber Tired Dozers Composite	
<i>Load and Transport Vegetation to Sycamore Landfill</i>	
Tractors/Loaders/Backhoes Composite	
T7-Tractor	
<i>Excavate Sediment with Dredge</i>	
T7-Tractor	
<i>Transport Dredged Sand to Oceanside Beach with F-Booster Pumps</i>	
<i>Spread Sand along Beach</i>	
Rubber Tired Dozers Composite	
Scrapers Composite	
Tractors/Loaders/Backhoes > 175 and <= 250	
LDT2	
<i>Transport Dredged Sand (70-80%) to Nearshore with F-Booster Pumps</i>	
<i>Transport Dredged Fine Grained Sediment to Barge with F-Booster Pumps</i>	
<i>Transport Fine Grained Sediment by Barge to LA-5</i>	
<i>Construct Inlet Channel Guide</i>	
Cranes Composite	
Compressor	
Pumps > 50 and <= 120	
<i>Site preparation/excavation</i>	
Tractors/Loaders/Backhoes > 250 and <= 500	
<i>Install Channel Guide</i>	
T7-Tractor	
Tractors/Loaders/Backhoes > 250 and <= 500	
Tractors/Loaders/Backhoes > 175 and <= 250	
Cranes Composite	
<i>Worker Trips</i>	
LDA-LDT	

Emission Factors							
ROG	NOX	CO	PM10	PM2.5	CO2	CH4	Units
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.11	0.78	0.73	0.04	0.04	124	0.01	lb/hr
0.19	1.23	0.69	0.04	0.04	345	0.02	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.19	1.23	0.69	0.04	0.04	345	0.02	lb/hr
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.09	0.27	0.33	0.02	0.02	30	0.01	lb/hr
0.25	1.95	0.93	0.08	0.07	239	0.02	lb/hr
0.06	0.37	0.37	0.02	0.02	67	0.01	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.25	2.74	1.07	0.08	0.08	571	0.02	lb/hr
0.25	1.95	0.93	0.08	0.07	239	0.02	lb/hr
0.23	1.75	0.87	0.07	0.07	262	0.02	lb/hr
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.00	0.00	0.00	0.00	0.00	0.70	0.00	lb/mile
			0.75	0.41			lb/CY
0.25	2.74	1.07	0.08	0.08	571	0.02	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.25	2.74	1.07	0.08	0.08	571	0.02	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.11	0.86	0.42	0.04	0.03	129	0.01	lb/hr
0.06	0.37	0.31	0.03	0.03	47	0.01	lb/hr
0.08	0.57	0.48	0.04	0.04	78	0.01	lb/hr
0.19	1.23	0.69	0.04	0.04	345	0.02	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.19	1.23	0.69	0.04	0.04	345	0.02	lb/hr
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.11	0.86	0.42	0.04	0.03	129	0.01	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.00	0.00	0.00	0.00	0.00	0.70	0.00	lb/mile

Daily Emissions (lb/Day)							
ROG	NOX	CO	PM10	PM2.5	CO2	CH4	
0.39	2.75	1.40	0.09	0.08	686.95	0.03	
0.45	3.11	2.92	0.17	0.16	495.69	0.04	
0.75	4.93	2.74	0.18	0.16	1379.41	0.07	
0.02	0.59	0.09	0.02	0.01	145.12	0.00	
0.02	0.59	0.09	0.02	0.01	145.12	0.00	
1.51	9.85	5.49	0.35	0.32	2758.83	0.14	
0.77	5.51	2.81	0.18	0.17	1373.90	0.07	
0.04	1.17	0.18	0.03	0.02	290.25	0.00	
0.69	2.15	2.63	0.17	0.16	242.68	0.06	
3.94	31.21	14.88	1.27	1.17	3825.42	0.36	
1.34	8.83	8.80	0.53	0.49	1603.13	0.12	
0.10	3.16	0.49	0.09	0.05	783.67	0.00	
3.46	111.44	17.32	3.02	1.86	27607.36	0.09	
8.39	71.02	37.50	2.45	2.26	6280.06		
0.16	0.01	0.28	0.02	0.02	2.20	0.00	
0.03	0.00	0.06	0.00	0.00	0.44	0.00	
5.92	46.82	22.32	1.91	1.76	5738.13	0.53	
1.81	13.99	6.97	0.57	0.53	2099.91	0.16	
0.77	5.51	2.81	0.18	0.17	1373.90	0.07	
0.00	0.01	0.01	0.00	0.00	5.58	0.00	
			18.07	9.96			
3.97	43.80	17.13	1.32	1.21	9131.22	0.36	
0.16	0.01	0.28	0.02	0.02	2.20	0.00	
0.03	0.00	0.06	0.00	0.00	0.44	0.00	
3.97	43.80	17.13	1.32	1.21	9131.22	0.36	
0.08	0.00	0.14	0.01	0.01	1.10	0.00	
34.33	284.59	152.82	9.73	8.95	25322.82		
0.81	0.03	1.39	0.11	0.11	10.99	0.00	
0.03	0.00	0.06	0.00	0.00	0.44	0.00	
0.54	4.31	2.08	0.18	0.16	643.14	0.05	
0.45	2.94	2.50	0.23	0.22	375.60	0.04	
1.22	9.14	7.68	0.64	0.59	1247.19	0.11	
1.51	9.85	5.49	0.35	0.32	2758.83	0.14	
0.44	14.06	2.18	0.38	0.24	3482.98	0.01	
3.02	19.70	10.97	0.70	0.65	5517.65	0.27	
1.16	8.26	4.21	0.27	0.25	2060.84	0.10	
0.86	6.90	3.32	0.28	0.26	1029.02	0.08	
0.42	13.57	2.11	0.37	0.23	3362.04	0.01	
0.03	0.31	0.72	0.05	0.03	281.25	0.03	

Construction Method 1 - Fines to LA-5
<i>Site Access, Haul Roads, Staging Area Maintenance</i>
Tractors/Loaders/Backhoes > 175 and <= 250
Motor Grader
Tractors/Loaders/Backhoes > 250 and <= 500
T7-Tractor
T7-Tractor
<i>Prepare Dredge Launch Area</i>
Tractors/Loaders/Backhoes > 250 and <= 500
Tractors/Loaders/Backhoes > 175 and <= 250
T7-Tractor
<i>Remove Vegetation and Stockpile</i>
Other Material Handling Equipment
Rubber Tired Dozers Composite
<i>Load and Transport Vegetation to Sycamore Landfill</i>
Tractors/Loaders/Backhoes Composite
T7-Tractor
T7-Tractor
<i>Excavate Sediment with Dredge</i>
<i>Transport Dredged Sand to Oceanside Beach with F</i>
Booster Pumps
<i>Spread Sand along Beach</i>
Rubber Tired Dozers Composite
Scrapers Composite
Tractors/Loaders/Backhoes > 175 and <= 250
LDT2
<i>Transport Dredged Sand (70-80%) to Nearshore with</i>
Booster Pumps
<i>Transport Dredged Fine Grained Sediment to Barge</i>
Booster Pumps
<i>Transport Fine Grained Sediment by Barge to LA-5</i>
<i>Construct Inlet Channel Guide</i>
Cranes Composite
Compressor
Pumps > 50 and <= 120
<i>Site preparation/excavation</i>
Tractors/Loaders/Backhoes > 250 and <= 500
<i>Install Channel Guide</i>
T7-Tractor
Tractors/Loaders/Backhoes > 250 and <= 500
Tractors/Loaders/Backhoes > 175 and <= 250
Cranes Composite
<i>Worker Trips</i>
LDA-LDT

Annual Emissions (Tons per Year)							
ROG	NOX	CO	PM10	PM2.5	CO2	CH4	Total GHG Emissions (MT)
0.06	0.41	0.21	0.01	0.01	103.04	0.01	93.90
0.07	0.47	0.44	0.03	0.02	74.35	0.01	67.82
0.11	0.74	0.41	0.03	0.02	206.91	0.01	188.55
0.00	0.09	0.01	0.00	0.00	21.77	0.00	19.81
0.00	0.09	0.01	0.00	0.00	21.77	0.00	19.81
0.01	0.06	0.03	0.00	0.00	16.55	0.00	15.08
0.00	0.03	0.02	0.00	0.00	8.24	0.00	7.51
0.00	0.01	0.00	0.00	0.00	1.74	0.00	1.58
0.04	0.13	0.16	0.01	0.01	14.68	0.00	13.46
0.24	1.89	0.90	0.08	0.07	231.44	0.02	211.16
0.08	0.53	0.53	0.03	0.03	96.99	0.01	88.45
0.01	0.19	0.03	0.01	0.00	47.41	0.00	43.15
0.21	6.74	1.05	0.18	0.11	1670.25	0.01	1520.06
0.68	5.79	3.06	0.20	0.18	511.82	0.00	465.76
0.01	0.00	0.02	0.00	0.00	0.18	0.00	0.16
0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.03
0.05	0.50	0.20	0.02	0.01	105.01	0.00	95.66
0.07	0.54	0.26	0.02	0.02	65.99	0.01	60.21
0.02	0.16	0.08	0.01	0.01	24.15	0.00	22.02
0.01	0.06	0.03	0.00	0.00	15.80	0.00	14.40
0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.41
0.02	0.22	0.09	0.01	0.01	45.66	0.00	41.59
0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.26	2.85	1.11	0.09	0.08	593.53	0.02	540.70
0.01	0.00	0.01	0.00	0.00	0.07	0.00	0.07
2.23	18.50	9.93	0.63	0.58	1645.98	0.00	1497.84
0.05	0.00	0.09	0.01	0.01	0.71	0.00	0.65
0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03
0.00	0.01	0.00	0.00	0.00	0.96	0.00	0.88
0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.51
0.01	0.08	0.07	0.01	0.01	10.60	0.00	9.67
0.00	0.01	0.01	0.00	0.00	2.76	0.00	2.51
0.00	0.08	0.01	0.00	0.00	20.90	0.00	19.02
0.02	0.12	0.07	0.00	0.00	33.11	0.00	30.17
0.01	0.05	0.03	0.00	0.00	12.37	0.00	11.27
0.01	0.04	0.02	0.00	0.00	6.17	0.00	5.63
0.00	0.08	0.01	0.00	0.00	20.17	0.00	18.36
0.00	0.05	0.11	0.01	0.00	42.19	0.00	38.49

Construction Method 1 - Fines to LA-5		Hybrid Alternative					Unit	Miles Per Day	Total Miles	Remarks
		Horse-power Rating (HP)	Equipment Quantity per Day	Hours per Day per Equipment	Number of Days per Equipment					
Site Access, Haul Roads, Staging Area Maintenance										
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader	250	1	4.0	284	Day/Equipment				
Motor Grader	Motor grader	150	1	4.0	284	Day/Equipment				
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe	290	1	4.0	284	Day/Equipment				
T7-Tractor	Dump truck (12 CY)	300	1	4.0	284	Day/Equipment	40	11360	Assumed onsite speed equal to 10 mph	
T7-Tractor	Water truck	175	1	4.0	284	Day/Equipment	40	11360	Assumed onsite speed equal to 10 mph	
Prepare Dredge Launch Area										
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe	290	1	8.0	12	Day/Equipment			1 launch area/basin	
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader	250	1	8.0	12	Day/Equipment				
T7-Tractor	Dump truck (16.5 CY)	375	1	8.0	12	Day/Equipment	80	960	Assumed onsite speed equal to 10 mph	
Remove Vegetation and Stockpile										
Other Material Handling Equipment	Amphibious harvester	100	1	8.0	85	Day/Equipment				
Rubber Tired Dozers Composite	Bulldozer	375	2	8.0	85	Day/Equipment				
					148,500	Total CY				
					1,750	CY/Day				
Load and Transport Vegetation to Sycamore Landfill - 72 miles round trip										
Tractors/Loaders/Backhoes Composite	Front-end loader	250	3	8.0	85	Day/Equipment				
T7-Tractor	Dump truck (16.5 CY)	375	27	8.0	85	Day/Equipment	216	18360	Assumed onsite speed equal to 1 mph	
					148,500	Total CY				
					1,750	CY/Day				
	Offsite									
T7-Tractor	Dump Truck				9,000	Total Trips				
					106	Trips/day	7624	648000		
Excavate Sediment with Dredge										
	Dredge (18") with pump	1,350	1	8.0	174	Day/Equipment			Ellicott Dredge 1270	
	Dredge support vessel	200	1	4.0	174	Day/Equipment				
	Boat - survey crew for lagoon	150	1	0.8	174	Day/Equipment			8 hours/10 days	
					833,000	Total CY				
					4,800	CY/Day				
Transport Dredged Sand to Oceanside Beach with Pipeline										
Booster Pumps	Booster pump	1,000	2	8.0	27	Day/Equipment				
					129,500	Total CY				
					4,800	CY/Day				
Spread Sand along Beach										
Rubber Tired Dozers Composite	Bulldozer	300	3	8.0	27	Day/Equipment				
Scrapers Composite	Scraper	150	1	8.0	27	Day/Equipment				
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader	250	1	8.0	27	Day/Equipment				
LDT2	Truck - survey crew for beach	150	1	0.8	174	Day/Equipment	8	1392	Assumed onsite speed equal to 10 mph	
	Fugitive Dust				129,500	Total CY				
					4,800	CY/Day				
Transport Dredged Sand (70-80%) to Nearshore with Pipeline										
Booster Pumps	Booster pump	1,000	2	8.0	11	Day/Equipment				
	Boat	200	1	4.0	11	Day/Equipment				
	Boat - survey crew for nearshore	150	1	0.8	11	Day/Equipment			8 hours/10 days	
					51,500	Total CY				
					4,800	CY/Day				
Transport Dredged Fine Grained Sediment to Barge with Pipeline										
Booster Pumps	Booster pump	1,000	2	8.0	136	Day/Equipment				
	Barge (idle)									
	Crew boat (from/to Oceanside Harbor)	200	1	2.0	136	Day/Equipment				
					652,000	Total CY				
					4,800	CY/Day				
Transport Fine Grained Sediment by Barge to LA-5 ODMDS (30% solids)										
	Barge		2	10.0	136	Day/Equipment			1500 cy capacity	
	Tug	2,000	2	10.0	136	Day/Equipment				
	Skiff	150	2	10.0	136	Day/Equipment				
	Boat - survey crew for LA-5	150	1	0.8	136	Day/Equipment			8 hrs every 10 days	
					652,000	Total CY				
					4,800	CY/Day				
					11	Total Trips - Barge				
					11	Total Trips - Tug				
Construct I-5 Inlet Weir										
Cranes Composite	Crawler Crane - install and remove cofferdam piles	300	1	5.0	4	Day/Equipment				
Compressor	Compressor - drive and remove cofferdam piles	100	1	8.0	4	Day/Equipment				
Pumps > 50 and <= 120	Pump	100	2	8.0	5	Day/Equipment				
					500	Total LF				
					150	LF/Day				
Install weir (1 to 1.5 ft thick)										
T7-Tractor	Truck (16.5 CY) - import material (steel)	375	2	8.0	1	Day/Equipment	160	160	Assumed onsite speed equal to 10 mph	
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe (3 CY) - build weir	290	1	8.0	6	Day/Equipment				
Cranes Composite	Crawler crane	300	1	4.0	6	Day/Equipment				
					200	Total LF				
					20	LF/Day				
	Offsite									
	Truck				2	Trips/Day	40	40		
Construct Inlet Channel Guide										
Cranes Composite	Crawler Crane - install and remove cofferdam piles	300	1	5.0	3	Day/Equipment				
Compressor	Compressor - drive and remove cofferdam piles	100	1	8.0	3	Day/Equipment				
Pumps > 50 and <= 120	Pump	100	2	8.0	17	Day/Equipment				
					400	Total LF				
					150	LF/Day				
Site preparation/excavation										
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe (3 CY) - build weir	290	1	8.0	2	Day/Equipment				
Install Channel Guide										
T7-Tractor	Truck (16.5 CY) - import armor material	375	12	8.0	12	Day/Equipment	960	11520	Assumed onsite speed equal to 10 mph	
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe (3 CY) - place material	290	2	8.0	12	Day/Equipment				
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader (5 CY) - place material	250	2	6.0	12	Day/Equipment				
Cranes Composite	Crawler crane	250	1	8.0	12	Day/Equipment				
	Armor Material (rock)				9,000	Total Tons				
	Armor Material (rock)				800	Tons/Day				
	Offsite									
	Truck				556	Total Trips				
					46	Trips/Day	927	11120		
Construct Weir Basin Channel Guide (Hybrid Alternative B Only)										
Cranes Composite	Crawler Crane - install and remove cofferdam piles	300	1	5.0	9	Day/Equipment				
Compressor	Compressor - drive and remove cofferdam piles	100	1	8.0	9	Day/Equipment				
Pumps > 50 and <= 120	Pump	100	2	8.0	11	Day/Equipment				
					1,340	Total LF				
					150	LF/Day				
Site preparation/excavation										
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe	290	1	8.0	2	Day/Equipment				
Install Channel Guide										
T7-Tractor	Truck (10 CY) - transport concrete	300	4	6.0	5	Day/Equipment	240	1200	Assumed onsite speed equal to 10 mph	
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader (5 CY) - place material	250	1	6.0	5	Day/Equipment				
Cranes Composite	Crane (40 ton) - place material	250	1	6.0	5	Day/Equipment				
	Armor Material (rock)				1,100	Total CY				
	Armor Material (rock)				250	CY/Day				
	Offsite									
	Truck				110	Total Trips				
					25	Trips/Day	500	2500		
Worker Trips										
LDA-LDT	Worker Trips		12		284	Day/Equipment	403.2	114508.8		

Construction Method 1 - Fines to LA-5	
<i>Site Access, Haul Roads, Staging Area Maintenance</i>	
Tractors/Loaders/Backhoes > 175 and <= 250	
Motor Grader	
Tractors/Loaders/Backhoes > 250 and <= 500	
T7-Tractor	
T7-Tractor	
<i>Prepare Dredge Launch Area</i>	
Tractors/Loaders/Backhoes > 250 and <= 500	
Tractors/Loaders/Backhoes > 175 and <= 250	
T7-Tractor	
<i>Remove Vegetation and Stockpile</i>	
Other Material Handling Equipment	
Rubber Tired Dozers Composite	
<i>Load and Transport Vegetation to Sycamore Landfill</i>	
Tractors/Loaders/Backhoes Composite	
T7-Tractor	
<i>Excavate Sediment with Dredge</i>	
T7-Tractor	
<i>Transport Dredged Sand to Oceanside Beach with F-Booster Pumps</i>	
<i>Spread Sand along Beach</i>	
Rubber Tired Dozers Composite	
Scrapers Composite	
Tractors/Loaders/Backhoes > 175 and <= 250	
LDT2	
<i>Transport Dredged Sand (70-80%) to Nearshore with F-Booster Pumps</i>	
<i>Transport Dredged Fine Grained Sediment to Barge with F-Booster Pumps</i>	
<i>Transport Fine Grained Sediment by Barge to LA-5</i>	
<i>Construct I-5 Inlet Weir</i>	
Cranes Composite	
Compressor	
Pumps > 50 and <= 120	
<i>Install weir (1 to 1.5 ft thick)</i>	
T7-Tractor	
Tractors/Loaders/Backhoes > 250 and <= 500	
Cranes Composite	
<i>Construct Inlet Channel Guide</i>	
Cranes Composite	
Compressor	
Pumps > 50 and <= 120	
<i>Site preparation/excavation</i>	
Tractors/Loaders/Backhoes > 250 and <= 500	
<i>Install Channel Guide</i>	
T7-Tractor	
Tractors/Loaders/Backhoes > 250 and <= 500	
Tractors/Loaders/Backhoes > 175 and <= 250	
Cranes Composite	
<i>Construct Weir Basin Channel Guide (Hybrid Alternative)</i>	
Cranes Composite	
Compressor	
Pumps > 50 and <= 120	
<i>Site preparation/excavation</i>	
Tractors/Loaders/Backhoes > 250 and <= 500	
<i>Install Channel Guide</i>	
T7-Tractor	
Tractors/Loaders/Backhoes > 175 and <= 250	
Cranes Composite	
<i>Worker Trips</i>	
LDA-LDT	

Emission Factors							
ROG	NOX	CO	PM10	PM2.5	CO2	CH4	Units
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.11	0.78	0.73	0.04	0.04	124	0.01	lb/hr
0.19	1.23	0.69	0.04	0.04	345	0.02	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.19	1.23	0.69	0.04	0.04	345	0.02	lb/hr
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.09	0.27	0.33	0.02	0.02	30	0.01	lb/hr
0.25	1.95	0.93	0.08	0.07	239	0.02	lb/hr
0.06	0.37	0.37	0.02	0.02	67	0.01	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.25	2.74	1.07	0.08	0.08	571	0.02	lb/hr
0.25	1.95	0.93	0.08	0.07	239	0.02	lb/hr
0.23	1.75	0.87	0.07	0.07	262	0.02	lb/hr
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.00	0.00	0.00	0.00	0.00	0.70	0.00	lb/mile
0.25	2.74	1.07	0.08	0.08	571	0.02	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.25	2.74	1.07	0.08	0.08	571	0.02	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.11	0.86	0.42	0.04	0.03	129	0.01	lb/hr
0.06	0.37	0.31	0.03	0.03	47	0.01	lb/hr
0.08	0.57	0.48	0.04	0.04	78	0.01	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.19	1.23	0.69	0.04	0.04	345	0.02	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.19	1.23	0.69	0.04	0.04	345	0.02	lb/hr
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.11	0.86	0.42	0.04	0.03	129	0.01	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.11	0.86	0.42	0.04	0.03	129	0.01	lb/hr
0.06	0.37	0.31	0.03	0.03	47	0.01	lb/hr
0.08	0.57	0.48	0.04	0.04	78	0.01	lb/hr
0.19	1.23	0.69	0.04	0.04	345	0.02	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.11	0.86	0.42	0.04	0.03	129	0.01	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile

Daily Emissions (lb/Day)							
ROG	NOX	CO	PM10	PM2.5	CO2	CH4	
0.39	2.75	1.40	0.09	0.08	686.95	0.03	
0.45	3.11	2.92	0.17	0.16	495.69	0.04	
0.75	4.93	2.74	0.18	0.16	1379.41	0.07	
0.02	0.59	0.09	0.02	0.01	145.12	0.00	
0.02	0.59	0.09	0.02	0.01	145.12	0.00	
1.51	9.85	5.49	0.35	0.32	2758.83	0.14	
0.77	5.51	2.81	0.18	0.17	1373.90	0.07	
0.04	1.17	0.18	0.03	0.02	290.25	0.00	
0.69	2.15	2.63	0.17	0.16	242.68	0.06	
3.94	31.21	14.88	1.27	1.17	3825.42	0.36	
1.34	8.83	8.80	0.53	0.49	1603.13	0.12	
0.10	3.16	0.49	0.09	0.05	783.67	0.00	
3.47	111.65	17.35	3.02	1.87	27658.93	0.09	
8.39	71.02	37.50	2.45	2.26	6280.06		
0.16	0.01	0.28	0.02	0.02	2.20	0.00	
0.03	0.00	0.06	0.00	0.00	0.44	0.00	
3.97	43.80	17.13	1.32	1.21	9131.22	0.36	
5.92	46.82	22.32	1.91	1.76	5738.13	0.53	
1.81	13.99	6.97	0.57	0.53	2099.91	0.16	
0.77	5.51	2.81	0.18	0.17	1373.90	0.07	
0.00	0.01	0.01	0.00	0.00	5.58	0.00	
			18.07	9.96			
3.97	43.80	17.13	1.32	1.21	9131.22	0.36	
0.16	0.01	0.28	0.02	0.02	2.20	0.00	
0.03	0.00	0.06	0.00	0.00	0.44	0.00	
3.97	43.80	17.13	1.32	1.21	9131.22	0.36	
0.08	0.00	0.14	0.01	0.01	1.10	0.00	
34.33	284.59	152.82	9.73	8.95	25322.82		
0.81	0.03	1.39	0.11	0.11	10.99	0.00	
0.03	0.00	0.06	0.00	0.00	0.44	0.00	
0.54	4.31	2.08	0.18	0.16	643.14	0.05	
0.45	2.94	2.50	0.23	0.22	375.60	0.04	
1.22	9.14	7.68	0.64	0.59	1247.19	0.11	
0.07	2.34	0.36	0.06	0.04	580.50	0.00	
1.51	9.85	5.49	0.35	0.32	2758.83	0.14	
0.43	3.45	1.66	0.14	0.13	514.51	0.04	
0.02	0.59	0.09	0.02	0.01	145.12	0.00	
0.54	4.31	2.08	0.18	0.16	643.14	0.05	
0.45	2.94	2.50	0.23	0.22	375.60	0.04	
1.22	9.14	7.68	0.64	0.59	1247.19	0.11	
1.51	9.85	5.49	0.35	0.32	2758.83	0.14	
0.44	14.06	2.18	0.38	0.24	3482.98	0.01	
3.02	19.70	10.97	0.70	0.65	5517.65	0.27	
1.16	8.26	4.21	0.27	0.25	2060.84	0.10	
0.86	6.90	3.32	0.28	0.26	1029.02	0.08	
0.42	13.57	2.11	0.37	0.23	3362.04	0.01	
0.54	4.31	2.08	0.18	0.16	643.14	0.05	
0.45	2.94	2.50	0.23	0.22	375.60	0.04	
1.22	9.14	7.68	0.64	0.59	1247.19	0.11	
1.51	9.85	5.49	0.35	0.32	2758.83	0.14	
0.11	3.51	0.55	0.10	0.06	870.74	0.00	
0.58	4.13	2.10	0.14	0.13	1030.42	0.05	
0.64	5.17	2.49	0.21	0.19	771.77	0.06	
0.23	7.32	1.14	0.20	0.12	1814.05	0.01	
0.03	0.31	0.72	0.05	0.03	281.25	0.03	

Construction Method 1 - Fines to LA-5	Annual Emissions (Tons per Year)							
	ROG	NOX	CO	PM10	PM2.5	CO2	CH4	Total GHG Emissions (MT)
Site Access, Haul Roads, Staging Area Maintenance								
Tractors/Loaders/Backhoes > 175 and <= 250	0.06	0.39	0.20	0.01	0.01	97.55	0.00	88.89
Motor Grader	0.06	0.44	0.41	0.02	0.02	70.39	0.01	64.20
Tractors/Loaders/Backhoes > 250 and <= 500	0.11	0.70	0.39	0.02	0.02	195.88	0.01	178.49
T7-Tractor	0.00	0.08	0.01	0.00	0.00	20.61	0.00	18.75
T7-Tractor	0.00	0.08	0.01	0.00	0.00	20.61	0.00	18.75
Prepare Dredge Launch Area								
Tractors/Loaders/Backhoes > 250 and <= 500	0.01	0.06	0.03	0.00	0.00	16.55	0.00	15.08
Tractors/Loaders/Backhoes > 175 and <= 250	0.00	0.03	0.02	0.00	0.00	8.24	0.00	7.51
T7-Tractor	0.00	0.01	0.00	0.00	0.00	1.74	0.00	1.58
Remove Vegetation and Stockpile								
Other Material Handling Equipment	0.03	0.09	0.11	0.01	0.01	10.31	0.00	9.45
Rubber Tired Dozers Composite	0.17	1.33	0.63	0.05	0.05	162.58	0.02	148.33
Load and Transport Vegetation to Sycamore Landfill								
Tractors/Loaders/Backhoes Composite	0.06	0.38	0.37	0.02	0.02	68.13	0.01	62.13
T7-Tractor	0.00	0.13	0.02	0.00	0.00	33.31	0.00	30.31
T7-Tractor	0.15	4.75	0.74	0.13	0.08	1175.50	0.00	1069.80
Excavate Sediment with Dredge								
	0.73	6.18	3.26	0.21	0.20	546.37	0.00	497.19
	0.01	0.00	0.02	0.00	0.00	0.19	0.00	0.18
	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.04
Transport Dredged Sand to Oceanside Beach with Booster Pumps								
Booster Pumps	0.05	0.59	0.23	0.02	0.02	123.27	0.00	112.30
Spread Sand along Beach								
Rubber Tired Dozers Composite	0.08	0.63	0.30	0.03	0.02	77.46	0.01	70.68
Scrapers Composite	0.02	0.19	0.09	0.01	0.01	28.35	0.00	25.85
Tractors/Loaders/Backhoes > 175 and <= 250	0.01	0.07	0.04	0.00	0.00	18.55	0.00	16.90
LDT2	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.44
Transport Dredged Sand (70-80%) to Nearshore with Booster Pumps								
Booster Pumps	0.02	0.24	0.09	0.01	0.01	50.22	0.00	45.75
	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Transport Dredged Fine Grained Sediment to Barge with Booster Pumps								
Booster Pumps	0.27	2.98	1.17	0.09	0.08	620.92	0.02	565.66
	0.01	0.00	0.01	0.00	0.00	0.07	0.00	0.07
Transport Fine Grained Sediment by Barge to LA-5								
	2.33	19.35	10.39	0.66	0.61	1721.95	0.00	1566.98
	0.05	0.00	0.09	0.01	0.01	0.75	0.00	0.68
	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03
Construct I-5 Inlet Weir								
Cranes Composite	0.00	0.01	0.00	0.00	0.00	1.29	0.00	1.17
Compressor	0.00	0.01	0.00	0.00	0.00	0.75	0.00	0.69
Pumps > 50 and <= 120	0.00	0.02	0.02	0.00	0.00	3.12	0.00	2.84
Install weir (1 to 1.5 ft thick)								
T7-Tractor	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.26
Tractors/Loaders/Backhoes > 250 and <= 500	0.00	0.03	0.02	0.00	0.00	8.28	0.00	7.54
Cranes Composite	0.00	0.01	0.00	0.00	0.00	1.54	0.00	1.41
	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.13
Construct Inlet Channel Guide								
Cranes Composite	0.00	0.01	0.00	0.00	0.00	0.96	0.00	0.88
Compressor	0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.51
Pumps > 50 and <= 120	0.01	0.08	0.07	0.01	0.01	10.60	0.00	9.67
Site preparation/excavation								
Tractors/Loaders/Backhoes > 250 and <= 500	0.00	0.01	0.01	0.00	0.00	2.76	0.00	2.51
Install Channel Guide								
T7-Tractor	0.00	0.08	0.01	0.00	0.00	20.90	0.00	19.02
Tractors/Loaders/Backhoes > 250 and <= 500	0.02	0.12	0.07	0.00	0.00	33.11	0.00	30.17
Tractors/Loaders/Backhoes > 175 and <= 250	0.01	0.05	0.03	0.00	0.00	12.37	0.00	11.27
Cranes Composite	0.01	0.04	0.02	0.00	0.00	6.17	0.00	5.63
	0.00	0.08	0.01	0.00	0.00	20.17	0.00	18.36
Construct Weir Basin Channel Guide (Hybrid Alternative)								
Cranes Composite	0.00	0.02	0.01	0.00	0.00	2.89	0.00	2.64
Compressor	0.00	0.01	0.01	0.00	0.00	1.69	0.00	1.54
Pumps > 50 and <= 120	0.01	0.05	0.04	0.00	0.00	6.86	0.00	6.26
Site preparation/excavation								
Tractors/Loaders/Backhoes > 250 and <= 500	0.00	0.01	0.01	0.00	0.00	2.76	0.00	2.51
Install Channel Guide								
T7-Tractor	0.00	0.01	0.00	0.00	0.00	2.18	0.00	1.98
Tractors/Loaders/Backhoes > 175 and <= 250	0.00	0.01	0.01	0.00	0.00	2.58	0.00	2.35
Cranes Composite	0.00	0.01	0.01	0.00	0.00	1.93	0.00	1.76
	0.00	0.02	0.00	0.00	0.00	4.54	0.00	4.13
Worker Trips								
LDA-LDT	0.00	0.04	0.10	0.01	0.00	39.94	0.00	36.43

Construction Method 3 - Fines to Overdredged Pit	Freshwater Alternative							Miles Per Day	Total Miles	Remarks
	Horse-power Rating (HP)	Equipment Quantity per Day	Hours per Day per Equipment	Number of Days per Equipment	Unit					
Site Access, Haul Roads, Staging Area Maintenance										
Tractors/Loaders/Backhoes > 175 and <= 250		250	1	4.0	433	Day/Equipment				
Motor Grader	Motor grader	150	1	4.0	433	Day/Equipment				
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe	290	1	4.0	433	Day/Equipment				
T7-Tractor	Dump truck (12 CY)	300	1	4.0	433	Day/Equipment	40	17320	Assumed onsite speed equal to 10 mph	
T7-Tractor	Water truck	175	1	4.0	433	Day/Equipment	40	17320	Assumed onsite speed equal to 10 mph	
Prepare Dredge Launch Area										
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe	290	1	8.0	12	Day/Equipment			1 launch area/basin	
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader	250	1	8.0	12	Day/Equipment				
T7-Tractor	Dump truck (16.5 CY)	375	1	8.0	12	Day/Equipment	80	960	Assumed onsite speed equal to 10 mph	
Remove Vegetation and Stockpile										
Other Material Handling Equipment	Amphibious harvester	100	1	8.0	74	Day/Equipment				
Rubber Tired Dozers Composite	Bulldozer	375	2	8.0	74	Day/Equipment				
					129,000	Total CY				
					1,750	CY/Day				
Load and Transport Vegetation to Sycamore Landfill - 72 miles round trip										
Tractors/Loaders/Backhoes Composite	Front-end loader	250	3	8.0	74	Day/Equipment				
T7-Tractor	Dump truck (16.5 CY)	375	27	8.0	74	Day/Equipment	216	15984	Assumed onsite speed equal to 1 mph	
					129,000	Total CY				
					1,750	CY/Day				
	Offsite									
T7-Tractor	Dump Truck				7,818	Total Trips				
					106	Trips/day	7607	562909.0909		
Excavate Sediment with Dredge										
	Dredge (18") with pump	1,350	1	8.0	117	Day/Equipment			Ellicott Dredge 1270	
	Dredge support vessel	200	1	4.0	117	Day/Equipment				
	Boat - survey crew for lagoon	150	1	0.8	117	Day/Equipment			8 hours/10 days	
					562,000	Total CY				
					4,800	CY/Day				
Construct Overdredge Pit										
	Dredge (18") with pump	1,350	1	8.0	141	Day/Equipment			Ellicott Dredge 1270	
	Dredge support vessel	200	1	4.0	141	Day/Equipment				
	Boat - survey crew for lagoon	150	1	0.8	141	Day/Equipment			8 hours/10 days	
					675,500	Total CY				
					4,800	CY/Day				
Transport Dredged Sand to Oceanside Beach with Pipeline										
Booster Pumps	Booster pump	1,000	2	8.0	88	Day/Equipment				
					420,000	Total CY				
					4,800	CY/Day				
Transport Dredged Sand to North Carlsbad Beach with Pipeline										
Booster Pumps	Booster pump	1,000	2	8.0	12	Day/Equipment				
					56,500	Total CY				
					4,800	CY/Day				
Spread Sand along Beach										
Rubber Tired Dozers Composite	Bulldozer	300	3	8.0	99	Day/Equipment				
Scrapers Composite	Scraper	150	1	8.0	99	Day/Equipment				
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader	250	1	8.0	99	Day/Equipment				
LDT2	Truck - survey crew for beach	150	1	0.8	99	Day/Equipment	8	792	Assumed onsite speed equal to 10 mph	
	Fugitive Dust				476,500	Total CY				
					4,800	CY/Day				
Transport Dredged Sand (70-80%) to Nearshore with Pipeline										
Booster Pumps	Booster pump	1,000	2	8.0	18	Day/Equipment				
	Boat	200	1	4.0	18	Day/Equipment				
	Boat - survey crew for nearshore	150	1	0.8	18	Day/Equipment			8 hours/10 days	
					85,500	Total CY				
					4,800	CY/Day				
Transport excavated fine grained soil from CH Basin to stockpile in I-5 Basin or CH Basin with pipeline										
	Boat	200	1	8.0	95	Day/Equipment				
					457,000	Total CY				
					4,800	CY/Day				
Transport excavated fine grained soil from I-5 Basin or RR Basin to Overdredged Pit with pipeline										
	Dredge (18") with pump	1,350	1	8.0	95	Day/Equipment			Ellicott Dredge 1270	
	Dredge support vessel	200	1	4.0	95	Day/Equipment				
	Boat - survey crew for lagoon	150	1	0.8	95	Day/Equipment			8 hours/10 days	
					457,000	Total CY				
					4,800	CY/Day				
Transport Dredged Sand (70-80%) to Nearshore with Pipeline										
	Boat	200	1	4.0	46	Day/Equipment				
					218,500	Total CY				
					4,800	CY/Day				
Construct Inlet Weir										
Cranes Composite	Crawler Crane - install and remove cofferdam piles	300	1	5.0	2	Day/Equipment				
Compressor	Compressor - drive and remove cofferdam piles	100	1	8.0	2	Day/Equipment				
Pumps > 50 and <= 120	Pump	100	2	8.0	6	Day/Equipment				
					300	Total LF				
					150	LF/Day				
Install weir (1 to 1.5 ft thick)										
T7-Tractor	Truck (16.5 CY) - import material (steel)	375	2	6.0	1	Day/Equipment	120	120	Assumed onsite speed equal to 10 mph	
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe (3 CY) - build weir	290	1	8.0	4	Day/Equipment				
Cranes Composite	Crawler crane	300	1	4.0	4	Day/Equipment				
					100	Total LF				
					20	LF/Day				
	Offsite									
	Truck				2	Trips/Day	40	40		
Demolish existing weir										
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe	290	1	8.0	2	Day/Equipment				
T7-Tractor	Truck - transport demolished material	375	1	8.0	1	Day/Equipment	80	80	Assumed onsite speed equal to 10 mph	
	Offsite									
	Truck				2	Trips/Day	40	40		
Worker Trips										
LDA-LDT	Worker Trips		5		433	Day/Equipment	168	72744		

Construction Method 3 - Fines to Overdredged P

<i>Site Access, Haul Roads, Staging Area Maintenance</i>	
Tractors/Loaders/Backhoes > 175 and <= 250	
Motor Grader	
Tractors/Loaders/Backhoes > 250 and <= 500	
T7-Tractor	
T7-Tractor	
<i>Prepare Dredge Launch Area</i>	
Tractors/Loaders/Backhoes > 250 and <= 500	
Tractors/Loaders/Backhoes > 175 and <= 250	
T7-Tractor	
<i>Remove Vegetation and Stockpile</i>	
Other Material Handling Equipment	
Rubber Tired Dozers Composite	
<i>Load and Transport Vegetation to Sycamore Landfill</i>	
Tractors/Loaders/Backhoes Composite	
T7-Tractor	
T7-Tractor	
<i>Excavate Sediment with Dredge</i>	
<i>Construct Overdredge Pit</i>	
<i>Transport Dredged Sand to Oceanside Beach with F Booster Pumps</i>	
<i>Transport Dredged Sand to North Carlsbad Beach with Booster Pumps</i>	
<i>Spread Sand along Beach</i>	
Rubber Tired Dozers Composite	
Scrapers Composite	
Tractors/Loaders/Backhoes > 175 and <= 250	
LDT2	
<i>Transport Dredged Sand (70-80%) to Nearshore with Booster Pumps</i>	
<i>Transport excavated fine grained soil from CH Basin</i>	
<i>Transport excavated fine grained soil from I-5 Basin</i>	
<i>Transport Dredged Sand (70-80%) to Nearshore with</i>	
<i>Construct Inlet Weir</i>	
Cranes Composite	
Compressor	
Pumps > 50 and <= 120	
<i>Install weir (1 to 1.5 ft thick)</i>	
T7-Tractor	
Tractors/Loaders/Backhoes > 250 and <= 500	
Cranes Composite	
<i>Demolish existing weir</i>	
Tractors/Loaders/Backhoes > 250 and <= 500	
T7-Tractor	
<i>Worker Trips</i>	
LDA-LDT	

Emission Factors							
ROG	NOX	CO	PM10	PM2.5	CO2	CH4	Units
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.11	0.78	0.73	0.04	0.04	124	0.01	lb/hr
0.19	1.23	0.69	0.04	0.04	345	0.02	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.19	1.23	0.69	0.04	0.04	345	0.02	lb/hr
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.09	0.27	0.33	0.02	0.02	30	0.01	lb/hr
0.25	1.95	0.93	0.08	0.07	239	0.02	lb/hr
0.06	0.37	0.37	0.02	0.02	67	0.01	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.25	2.74	1.07	0.08	0.08	571	0.02	lb/hr
0.25	2.74	1.07	0.08	0.08	571	0.02	lb/hr
0.25	1.95	0.93	0.08	0.07	239	0.02	lb/hr
0.23	1.75	0.87	0.07	0.07	262	0.02	lb/hr
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.00	0.00	0.00	0.00	0.00	0.70	0.00	lb/mile
			0.75	0.41			lb/CY
0.25	2.74	1.07	0.08	0.08	571	0.02	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.11	0.86	0.42	0.04	0.03	129	0.01	lb/hr
0.06	0.37	0.31	0.03	0.03	47	0.01	lb/hr
0.08	0.57	0.48	0.04	0.04	78	0.01	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.19	1.23	0.69	0.04	0.04	345	0.02	lb/hr
0.11	0.86	0.42	0.04	0.03	129	0.01	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.19	1.23	0.69	0.04	0.04	345	0.02	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.00	0.00	0.00	0.00	0.00	0.70	0.00	lb/mile

Construction Method 3 - Fines to Overdredged P

Site Access, Haul Roads, Staging Area Maintenance							
Tractors/Loaders/Backhoes > 175 and <= 250	0.39	2.75	1.40	0.09	0.08	686.95	0.03
Motor Grader	0.45	3.11	2.92	0.17	0.16	495.69	0.04
Tractors/Loaders/Backhoes > 250 and <= 500	0.75	4.93	2.74	0.18	0.16	1379.41	0.07
T7-Tractor	0.02	0.59	0.09	0.02	0.01	145.12	0.00
T7-Tractor	0.02	0.59	0.09	0.02	0.01	145.12	0.00
Prepare Dredge Launch Area							
Tractors/Loaders/Backhoes > 250 and <= 500	1.51	9.85	5.49	0.35	0.32	2758.83	0.14
Tractors/Loaders/Backhoes > 175 and <= 250	0.77	5.51	2.81	0.18	0.17	1373.90	0.07
T7-Tractor	0.04	1.17	0.18	0.03	0.02	290.25	0.00
Remove Vegetation and Stockpile							
Other Material Handling Equipment	0.69	2.15	2.63	0.17	0.16	242.68	0.06
Rubber Tired Dozers Composite	3.94	31.21	14.88	1.27	1.17	3825.42	0.36
Load and Transport Vegetation to Sycamore Landfill							
Tractors/Loaders/Backhoes Composite	1.34	8.83	8.80	0.53	0.49	1603.13	0.12
T7-Tractor	0.10	3.16	0.49	0.09	0.05	783.67	0.00
Excavate Sediment with Dredge							
T7-Tractor	3.46	111.41	17.31	3.01	1.86	27598.52	0.09
Excavate Sediment with Dredge							
T7-Tractor	8.39	71.02	37.50	2.45	2.26	6280.06	0.00
	0.16	0.01	0.28	0.02	0.02	2.20	0.00
	0.03	0.00	0.06	0.00	0.00	0.44	0.00
Construct Overdredge Pit							
T7-Tractor	8.39	71.02	37.50	2.45	2.26	6280.06	0.00
	0.16	0.01	0.28	0.02	0.02	2.20	0.00
	0.03	0.00	0.06	0.00	0.00	0.44	0.00
Transport Dredged Sand to Oceanside Beach with F							
Booster Pumps	3.97	43.80	17.13	1.32	1.21	9131.22	0.36
Transport Dredged Sand to North Carlsbad Beach w							
Booster Pumps	3.97	43.80	17.13	1.32	1.21	9131.22	0.36
Spread Sand along Beach							
Rubber Tired Dozers Composite	5.92	46.82	22.32	1.91	1.76	5738.13	0.53
Scrapers Composite	1.81	13.99	6.97	0.57	0.53	2099.91	0.16
Tractors/Loaders/Backhoes > 175 and <= 250	0.77	5.51	2.81	0.18	0.17	1373.90	0.07
LDT2	0.00	0.01	0.01	0.00	0.00	5.58	0.00
				18.07	9.96		
Transport Dredged Sand (70-80%) to Nearshore with							
Booster Pumps	3.97	43.80	17.13	1.32	1.21	9131.22	0.36
	0.16	0.01	0.28	0.02	0.02	2.20	0.00
	0.03	0.00	0.06	0.00	0.00	0.44	0.00
Transport excavated fine grained soil from CH Basin							
	0.32	0.01	0.55	0.05	0.04	4.40	0.00
Transport excavated fine grained soil from I-5 Basin							
	8.39	71.02	37.50	2.45	2.26	6280.06	0.00
	0.16	0.01	0.28	0.02	0.02	2.20	0.00
	0.03	0.00	0.06	0.00	0.00	0.44	0.00
Transport Dredged Sand (70-80%) to Nearshore with							
	0.16	0.01	0.28	0.02	0.02	2.20	0.00
Construct Inlet Weir							
Cranes Composite	0.54	4.31	2.08	0.18	0.16	643.14	0.05
Compressor	0.45	2.94	2.50	0.23	0.22	375.60	0.04
Pumps > 50 and <= 120	1.22	9.14	7.68	0.64	0.59	1247.19	0.11
Install weir (1 to 1.5 ft thick)							
T7-Tractor	0.05	1.76	0.27	0.05	0.03	435.37	0.00
Tractors/Loaders/Backhoes > 250 and <= 500	1.51	9.85	5.49	0.35	0.32	2758.83	0.14
Cranes Composite	0.43	3.45	1.66	0.14	0.13	514.51	0.04
Demolish existing weir							
Tractors/Loaders/Backhoes > 250 and <= 500	1.51	9.85	5.49	0.35	0.32	2758.83	0.14
T7-Tractor	0.04	1.17	0.18	0.03	0.02	290.25	0.00
	0.02	0.59	0.09	0.02	0.01	145.12	0.00
Worker Trips							
LDA-LDT	0.01	0.13	0.30	0.02	0.01	117.19	0.01

Daily Emissions (lb/Day)							
ROG	NOX	CO	PM10	PM2.5	CO2	CH4	
Site Access, Haul Roads, Staging Area Maintenance							
Tractors/Loaders/Backhoes > 175 and <= 250	0.39	2.75	1.40	0.09	0.08	686.95	0.03
Motor Grader	0.45	3.11	2.92	0.17	0.16	495.69	0.04
Tractors/Loaders/Backhoes > 250 and <= 500	0.75	4.93	2.74	0.18	0.16	1379.41	0.07
T7-Tractor	0.02	0.59	0.09	0.02	0.01	145.12	0.00
T7-Tractor	0.02	0.59	0.09	0.02	0.01	145.12	0.00
Prepare Dredge Launch Area							
Tractors/Loaders/Backhoes > 250 and <= 500	1.51	9.85	5.49	0.35	0.32	2758.83	0.14
Tractors/Loaders/Backhoes > 175 and <= 250	0.77	5.51	2.81	0.18	0.17	1373.90	0.07
T7-Tractor	0.04	1.17	0.18	0.03	0.02	290.25	0.00
Remove Vegetation and Stockpile							
Other Material Handling Equipment	0.69	2.15	2.63	0.17	0.16	242.68	0.06
Rubber Tired Dozers Composite	3.94	31.21	14.88	1.27	1.17	3825.42	0.36
Load and Transport Vegetation to Sycamore Landfill							
Tractors/Loaders/Backhoes Composite	1.34	8.83	8.80	0.53	0.49	1603.13	0.12
T7-Tractor	0.10	3.16	0.49	0.09	0.05	783.67	0.00
Excavate Sediment with Dredge							
T7-Tractor	3.46	111.41	17.31	3.01	1.86	27598.52	0.09
Excavate Sediment with Dredge							
T7-Tractor	8.39	71.02	37.50	2.45	2.26	6280.06	0.00
	0.16	0.01	0.28	0.02	0.02	2.20	0.00
	0.03	0.00	0.06	0.00	0.00	0.44	0.00
Construct Overdredge Pit							
T7-Tractor	8.39	71.02	37.50	2.45	2.26	6280.06	0.00
	0.16	0.01	0.28	0.02	0.02	2.20	0.00
	0.03	0.00	0.06	0.00	0.00	0.44	0.00
Transport Dredged Sand to Oceanside Beach with F							
Booster Pumps	3.97	43.80	17.13	1.32	1.21	9131.22	0.36
Transport Dredged Sand to North Carlsbad Beach w							
Booster Pumps	3.97	43.80	17.13	1.32	1.21	9131.22	0.36
Spread Sand along Beach							
Rubber Tired Dozers Composite	5.92	46.82	22.32	1.91	1.76	5738.13	0.53
Scrapers Composite	1.81	13.99	6.97	0.57	0.53	2099.91	0.16
Tractors/Loaders/Backhoes > 175 and <= 250	0.77	5.51	2.81	0.18	0.17	1373.90	0.07
LDT2	0.00	0.01	0.01	0.00	0.00	5.58	0.00
				18.07	9.96		
Transport Dredged Sand (70-80%) to Nearshore with							
Booster Pumps	3.97	43.80	17.13	1.32	1.21	9131.22	0.36
	0.16	0.01	0.28	0.02	0.02	2.20	0.00
	0.03	0.00	0.06	0.00	0.00	0.44	0.00
Transport excavated fine grained soil from CH Basin							
	0.32	0.01	0.55	0.05	0.04	4.40	0.00
Transport excavated fine grained soil from I-5 Basin							
	8.39	71.02	37.50	2.45	2.26	6280.06	0.00
	0.16	0.01	0.28	0.02	0.02	2.20	0.00
	0.03	0.00	0.06	0.00	0.00	0.44	0.00
Transport Dredged Sand (70-80%) to Nearshore with							
	0.16	0.01	0.28	0.02	0.02	2.20	0.00
Construct Inlet Weir							
Cranes Composite	0.54	4.31	2.08	0.18	0.16	643.14	0.05
Compressor	0.45	2.94	2.50	0.23	0.22	375.60	0.04
Pumps > 50 and <= 120	1.22	9.14	7.68	0.64	0.59	1247.19	0.11
Install weir (1 to 1.5 ft thick)							
T7-Tractor	0.05	1.76	0.27	0.05	0.03	435.37	0.00
Tractors/Loaders/Backhoes > 250 and <= 500	1.51	9.85	5.49	0.35	0.32	2758.83	0.14
Cranes Composite	0.43	3.45	1.66	0.14	0.13	514.51	0.04
Demolish existing weir							
Tractors/Loaders/Backhoes > 250 and <= 500	1.51	9.85	5.49	0.35	0.32	2758.83	0.14
T7-Tractor	0.04	1.17	0.18	0.03	0.02	290.25	0.00
	0.02	0.59	0.09	0.02	0.01	145.12	0.00
Worker Trips							
LDA-LDT	0.01	0.13	0.30	0.02	0.01	117.19	0.01

Construction Method 3 - Fines to Overdredged P

Annual Emissions (Tons per Year)								
ROG	NOX	CO	PM10	PM2.5	CO2	CH4	Total GHG Emissions (MT)	
Site Access, Haul Roads, Staging Area Maintenance								
Tractors/Loaders/Backhoes > 175 and <= 250	0.08	0.60	0.30	0.02	0.02	148.72	0.01	135.53
Motor Grader	0.10	0.67	0.63	0.04	0.03	107.32	0.01	97.88
Tractors/Loaders/Backhoes > 250 and <= 500	0.16	1.07	0.59	0.04	0.03	298.64	0.01	272.14
T7-Tractor	0.00	0.13	0.02	0.00	0.00	31.42	0.00	28.59
T7-Tractor	0.00	0.13	0.02	0.00	0.00	31.42	0.00	28.59
Prepare Dredge Launch Area								
Tractors/Loaders/Backhoes > 250 and <= 500	0.01	0.06	0.03	0.00	0.00	16.55	0.00	15.08
Tractors/Loaders/Backhoes > 175 and <= 250	0.00	0.03	0.02	0.00	0.00	8.24	0.00	7.51
T7-Tractor	0.00	0.01	0.00	0.00	0.00	1.74	0.00	1.58
Remove Vegetation and Stockpile								
Other Material Handling Equipment	0.03	0.08	0.10	0.01	0.01	8.98	0.00	8.23
Rubber Tired Dozers Composite	0.15	1.15	0.55	0.05	0.04	141.54	0.01	129.14
Load and Transport Vegetation to Sycamore Landfill								
Tractors/Loaders/Backhoes Composite	0.05	0.33	0.33	0.02	0.02	59.32	0.00	54.09
T7-Tractor	0.00	0.12	0.02	0.00	0.00	29.00	0.00	26.39
Excavate Sediment with Dredge								
T7-Tractor	0.13	4.12	0.64	0.11	0.07	1021.15	0.00	929.32
Excavate Sediment with Dredge								
	0.49	4.15	2.19	0.14	0.13	367.38	0.00	334.32
	0.01	0.00	0.02	0.00	0.00	0.13	0.00	0.12
	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.02
Construct Overdredge Pit								
	0.59	5.01	2.64	0.17	0.16	442.74	0.00	402.90
	0.01	0.00	0.02	0.00	0.00	0.16	0.00	0.14
	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03
Transport Dredged Sand to Oceanside Beach with F								
Booster Pumps	0.17	1.93	0.75	0.06	0.05	401.77	0.02	366.02
Transport Dredged Sand to North Carlsbad Beach w								
Booster Pumps	0.02	0.26	0.10	0.01	0.01	54.79	0.00	49.91
Spread Sand along Beach								
Rubber Tired Dozers Composite	0.29	2.32	1.10	0.09	0.09	284.04	0.03	259.15
Scrapers Composite	0.09	0.69	0.35	0.03	0.03	103.95	0.01	94.80
Tractors/Loaders/Backhoes > 175 and <= 250	0.04	0.27	0.14	0.01	0.01	68.01	0.00	61.98
LDT2	0.00	0.00	0.00	0.00	0.00	0.28	0.00	0.25
				0.89	0.49			
Transport Dredged Sand (70-80%) to Nearshore w/								
Booster Pumps	0.04	0.39	0.15	0.01	0.01	82.18	0.00	74.87
	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Transport excavated fine grained soil from CH Basin								
	0.02	0.00	0.03	0.00	0.00	0.21	0.00	0.19
Transport excavated fine grained soil from I-5 Basin								
	0.40	3.37	1.78	0.12	0.11	298.30	0.00	271.46
	0.01	0.00	0.01	0.00	0.00	0.10	0.00	0.10
	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02
Transport Dredged Sand (70-80%) to Nearshore w/								
	0.00	0.00	0.01	0.00	0.00	0.05	0.00	0.05
Construct Inlet Weir								
Cranes Composite	0.00	0.00	0.00	0.00	0.00	0.64	0.00	0.59
Compressor	0.00	0.00	0.00	0.00	0.00	0.38	0.00	0.34
Pumps > 50 and <= 120	0.00	0.03	0.02	0.00	0.00	3.74	0.00	3.41
Install weir (1 to 1.5 ft thick)								
T7-Tractor	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.20
Tractors/Loaders/Backhoes > 250 and <= 500	0.00	0.02	0.01	0.00	0.00	5.52	0.00	5.03
Cranes Composite	0.00	0.01	0.00	0.00	0.00	1.03	0.00	0.94
Demolish existing weir								
Tractors/Loaders/Backhoes > 250 and <= 500	0.00	0.01	0.00	0.00	0.00	2.07	0.00	1.89
T7-Tractor	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.13
Worker Trips								
LDA-LDT	0.00	0.03	0.06	0.00	0.00	25.37	0.00	23.15

Construction Method 3 - Fines to Overdredged Pit		Saltwater Alternative							Miles Per Day	Total Miles	Remarks
		Horse-power Rating (HP)	Equipment Quantity per Day	Hours per Day per Equipment	Number of Days per Equipment	Unit					
Site Access, Haul Roads, Staging Area Maintenance											
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader	250	1	4.0	565	Day/Equipment					
Motor Grader	Motor grader	150	1	4.0	565	Day/Equipment					
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe	290	1	4.0	565	Day/Equipment					
T7-Tractor	Dump truck (12 CY)	300	1	4.0	565	Day/Equipment	40	22600	Assumed onsite speed equal to 10 mph		
T7-Tractor	Water truck	175	1	4.0	565	Day/Equipment	40	22600	Assumed onsite speed equal to 10 mph		
Prepare Dredge Launch Area											
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe	290	1	8.0	12	Day/Equipment				1 launch area/basin	
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader	250	1	8.0	12	Day/Equipment					
T7-Tractor	Dump truck (16.5 CY)	375	1	8.0	12	Day/Equipment	80	960	Assumed onsite speed equal to 10 mph		
Remove Vegetation and Stockpile											
Other Material Handling Equipment	Amphibious harvester	100	1	8.0	121	Day/Equipment					
Rubber Tired Dozers Composite	Bulldozer	375	2	8.0	121	Day/Equipment					
					211,000	Total CY					
					1,750	CY/Day					
Load and Transport Vegetation to Sycamore Landfill - 72 miles round trip											
Tractors/Loaders/Backhoes Composite	Front-end loader	250	3	8.0	121	Day/Equipment					
T7-Tractor	Dump truck (16.5 CY)	375	27	8.0	121	Day/Equipment	216	26136	Assumed onsite speed equal to 1 mph		
					129,000	Total CY					
					1,750	CY/Day					
	Offsite										
T7-Tractor	Dump Truck				12,788	Total Trips					
					106	Trips/day	7609	920736			
Excavate Sediment with Dredge											
	Dredge (18") with pump	1,350	1	8.0	163	Day/Equipment				Ellicott Dredge 1270	
	Dredge support vessel	200	1	4.0	163	Day/Equipment					
	Boat - survey crew for lagoon	150	1	0.8	163	Day/Equipment				8 hours/10 days	
					781,500	Total CY					
					4,800	CY/Day					
Construct Overdredge Pit											
	Dredge (18") with pump	1,350	1	8.0	170	Day/Equipment				Ellicott Dredge 1270	
	Dredge support vessel	200	1	4.0	170	Day/Equipment					
	Boat - survey crew for lagoon	150	1	0.8	170	Day/Equipment				8 hours/10 days	
					814,000	Total CY					
					4,800	CY/Day					
Transport Dredged Sand to Oceanside Beach with Pipeline											
Booster Pumps	Booster pump	1,000	2	8.0	88	Day/Equipment					
					420,000	Total CY					
					4,800	CY/Day					
Transport Dredged Sand to North Carlsbad Beach with Pipeline											
Booster Pumps	Booster pump	1,000	2	8.0	21	Day/Equipment					
					99,000	Total CY					
					4,800	CY/Day					
Spread Sand along Beach											
Rubber Tired Dozers Composite	Bulldozer	300	3	8.0	108	Day/Equipment					
Scrapers Composite	Scraper	150	1	8.0	108	Day/Equipment					
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader	250	1	8.0	108	Day/Equipment					
LDT2	Truck - survey crew for beach	150	1	0.8	108	Day/Equipment	8	864	Assumed onsite speed equal to 10 mph		
	Fugitive Dust				519,000	Total CY					
					4,800	CY/Day					
Transport Dredged Sand (70-80%) to Nearshore with Pipeline											
Booster Pumps	Booster pump	1,000	2	8.0	55	Day/Equipment					
	Boat	200	1	4.0	55	Day/Equipment					
	Boat - survey crew for nearshore	150	1	0.8	55	Day/Equipment				8 hours/10 days	
					262,000	Total CY					
					4,800	CY/Day					
Transport excavated fine grained soil from CH Basin to stockpile in I-5 Basin or CH Basin with pipeline											
	Boat	200	1	8.0	95	Day/Equipment					
					457,000	Total CY					
					4,800	CY/Day					
Transport excavated fine grained soil from I-5 Basin or RR Basin to Overdredged Pit with pipeline											
	Dredge (18") with pump	1,350	1	8.0	95	Day/Equipment				Ellicott Dredge 1270	
	Dredge support vessel	200	1	4.0	95	Day/Equipment					
	Boat - survey crew for lagoon	150	1	0.8	95	Day/Equipment				8 hours/10 days	
					457,000	Total CY					
					4,800	CY/Day					
Transport excavated fine grained soil from I-5 Basin or RR Basin to Overdredged Pit with pipeline											
	Boat	200	1	4.0	74	Day/Equipment					
					357,000	Total CY					
					4,800	CY/Day					
Construct Inlet Channel Guide											
Cranes Composite	Crawler Crane - install and remove cofferdam piles	300	1	5.0	3	Day/Equipment					
Compressor	Compressor - drive and remove cofferdam piles	100	1	8.0	3	Day/Equipment					
Pumps > 50 and <= 120	Pump	100	2	8.0	17	Day/Equipment					
					400	Total LF					
					150	LF/Day					
Site preparation/excavation											
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe (3 CY) - build weir	290	1	8.0	2	Day/Equipment					
Install Channel Guide											
T7-Tractor	Truck (16.5 CY) - import armor materi	375	12	8.0	12	Day/Equipment	960	11520	Assumed onsite speed equal to 10 mph		
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe (3 CY) - place material	290	2	8.0	12	Day/Equipment					
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader (6 CY) - place materi	250	2	8.0	12	Day/Equipment					
Cranes Composite	Crawler crane	250	1	8.0	12	Day/Equipment					
	Armor Material (rock)				9,000	Total Tons					
	Armor Material (rock)				800	Tons/Day					
	Offsite										
	Truck				556	Total Trips					
					46	Trips/Day	927	11120			
Worker Trips											
LDA-LDT	Worker Trips		5		565	Day/Equipment	168	94920			

Construction Method 3 - Fines to Overdredged P

<i>Site Access, Haul Roads, Staging Area Maintenance</i>	
Tractors/Loaders/Backhoes > 175 and <= 250	
Motor Grader	
Tractors/Loaders/Backhoes > 250 and <= 500	
T7-Tractor	
T7-Tractor	
<i>Prepare Dredge Launch Area</i>	
Tractors/Loaders/Backhoes > 250 and <= 500	
Tractors/Loaders/Backhoes > 175 and <= 250	
T7-Tractor	
<i>Remove Vegetation and Stockpile</i>	
Other Material Handling Equipment	
Rubber Tired Dozers Composite	
<i>Load and Transport Vegetation to Sycamore Landfill</i>	
Tractors/Loaders/Backhoes Composite	
T7-Tractor	
<i>Excavate Sediment with Dredge</i>	
T7-Tractor	
<i>Construct Overdredge Pit</i>	
T7-Tractor	
<i>Transport Dredged Sand to Oceanside Beach with F Booster Pumps</i>	
<i>Transport Dredged Sand to North Carlsbad Beach with Booster Pumps</i>	
<i>Spread Sand along Beach</i>	
Rubber Tired Dozers Composite	
Scrapers Composite	
Tractors/Loaders/Backhoes > 175 and <= 250	
LDT2	
<i>Transport Dredged Sand (70-80%) to Nearshore with Booster Pumps</i>	
<i>Transport excavated fine grained soil from CH Basin</i>	
<i>Transport excavated fine grained soil from I-5 Basin</i>	
<i>Transport excavated fine grained soil from I-5 Basin</i>	
<i>Construct Inlet Channel Guide</i>	
Cranes Composite	
Compressor	
Pumps > 50 and <= 120	
<i>Site preparation/excavation</i>	
Tractors/Loaders/Backhoes > 250 and <= 500	
<i>Install Channel Guide</i>	
T7-Tractor	
Tractors/Loaders/Backhoes > 250 and <= 500	
Tractors/Loaders/Backhoes > 175 and <= 250	
Cranes Composite	
<i>Worker Trips</i>	
LDA-LDT	

Emission Factors							
ROG	NOX	CO	PM10	PM2.5	CO2	CH4	Units
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.11	0.78	0.73	0.04	0.04	124	0.01	lb/hr
0.19	1.23	0.69	0.04	0.04	345	0.02	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.19	1.23	0.69	0.04	0.04	345	0.02	lb/hr
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.09	0.27	0.33	0.02	0.02	30	0.01	lb/hr
0.25	1.95	0.93	0.08	0.07	239	0.02	lb/hr
0.06	0.37	0.37	0.02	0.02	67	0.01	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.25	2.74	1.07	0.08	0.08	571	0.02	lb/hr
0.25	2.74	1.07	0.08	0.08	571	0.02	lb/hr
0.25	1.95	0.93	0.08	0.07	239	0.02	lb/hr
0.23	1.75	0.87	0.07	0.07	262	0.02	lb/hr
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.00	0.00	0.00	0.00	0.00	0.70	0.00	lb/mile
			0.75	0.41			lb/CY
0.25	2.74	1.07	0.08	0.08	571	0.02	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.04	0.00	0.07	0.01	0.01	0.55	0.00	lb/hr
0.11	0.86	0.42	0.04	0.03	129	0.01	lb/hr
0.06	0.37	0.31	0.03	0.03	47	0.01	lb/hr
0.08	0.57	0.48	0.04	0.04	78	0.01	lb/hr
0.19	1.23	0.69	0.04	0.04	345	0.02	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.19	1.23	0.69	0.04	0.04	345	0.02	lb/hr
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.11	0.86	0.42	0.04	0.03	129	0.01	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.00	0.00	0.00	0.00	0.00	0.70	0.00	lb/mile

Daily Emissions (lb/Day)							
ROG	NOX	CO	PM10	PM2.5	CO2	CH4	
0.39	2.75	1.40	0.09	0.08	686.95	0.03	
0.45	3.11	2.92	0.17	0.16	495.69	0.04	
0.75	4.93	2.74	0.18	0.16	1379.41	0.07	
0.02	0.59	0.09	0.02	0.01	145.12	0.00	
0.02	0.59	0.09	0.02	0.01	145.12	0.00	
1.51	9.85	5.49	0.35	0.32	2758.83	0.14	
0.77	5.51	2.81	0.18	0.17	1373.90	0.07	
0.04	1.17	0.18	0.03	0.02	290.25	0.00	
0.69	2.15	2.63	0.17	0.16	242.68	0.06	
3.94	31.21	14.88	1.27	1.17	3825.42	0.36	
1.34	8.83	8.80	0.53	0.49	1603.13	0.12	
0.10	3.16	0.49	0.09	0.05	783.67	0.00	
3.46	111.44	17.32	3.02	1.86	27607.63	0.09	
8.39	71.02	37.50	2.45	2.26	6280.06	0.49	
0.16	0.01	0.28	0.02	0.02	2.20	0.00	
0.03	0.00	0.06	0.00	0.00	0.44	0.00	
8.39	71.02	37.50	2.45	2.26	6280.06	0.49	
0.16	0.01	0.28	0.02	0.02	2.20	0.00	
0.03	0.00	0.06	0.00	0.00	0.44	0.00	
3.97	43.80	17.13	1.32	1.21	9131.22	0.36	
3.97	43.80	17.13	1.32	1.21	9131.22	0.36	
5.92	46.82	22.32	1.91	1.76	5738.13	0.53	
1.81	13.99	6.97	0.57	0.53	2099.91	0.16	
0.77	5.51	2.81	0.18	0.17	1373.90	0.07	
0.00	0.01	0.01	0.00	0.00	5.58	0.00	
			18.07	9.96			
3.97	43.80	17.13	1.32	1.21	9131.22	0.36	
0.16	0.01	0.28	0.02	0.02	2.20	0.00	
0.03	0.00	0.06	0.00	0.00	0.44	0.00	
0.32	0.01	0.55	0.05	0.04	4.40	0.00	
8.39	71.02	37.50	2.45	2.26	6280.06	0.49	
0.16	0.01	0.28	0.02	0.02	2.20	0.00	
0.03	0.00	0.06	0.00	0.00	0.44	0.00	
0.16	0.01	0.28	0.02	0.02	2.20	0.00	
0.54	4.31	2.08	0.18	0.16	643.14	0.05	
0.45	2.94	2.50	0.23	0.22	375.60	0.04	
1.22	9.14	7.68	0.64	0.59	1247.19	0.11	
1.51	9.85	5.49	0.35	0.32	2758.83	0.14	
0.44	14.06	2.18	0.38	0.24	3482.98	0.01	
3.02	19.70	10.97	0.70	0.65	5517.65	0.27	
1.16	8.26	4.21	0.27	0.25	2060.84	0.10	
0.86	6.90	3.32	0.28	0.26	1029.02	0.08	
0.42	13.57	2.11	0.37	0.23	3362.04	0.01	
0.01	0.13	0.30	0.02	0.01	117.19	0.01	

Construction Method 3 - Fines to Overdredged P

Annual Emissions (Tons per Year)								
ROG	NOX	CO	PM10	PM2.5	CO2	CH4	Total GHG Emissions (MT)	
Site Access, Haul Roads, Staging Area Maintenance								
Tractors/Loaders/Backhoes > 175 and <= 250	0.11	0.78	0.40	0.03	0.02	194.06	0.01	176.85
Motor Grader	0.13	0.88	0.83	0.05	0.04	140.03	0.01	127.72
Tractors/Loaders/Backhoes > 250 and <= 500	0.21	1.39	0.78	0.05	0.05	389.68	0.02	355.10
T7-Tractor	0.01	0.17	0.03	0.00	0.00	41.00	0.00	37.31
T7-Tractor	0.01	0.17	0.03	0.00	0.00	41.00	0.00	37.31
Prepare Dredge Launch Area								
Tractors/Loaders/Backhoes > 250 and <= 500	0.01	0.06	0.03	0.00	0.00	16.55	0.00	15.08
Tractors/Loaders/Backhoes > 175 and <= 250	0.00	0.03	0.02	0.00	0.00	8.24	0.00	7.51
T7-Tractor	0.00	0.01	0.00	0.00	0.00	1.74	0.00	1.58
Remove Vegetation and Stockpile								
Other Material Handling Equipment	0.04	0.13	0.16	0.01	0.01	14.68	0.00	13.46
Rubber Tired Dozers Composite	0.24	1.89	0.90	0.08	0.07	231.44	0.02	211.16
Load and Transport Vegetation to Sycamore Landfill								
Tractors/Loaders/Backhoes Composite	0.08	0.53	0.53	0.03	0.03	96.99	0.01	88.45
T7-Tractor	0.01	0.19	0.03	0.01	0.00	47.41	0.00	43.15
Excavate Sediment with Dredge								
T7-Tractor	0.21	6.74	1.05	0.18	0.11	1670.26	0.01	1520.07
Construct Overdredge Pit								
T7-Tractor	0.68	5.79	3.06	0.20	0.18	511.82	0.00	465.76
	0.01	0.00	0.02	0.00	0.00	0.18	0.00	0.16
	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.03
Transport Dredged Sand to Oceanside Beach with F Booster Pumps								
	0.71	6.04	3.19	0.21	0.19	533.80	0.04	486.83
	0.01	0.00	0.02	0.00	0.00	0.19	0.00	0.17
	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.03
Transport Dredged Sand to North Carlsbad Beach with Booster Pumps								
	0.17	1.93	0.75	0.06	0.05	401.77	0.02	366.02
Spread Sand along Beach								
Rubber Tired Dozers Composite	0.04	0.46	0.18	0.01	0.01	95.88	0.00	87.34
Scrapers Composite	0.32	2.53	1.21	0.10	0.09	309.86	0.03	282.71
Tractors/Loaders/Backhoes > 175 and <= 250	0.10	0.76	0.38	0.03	0.03	113.40	0.01	103.41
LDT2	0.04	0.30	0.15	0.01	0.01	74.19	0.00	67.61
	0.00	0.00	0.00	0.00	0.00	0.30	0.00	0.27
			0.98	0.54				
Transport Dredged Sand (70-80%) to Nearshore with Booster Pumps								
	0.11	1.20	0.47	0.04	0.03	251.11	0.01	228.76
	0.00	0.00	0.01	0.00	0.00	0.06	0.00	0.05
	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
Transport excavated fine grained soil from CH Basin								
	0.02	0.00	0.03	0.00	0.00	0.21	0.00	0.19
Transport excavated fine grained soil from I-5 Basin								
	0.40	3.37	1.78	0.12	0.11	298.30	0.02	272.05
	0.01	0.00	0.01	0.00	0.00	0.10	0.00	0.10
	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02
Transport excavated fine grained soil from I-5 Basin								
	0.01	0.00	0.01	0.00	0.00	0.08	0.00	0.07
Construct Inlet Channel Guide								
Cranes Composite	0.00	0.01	0.00	0.00	0.00	0.96	0.00	0.88
Compressor	0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.51
Pumps > 50 and <= 120	0.01	0.08	0.07	0.01	0.01	10.60	0.00	9.67
Site preparation/excavation								
Tractors/Loaders/Backhoes > 250 and <= 500	0.00	0.01	0.01	0.00	0.00	2.76	0.00	2.51
Install Channel Guide								
T7-Tractor	0.00	0.08	0.01	0.00	0.00	20.90	0.00	19.02
Tractors/Loaders/Backhoes > 250 and <= 500	0.02	0.12	0.07	0.00	0.00	33.11	0.00	30.17
Tractors/Loaders/Backhoes > 175 and <= 250	0.01	0.05	0.03	0.00	0.00	12.37	0.00	11.27
Cranes Composite	0.01	0.04	0.02	0.00	0.00	6.17	0.00	5.63
	0.01	0.31	0.05	0.01	0.01	77.89	0.00	70.88
Worker Trips								
LDA-LDT	0.00	0.04	0.08	0.01	0.00	33.11	0.00	30.20

Construction Method 3 - Fines to Overdredged Pit		Hybrid Alternative							Miles Per Day	Total Miles	Remarks
		Horse-power Rating (HP)	Equipment Quantity per Day	Hours per Day per Equipment	Number of Days per Equipment	Unit					
Site Access, Haul Roads, Staging Area Maintenance											
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader	250	1	4.0	529	Day/Equipment					
Motor Grader	Motor grader	150	1	4.0	529	Day/Equipment					
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe	290	1	4.0	529	Day/Equipment					
T7-Tractor	Dump truck (12 CY)	300	1	4.0	529	Day/Equipment	40	21160	Assumed onsite speed equal to 10 mph		
T7-Tractor	Water truck	175	1	4.0	529	Day/Equipment	40	21160	Assumed onsite speed equal to 10 mph		
Prepare Dredge Launch Area											
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe	290	1	8.0	12	Day/Equipment				1 launch area/basin	
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader	250	1	8.0	12	Day/Equipment					
T7-Tractor	Dump truck (16.5 CY)	375	1	8.0	12	Day/Equipment	80	960	Assumed onsite speed equal to 10 mph		
Remove Vegetation and Stockpile											
Other Material Handling Equipment	Amphibious harvester	100	1	8.0	85	Day/Equipment					
Rubber Tired Dozers Composite	Bulldozer	375	2	8.0	85	Day/Equipment					
					148,500	Total CY					
					1,750	CY/Day					
Load and Transport Vegetation to Sycamore Landfill - 72 miles round trip											
Tractors/Loaders/Backhoes Composite	Front-end loader	250	3	8.0	85	Day/Equipment					
T7-Tractor	Dump truck (16.5 CY)	375	27	8.0	85	Day/Equipment	216	18360	Assumed onsite speed equal to 1 mph		
					148,500	Total CY					
					1,750	CY/Day					
	Offsite										
T7-Tractor	Dump Truck				9,000	Total Trips					
					106	Trips/day	7624	648000			
Excavate Sediment with Dredge											
	Dredge (18") with pump	1,350	1	8.0	174	Day/Equipment				Ellicott Dredge 1270	
	Dredge support vessel	200	1	4.0	174	Day/Equipment					
	Boat - survey crew for lagoon	150	1	0.8	174	Day/Equipment				8 hours/10 days	
					833,000	Total CY					
					4,800	CY/Day					
Construct Overdredge Pit											
	Dredge (18") with pump	1,350	1	8.0	150	Day/Equipment				Ellicott Dredge 1270	
	Dredge support vessel	200	1	4.0	150	Day/Equipment					
	Boat - survey crew for lagoon	150	1	0.8	150	Day/Equipment				8 hours/10 days	
					718,000	Total CY					
					4,800	CY/Day					
Transport Dredged Sand to Oceanside Beach with Pipeline											
Booster Pumps	Booster pump	1,000	2	8.0	28	Day/Equipment					
					136,500	Total CY					
					4,800	CY/Day					
Transport Dredged Sand to North Carlsbad Beach with Pipeline											
Booster Pumps	Booster pump	1,000	2	8.0	12	Day/Equipment					
					56,500	Total CY					
					4,800	CY/Day					
Spread Sand along Beach											
Rubber Tired Dozers Composite	Bulldozer	300	3	8.0	116	Day/Equipment					
Scrapers Composite	Scraper	150	1	8.0	116	Day/Equipment					
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader	250	1	8.0	116	Day/Equipment					
LDT2	Truck - survey crew for beach	150	1	0.8	116	Day/Equipment	8	928	Assumed onsite speed equal to 10 mph		
	Fugitive Dust				129,500	Total CY					
					4,800	CY/Day					
Transport Dredged Sand (70-80%) to Nearshore with Pipeline											
Booster Pumps	Booster pump	1,000	2	8.0	58	Day/Equipment					
	Boat	200	1	4.0	58	Day/Equipment					
	Boat - survey crew for nearshore	150	1	0.8	58	Day/Equipment				8 hours/10 days	
					276,500	Total CY					
					4,800	CY/Day					
Transport excavated fine grained soil from CH Basin to stockpile in I-5 Basin or CH Basin with pipeline											
	Boat	200	1	8.0	95	Day/Equipment					
					457,000	Total CY					
					4,800	CY/Day					
Transport excavated fine grained soil from I-5 Basin or RR Basin to Overdredged Pit with pipeline											
	Dredge (18") with pump	1,350	1	8.0	95	Day/Equipment				Ellicott Dredge 1270	
	Dredge support vessel	200	1	4.0	95	Day/Equipment					
	Boat - survey crew for lagoon	150	1	0.8	95	Day/Equipment				8 hours/10 days	
					457,000	Total CY					
					4,800	CY/Day					
Transport Dredged Sand (70-80%) to Nearshore with Pipeline											
	Boat	200	1	4.0	46	Day/Equipment					
					218,500	Total CY					
					4,800	CY/Day					
Construct I-5 Inlet Weir											
Cranes Composite	Crawler Crane - install and remove cofferdam piles	300	1	5.0	4	Day/Equipment					
Compressor	Compressor - drive and remove cofferdam piles	100	1	8.0	4	Day/Equipment					
Pumps > 50 and <= 120	Pump	100	2	8.0	5	Day/Equipment					
					500	Total LF					
					150	LF/Day					
Install weir (1 to 1.5 ft thick)											
T7-Tractor	Truck (16.5 CY) - import material (std	375	2	8.0	1	Day/Equipment	160	160	Assumed onsite speed equal to 10 mph		
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe (3 CY) - build weir	290	1	8.0	6	Day/Equipment					
Cranes Composite	Crawler crane	300	1	4.0	6	Day/Equipment					
					200	Total LF					
					20	LF/Day					
	Offsite										
	Truck				2	Trips/Day	40	40			
Construct Inlet Channel Guide											
Cranes Composite	Crawler Crane - install and remove cofferdam piles	300	1	5.0	3	Day/Equipment					
Compressor	Compressor - drive and remove cofferdam piles	100	1	8.0	3	Day/Equipment					
Pumps > 50 and <= 120	Pump	100	2	8.0	17	Day/Equipment					
					400	Total LF					
					150	LF/Day					
Site preparation/excavation											
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe (3 CY) - bulk weir	290	1	8.0	2	Day/Equipment					
Install Channel Guide											
T7-Tractor	Truck (16.5 CY) - import armor materi	375	12	8.0	12	Day/Equipment	960	11520	Assumed onsite speed equal to 10 mph		
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe (3 CY) - place material	290	2	8.0	12	Day/Equipment					
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader (5 CY) - place mater	250	2	6.0	12	Day/Equipment					
Cranes Composite	Crawler crane	250	1	8.0	12	Day/Equipment					
	Armor Material (rock)				9,000	Total Tons					
	Armor Material (rock)				800	Tons/Day					
	Offsite										
	Truck				556	Total Trips					
					46	Trips/Day	927	11120			
Construct Weir Basin Channel Guide (Hybrid Alternative B Only)											
Cranes Composite	Crawler Crane - install and remove cofferdam piles	300	1	5.0	9	Day/Equipment					
Compressor	Compressor - drive and remove cofferdam piles	100	1	8.0	9	Day/Equipment					
Pumps > 50 and <= 120	Pump	100	2	8.0	11	Day/Equipment					
					1,340	Total LF					
					150	LF/Day					
Site preparation/excavation											
Tractors/Loaders/Backhoes > 250 and <= 500	Backhoe	290	1	8.0	2	Day/Equipment					
Install Channel Guide											
T7-Tractor	Truck (10 CY) - transport concrete	300	4	6.0	5	Day/Equipment	240	1200	Assumed onsite speed equal to 10 mph		
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader (5 CY) - place mater	250	1	6.0	5	Day/Equipment					
Cranes Composite	Crane (40 ton) - place material	250	1	6.0	5	Day/Equipment					
	Armor Material (rock)				1,100	Total CY					
	Armor Material (rock)				250	CY/Day					
	Offsite										
	Truck				110	Total Trips					
					25	Trips/Day	500	2500			
Worker Trips											
LDA-LDT	Worker Trips		5		529	Day/Equipment	168	88872			

Construction Method 3 - Fines to Overdredged

	Annual Emissions (Tons per Year)							Total GHG Emissions (MT)
	ROG	NOX	CO	PM10	PM2.5	CO2	CH4	
Site Access, Haul Roads, Staging Area Maintenance								
Tractors/Loaders/Backhoes > 175 and <= 250	0.10	0.73	0.37	0.02	0.02	181.70	0.01	165.58
Motor Grader	0.12	0.82	0.77	0.05	0.04	131.11	0.01	119.59
Tractors/Loaders/Backhoes > 250 and <= 500	0.20	1.30	0.73	0.05	0.04	364.85	0.02	332.48
T7-Tractor	0.00	0.15	0.02	0.00	0.00	38.39	0.00	34.93
T7-Tractor	0.00	0.15	0.02	0.00	0.00	38.39	0.00	34.93
Prepare Dredge Launch Area								
Tractors/Loaders/Backhoes > 250 and <= 500	0.01	0.06	0.03	0.00	0.00	16.55	0.00	15.08
Tractors/Loaders/Backhoes > 175 and <= 250	0.00	0.03	0.02	0.00	0.00	8.24	0.00	7.51
T7-Tractor	0.00	0.01	0.00	0.00	0.00	1.74	0.00	1.58
Remove Vegetation and Stockpile								
Other Material Handling Equipment	0.03	0.09	0.11	0.01	0.01	10.31	0.00	9.45
Rubber Tired Dozers Composite	0.17	1.33	0.63	0.05	0.05	162.58	0.02	148.33
Load and Transport Vegetation to Sycamore Land								
Tractors/Loaders/Backhoes Composite	0.06	0.38	0.37	0.02	0.02	68.13	0.01	62.13
T7-Tractor	0.00	0.13	0.02	0.00	0.00	33.31	0.00	30.31
Excavate Sediment with Dredge								
T7-Tractor	0.15	4.75	0.74	0.13	0.08	1175.50	0.00	1069.80
Construct Overdredge Pit								
T7-Tractor	0.73	6.18	3.26	0.21	0.20	546.37	0.00	497.19
Tractors/Loaders/Backhoes > 175 and <= 250	0.01	0.00	0.02	0.00	0.00	0.19	0.00	0.18
Tractors/Loaders/Backhoes > 250 and <= 500	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.04
Transport Dredged Sand to Oceanside Beach with Booster Pumps								
Tractors/Loaders/Backhoes > 175 and <= 250	0.06	0.61	0.24	0.02	0.02	127.84	0.01	116.46
Tractors/Loaders/Backhoes > 250 and <= 500	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Transport Dredged Sand to North Carlsbad Beach with Booster Pumps								
Tractors/Loaders/Backhoes > 175 and <= 250	0.02	0.26	0.10	0.01	0.01	54.79	0.00	49.91
Tractors/Loaders/Backhoes > 250 and <= 500	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spread Sand along Beach								
Rubber Tired Dozers Composite	0.34	2.72	1.29	0.11	0.10	332.81	0.03	303.85
Scrapers Composite	0.10	0.81	0.40	0.03	0.03	121.79	0.01	111.07
Tractors/Loaders/Backhoes > 175 and <= 250	0.04	0.32	0.16	0.01	0.01	79.69	0.00	72.62
LDT2	0.00	0.00	0.00	0.00	0.00	0.32	0.00	0.30
Tractors/Loaders/Backhoes > 250 and <= 500				1.05	0.58			
Transport Dredged Sand (70-80%) to Nearshore with Booster Pumps								
Tractors/Loaders/Backhoes > 175 and <= 250	0.12	1.27	0.50	0.04	0.04	264.81	0.01	241.24
Tractors/Loaders/Backhoes > 250 and <= 500	0.00	0.00	0.01	0.00	0.00	0.06	0.00	0.06
Tractors/Loaders/Backhoes > 175 and <= 250	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
Transport excavated fine grained soil from CH Basin								
Tractors/Loaders/Backhoes > 175 and <= 250	0.02	0.00	0.03	0.00	0.00	0.21	0.00	0.19
Transport excavated fine grained soil from I-5 Basin								
Tractors/Loaders/Backhoes > 175 and <= 250	0.40	3.37	1.78	0.12	0.11	298.30	0.02	272.05
Tractors/Loaders/Backhoes > 250 and <= 500	0.01	0.00	0.01	0.00	0.00	0.10	0.00	0.10
Tractors/Loaders/Backhoes > 175 and <= 250	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02
Transport Dredged Sand (70-80%) to Nearshore with Booster Pumps								
Tractors/Loaders/Backhoes > 175 and <= 250	0.00	0.00	0.01	0.00	0.00	0.05	0.00	0.05
Construct I-5 Inlet Weir								
Cranes Composite	0.00	0.01	0.00	0.00	0.00	1.29	0.00	1.17
Compressor	0.00	0.01	0.00	0.00	0.00	0.75	0.00	0.69
Pumps > 50 and <= 120	0.00	0.02	0.02	0.00	0.00	3.12	0.00	2.84
Install weir (1 to 1.5 ft thick)								
T7-Tractor	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.26
Tractors/Loaders/Backhoes > 250 and <= 500	0.00	0.03	0.02	0.00	0.00	8.28	0.00	7.54
Cranes Composite	0.00	0.01	0.00	0.00	0.00	1.54	0.00	1.41
Construct Inlet Channel Guide								
Cranes Composite	0.00	0.01	0.00	0.00	0.00	0.96	0.00	0.88
Compressor	0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.51
Pumps > 50 and <= 120	0.01	0.08	0.07	0.01	0.01	10.60	0.00	9.67
Site preparation/excavation								
Tractors/Loaders/Backhoes > 250 and <= 500	0.00	0.01	0.01	0.00	0.00	2.76	0.00	2.51
Install Channel Guide								
T7-Tractor	0.00	0.08	0.01	0.00	0.00	20.90	0.00	19.02
Tractors/Loaders/Backhoes > 250 and <= 500	0.02	0.12	0.07	0.00	0.00	33.11	0.00	30.17
Tractors/Loaders/Backhoes > 175 and <= 250	0.01	0.05	0.03	0.00	0.00	12.37	0.00	11.27
Cranes Composite	0.01	0.04	0.02	0.00	0.00	6.17	0.00	5.63
Construct Weir Basin Channel Guide (Hybrid Alter)								
Cranes Composite	0.00	0.08	0.01	0.00	0.00	20.17	0.00	18.36
Construct Weir Basin Channel Guide (Hybrid Alter)								
Cranes Composite	0.00	0.02	0.01	0.00	0.00	2.89	0.00	2.64
Compressor	0.00	0.01	0.01	0.00	0.00	1.69	0.00	1.54
Pumps > 50 and <= 120	0.01	0.05	0.04	0.00	0.00	6.86	0.00	6.26
Site preparation/excavation								
Tractors/Loaders/Backhoes > 250 and <= 500	0.00	0.01	0.01	0.00	0.00	2.76	0.00	2.51
Install Channel Guide								
T7-Tractor	0.00	0.01	0.00	0.00	0.00	2.18	0.00	1.98
Tractors/Loaders/Backhoes > 175 and <= 250	0.00	0.01	0.01	0.00	0.00	2.58	0.00	2.35
Cranes Composite	0.00	0.01	0.01	0.00	0.00	1.93	0.00	1.76
Worker Trips								
LDA-LDT	0.00	0.03	0.08	0.01	0.00	31.00	0.00	28.28

Operations - Saltwater and Hybrid Alternatives		Saltwater and Hybrid Alternatives							
		Horse-power Rating (HP)	Equipment Quantity per Day	Hours per Day per Equipment	Number of Days per Equipment	Unit	Miles Per Day	Total Miles	Remarks
<i>Excavate Sediment</i>									
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader	250	2	8.0	10	Day/Equipment			
					27,000	Total CY			
					2,700	CY/Day			
<i>Transport Dredged Sand to North Carlsbad Beach</i>									
T7-Tractor	Dump truck (16.5 CY)	375	1	8.0	10	Day/Equipment	80		Assumed onsite speed equal to 10 mph
					27,000	Total CY			
					2,700	CY/Day			
<i>Spread Sand along Beach</i>									
Rubber Tired Dozers Composite	Bulldozer	300	3	8.0	10	Day/Equipment			
Scrapers Composite	Scraper	150	1	8.0	10	Day/Equipment			
Tractors/Loaders/Backhoes > 175 and <= 250	Front-end loader	250	1	8.0	10	Day/Equipment			
LDA-LDT	Truck - survey crew for beach	150	1	0.8	10	Day/Equipment	8	80	Assumed onsite speed equal to 10 mph
	Fugitive Dust				27,000	Total CY			
					4,800	CY/Day			
<i>Worker Trips</i>									
LDA-LDT	Worker Trips		16		10	Day/Equipment	537.6	5376	

Daily Emissions Summary (lb/day)	GHG Emissions Summary (MT/year)				
	ROG	NOX	CO	PM10	PM2.5
Maximum Daily Emissions	10.12	78.92	38.86	21.20	12.80
Total Annual Emissions					72.87

Global Warming Potential

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)
Carbon Dioxide	50-200	1
Methane	12 ± 3	28
Nitrous Oxide	120	265

Operations - Saltwater and Hybrid Alternatives

<i>Excavate Sediment</i>	
Tractors/Loaders/Backhoes > 175 and <= 250	
<i>Transport Dredged Sand to North Carlsbad Beach</i>	
T7-Tractor	
<i>Spread Sand along Beach</i>	
Rubber Tired Dozers Composite	
Scrapers Composite	
Tractors/Loaders/Backhoes > 175 and <= 250	
LDA-LDT	
<i>Worker Trips</i>	
LDA-LDT	

Emission Factors							
ROG	NOX	CO	PM10	PM2.5	CO2	CH4	Units
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.00	0.01	0.00	0.00	0.00	3.63	0.00	lb/mile
0.25	1.95	0.93	0.08	0.07	239	0.02	lb/hr
0.23	1.75	0.87	0.07	0.07	262	0.02	lb/hr
0.10	0.69	0.35	0.02	0.02	172	0.01	lb/hr
0.00	0.00	0.00	0.00	0.00	0.70	0.00	lb/mile
			0.75	0.41			lb/CY
0.00	0.00	0.00	0.00	0.00	0.70	0.00	lb/mile

Daily Emissions (lb/Day)						
ROG	NOX	CO	PM10	PM2.5	CO2	CH4
1.55	11.02	5.61	0.37	0.34	2747.79	0.14
0.04	1.17	0.18	0.03	0.02	290.25	0.00
5.92	46.82	22.32	1.91	1.76	5738.13	0.53
1.81	13.99	6.97	0.57	0.53	2099.91	0.16
0.77	5.51	2.81	0.18	0.17	1373.90	0.07
0.00	0.01	0.01	0.00	0.00	5.58	0.00
			18.07	9.96		
0.04	0.41	0.96	0.07	0.04	375.00	0.03

Annual Emissions (Tons per Year)							
ROG	NOX	CO	PM10	PM2.5	CO2	CH4	Total GHG Emissions (MT)
0.01	0.06	0.03	0.00	0.00	13.74	0.00	12.50
0.00	0.01	0.00	0.00	0.00	1.45	0.00	1.32
0.03	0.23	0.11	0.01	0.01	28.69	0.00	26.11
0.01	0.07	0.03	0.00	0.00	10.50	0.00	9.55
0.00	0.03	0.01	0.00	0.00	6.87	0.00	6.25
0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03
			0.09	0.05			
0.00	0.02	0.05	0.00	0.00	18.75	0.00	17.11

Boardwalk Construction - All Alternatives

Off-Road Construction Equipment

Equipment Category	Equipment Type	Number	Usage Factor (hrs/day)	Power Rating (hp)	Calculated Time - Rounded (days)	Emissions Summary (lbs/day)							Emissions Summary (tons per phase)							Total GHG Emissions (MT CO ₂ e)
						ROG	NO _x	CO	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	ROG	NO _x	CO	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	
Tractors/Loaders/Backhoes > 175 and <= 250	Front End Loader	2	8	250	120	1.55	11.02	5.61	0.37	0.34	2,748	0.14	0.09	0.66	0.34	0.02	0.02	164.87	0.01	150.24
Total						1.55	11.02	5.61	0.37	0.34	2,748	0.14	0.09	0.66	0.34	0.02	0.02	164.87	0.01	150.24

Notes: Assumes construction equipment operates 10 hours per day and 6 days per week. Indirect support equipment operates 6 hours per day.

On Road Construction Emissions

	Trips Per Day	Distance	Average Daily Mileage	Calculated Time - Rounded	Total Mileage	Emissions Summary (lbs/day)							Emissions Summary (tons per phase)							Total GHG Emissions (MT CO ₂ e)
						ROG	NO _x	CO	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	ROG	NO _x	CO	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	
Dump Truck	8	20	160	120	19,200	0.08	2.34	0.36	0.06	0.04	580	0.00	0.00	0.14	0.02	0.00	0.00	34.83	0.00	31.70
Total			160	120	19,200	0.08	2.34	0.36	0.06	0.04	580	0.00	0.00	0.14	0.02	0.00	0.00	34.83	0.00	31.70

	Total Trips	Distance	Average Daily Mileage	Calculated Time - Rounded	Total Mileage	Emissions Summary (lbs/day)							Emissions Summary (tons per phase)							Total GHG Emissions (MT CO ₂ e)
						ROG	NO _x	CO	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	ROG	NO _x	CO	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	
Worker Trips	16	16.8	269	120	32,256	0.02	0.20	0.48	0.04	0.02	187	0.02	0.00	0.01	0.03	0.00	0.00	11.25	0.00	10.26

Total	Emissions Summary (lbs/day)							Emissions Summary (tons per phase)							Total GHG Emissions (MT CO ₂ e)
	ROG	NO _x	CO	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	ROG	NO _x	CO	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	
	1.65	13.57	6.45	0.47	0.39	3,515.79	0.16	0.10	0.81	0.39	0.03	0.02	210.95	0.01	192.20

Global Warming Potential

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)
Carbon Dioxide	50-200	1
Methane	12 ± 3	28
Nitrous Oxide	120	265

Bridge Construction - Saltwater and Hybrid Alternatives

Off-Road Construction Equipment

Equipment Type	Equipment Category	Number	Usage Factor (hrs/day)	Power Rating (hp)	Calculated Time - Rounded (days)	Emissions Summary (lbs/day)							Emissions Summary (tons per phase)							Total GHG Emissions (MT CO2e)
						ROG	NOx	CO	PM10	PM2.5	CO2	CH4	ROG	NOx	CO	PM10	PM2.5	CO2	CH4	
Demolition																				
Tractors/Loaders/Backhoes	Front-end Loaders	1	8	250	80	0.77	5.51	2.81	0.18	0.17	1,373.90	0.07	0.03	0.22	0.11	0.01	0.01	54.96	0.00	50.08
Cranes Composite	Crane	1	8	300	80	0.86	6.90	3.32	0.28	0.26	1,029.02	0.08	0.03	0.28	0.13	0.01	0.01	41.16	0.00	37.54
Air Compressors Composite	Air Compressor	1	8	120	80	0.51	3.45	2.53	0.23	0.21	508.86	0.05	0.02	0.14	0.10	0.01	0.01	20.35	0.00	18.57
Generator Sets Composite	Generator	1	8	50	80	0.42	3.24	2.26	0.17	0.16	487.94	0.04	0.02	0.13	0.09	0.01	0.01	19.52	0.00	17.80
Off-Highway Trucks Composite	Water Truck	1	8	250	80	1.37	9.48	4.58	0.33	0.30	2,080.45	0.12	0.05	0.38	0.18	0.01	0.01	83.22	0.00	75.85
Bridge Construction																				
Tractors/Loaders/Backhoes	Front-end Loaders	1	8	250	80	0.77	5.51	2.81	0.18	0.17	1,374	0.07	0.03	0.22	0.11	0.01	0.01	54.96	0.00	50.08
Cranes Composite	Crane	1	8	300	80	0.86	6.90	3.32	0.28	0.26	1,029	0.08	0.03	0.28	0.13	0.01	0.01	41.16	0.00	37.54
Motor Grader	Motor grader	1	8	150	80	0.91	6.23	5.84	0.34	0.32	991	0.08	0.04	0.25	0.23	0.01	0.01	39.65	0.00	36.17
Asphalt Concrete																				
Asphalt Paver	Pavers Composite	1	8	130	80	0.69	4.15	3.07	0.35	0.32	436	0.06	0.03	0.17	0.12	0.01	0.01	17.44	0.00	15.93
Roller	Rollers Composite	1	8	130	80	0.59	3.80	3.16	0.30	0.28	472	0.05	0.02	0.15	0.13	0.01	0.01	18.88	0.00	17.23
Total						7.75	55.17	33.68	2.65	2.43	9,782	0.70	0.31	2.21	1.35	0.11	0.10	391.29	0.03	356.79

On Road Construction Emissions

Equipment Type	Trips Per Day	Distance	Average Daily Mileage	Calculated Time - Rounded (days)	Total Mileage	Emissions Summary (lbs/day)							Emissions Summary (tons per phase)							Total GHG Emissions (MT CO2e)
						ROG	NOx	CO	PM10	PM2.5	CO2	CH4	ROG	NOx	CO	PM10	PM2.5	CO2	CH4	
Dump Truck	64	24	1,536	80	122,880	0.77	22.50	3.50	0.61	0.38	5,573	0.02	0.03	0.90	0.14	0.02	0.02	222.91	0.00	202.87
Total						0.77	22.50	3.50	0.61	0.38	5,572.76	0.02	0.03	0.90	0.14	0.02	0.02	222.91	0.00	202.87

Notes: Utility Road Surface (Agg. Base) dump truck trips assumes 2.1194 tons of stone in 1 cy. Number in () after equipment name represents the number of equipment.
Haul distance assumes that materials from the site will be hauled off and disposed of at the Mira Mar landfill located approximately 24 miles roundtrip from the site in San Diego

Equipment Type	Total Trips	Distance	Average Daily Mileage	Calculated Time - Rounded (days)	Total Mileage	Emissions Summary (lbs/day)							Emissions Summary (tons per phase)							Total GHG Emissions (MT CO2e)	
						ROG	NOx	CO	PM10	PM2.5	CO2	CH4	ROG	NOx	CO	PM10	PM2.5	CO2	CH4		
Worker Trips	60	16.8	1,008	80	80,640	0.08	0.76	1.80	0.13	0.07	703	0.06	-	-	-	-	-	-	-	-	-

Note: Assumes a total of 40 workers per day and 20 visitors per day, consistent with the traffic report for the proposed project.

						Emissions Summary (lbs/day)							Emissions Summary (tons per phase)							Total GHG Emissions (MT CO2e)
						ROG	NOx	CO	PM10	PM2.5	CO2	CH4	ROG	NOx	CO	PM10	PM2.5	CO2	CH4	
Total						8.61	78.43	38.98	3.39	2.88	16,068.25	0.78	0.34	3.11	1.49	0.13	0.11	614.21	0.03	559.66

Global Warming Potential

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100 year time horizon)
Carbon Dioxide	50-200	1
Methane	12 ± 3	28
Nitrous Oxide	120	265

IPCC, Second Assessment Report, 1995.

Dredge Emissions

Assumptions	
Main Generator Engine	1350 bhp 1006.7 kW
Aux Generator Engines	200 bhp 149.1 kW
Number	1.0

Activity	Number of Construction Days	Time (hours per day)	Emissions (pounds per day)					Emissions (tons per phase)					Emissions (metric tons per phase)	
			ROG	NOx	CO	PM10	PM2.5	CO2e*	ROG	NOx	CO	PM10	PM2.5	CO2e*
Dredge	117	8	8.39	71.02	37.50	2.45	2.26	6,280.06	0.49	4.15	2.19	0.14	0.13	334.32

*To account for N2O and CH4 emissions, an extra 5% was added to the CO2 emissions.

Main Engine - 2015 Emission Factors (g/bhp-hr)

	ROG	NOx	CO	PM10	PM2.5	CO2	Fuel
1000 hp	0.66	6.16	2.99	0.24	0.22	652	184.16

Note: CO2 emission factor in g/kWh

Source: ARB Harborcraft Emission Inventory Database

Auxiliary Engine - 2015 Emission Factors (g/bhp-hr)

	ROG	NOx	CO	PM10	PM2.5	CO2	Fuel
500 hp	0.81	5.63	3.45	0.19	0.17	652	184.16

Note: CO2 emission factor in g/kWh.

Source: ARB Harborcraft Emission Inventory Database

CO2 emissions factor from Port of Long Beach, 2011 Emissions Inventory. Available at <http://www.polb.com/environment/air/emissions.asp>.

Load Factor

Engine	Load factor
Propulsion	0.45
Auxiliary	0.45

Source: ARB, Appendix B, Emissions Estimation Methodology for Commercial Harbor Craft Operating in California

The basic equation for the estimating emissions from a commercial harbor craft engine is:

$$E = EF_0 \times F \times (1 + D \times \frac{A}{UL}) \times HP \times LF \times Hr$$

Where:

E is the amount of emissions of a pollutant (ROG, CO, NOx, or PM) emitted during one period;

EF₀ is the model year, horsepower and engine use (propulsion or auxiliary) specific zero hour emission factor (when engine is new);

F is the fuel correction factor which accounts for emission reduction benefits from burning cleaner fuel;

D is the horsepower and pollutant specific engine deterioration factor, which is the percentage increase of emission factors at the end of the useful life of the engine;

A is the age of the engine when the emissions are estimated;

UL is the vessel type and engine use specific engine useful life;

HP is rated horsepower of the engine;

LF is the vessel type and engine use specific engine load factor;

Hr is the number of annual operating hours of the engine.

Table II-4 Fuel Correction Factor

Calendar Years	Horsepower Range	Model Years	NOx	PM
1994-2006	<25	Pre-1995	0.930	0.750
	25-50	Pre-1999		
	51-100	Pre-1998		
	101-175	Pre-1997		
	176+	Pre-1996		
	1995+	1995+		
25-50	1999-2010			
51-100	1998-2010			
101-175	1997-2010			
176+	1996-2010			
2007+	<25	Pre-1995	0.930	0.720
	25-50	Pre-1999		
	51-100	Pre-1998		
	101-175	Pre-1997		
	176+	Pre-1996		
	1995+	1995+		
25-50	1999-2010			
51-100	1998-2010			
101-175	1997-2010			
176+	1996-2010			
All	2011+	0.948	0.852	

Source: Off-road Exhaust Emissions Inventory Fuel Correction Factors (2)

Calendar Years	Horsepower Range	Model Years	NOx	PM
2007+	All	2011+	0.948	0.852

Source: ARB, Appendix B, Emissions Estimation Methodology for Commercial Harbor Craft Operating in California

Tugboat Emissions

Assumptions	
Main Generator Engine	2000 bhp 1491.4 kW
Aux Generator Engines	500 bhp 372.8 kW
Number	2.0

Activity	Emissions (pounds per day)								Emissions (tons per phase)				Emissions (metric tons per phase)	
	Number of Construction Days	Time (hours per day)	ROG	NOx	CO	PM10	PM2.5	CO2e*	ROG	NOx	CO	PM10	PM2.5	CO2e*
Dredge	101	10	34.33	284.59	152.82	9.73	8.95	25,322.82	1.73	14.37	7.72	0.49	0.45	1,163.71

*To account for N2O and CH4 emissions, an extra 5% was added to the CO2 emissions.

Main Engine - 2017 Emission Factors (g/bhp-hr)

	ROG	NOx	CO	PM10	PM2.5	CO2	Fuel
1000 hp	0.66	6.16	2.99	0.24	0.22	652	184.16

Note: CO2 emission factor in g/kWh

Source: ARB Harborcraft Emission Inventory Database

Auxiliary Engine - 2017 Emission Factors (g/bhp-hr)

	ROG	NOx	CO	PM10	PM2.5	CO2	Fuel
500 hp	0.81	5.63	3.45	0.19	0.17	652	184.16

Note: CO2 emission factor in g/kWh.

Source: ARB Harborcraft Emission Inventory Database

CO2 emissions factor from Port of Long Beach, 2011 Emissions Inventory. Available at <http://www.polb.com/environment/air/emissions.asp>.

Load Factor

Engine	Load factor
Propulsion	0.45
Auxiliary	0.45

Source: ARB, Appendix B, Emissions Estimation Methodology for Commercial Harbor Craft Operating in California

The basic equation for the estimating emissions from a commercial harbor craft engine is:

$$E = EF_0 \times F \times (1 + D \times \frac{A}{UL}) \times HP \times LF \times Hr$$

Where:

- E** is the amount of emissions of a pollutant (ROG, CO, NOx, or PM) emitted during one period;
- EF₀** is the model year, horsepower and engine use (propulsion or auxiliary) specific zero hour emission factor (when engine is new);
- F** is the fuel correction factor which accounts for emission reduction benefits from burning cleaner fuel;
- D** is the horsepower and pollutant specific engine deterioration factor, which is the percentage increase of emission factors at the end of the useful life of the engine;
- A** is the age of the engine when the emissions are estimated;
- UL** is the vessel type and engine use specific engine useful life;
- HP** is rated horsepower of the engine;
- LF** is the vessel type and engine use specific engine load factor;
- Hr** is the number of annual operating hours of the engine.

Table II-4 Fuel Correction Factor

Calendar Years	Horsepower Range	Model Years	NOx	PM
1994-2006	<25	Pre-1995	0.930	0.750
	25-50	Pre-1999		
	51-100	Pre-1998		
	101-175	Pre-1997		
	176+	Pre-1996		
	<25	1995+		
25-50	1998-2010			
51-100	1998-2010			
101-175	1997-2010			
176+	1996-2010			
2007+	<25	Pre-1995	0.930	0.720
	25-50	Pre-1999		
	51-100	Pre-1998		
	101-175	Pre-1997		
	176+	Pre-1996		
	<25	1995+		
25-50	1999-2010			
51-100	1998-2010			
101-175	1997-2010			
176+	1996-2010			
All	2011+	0.948	0.852	

Source: Off-road Exhaust Emissions Inventory Fuel Correction Factors (2)

Calendar Years	Horsepower Range	Model Years	NOx	PM
2007+	All	2011+	0.948	0.852

Source: ARB, Appendix B, Emissions Estimation Methodology for Commercial Harbor Craft Operating in California

