CHAMBERS GROUP

APPENDIX F - AIR QUALITY/GREENHOUSE GAS EMISSIONS

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SUMMARY Construction Off-road

County	Emissions (lb/d)				Emissions (t/y)				
	ROG	CO	NO_X	PM_{10}	ROG	CO	NO_X	PM_{10}	CO_2
San Bernardino	11.4	41.0	56.8	4.5	1.33	4.59	6.08	0.52	586
East Kern	11.4	41.0	56.8	4.5	2.52	8.57	11.44	0.98	1,091
Inyo	11.4	41.0	56.8	4.5	2.99	10.22	13.71	1.16	1,336
Mono	11.4	41.0	56.8	4.5	5.37	18.43	24.73	2.09	2,426
Douglas	7.7	28.4	36.2	3.1	0.49	1.78	2.30	0.20	230
Carson City	7.7	28.4	36.2	3.1	0.20	0.69	0.92	0.08	87
Washoe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
TOTAL	***61.1***	***220.6***	***299.7***	***24.0***	***12.90***	***44.28***	***59.17***	***5.03***	***5,755***

Douglas County Off Road Emissions

Activity	Crew Size	Size (lf)	Duration (days)	Equipment						Emission Factors (g/bhp-hr)					Emissions (lbs/d)				Emissions (tpy)				
				Type	BHP	Load Factor	# per crew	hrs/ day	total hrs/yr	ROG	CO	NO_X	PM	CO_2	ROG	CO	NO_X	PM_{10}	ROG	CO	NO_X	PM	CO_2
Boring	7	15,449	99	Backhoe	108	0.55	1	8	793	0.504	2.170	3.198	0.289	312.846	0.5	2.3	3.4	0.3	0.03	0.11	0.17	0.01	16.2
				Slurry Pump	53	0.74	1	8	793	1.510	4.055	4.182	0.384	420.920	1.0	2.8	2.9	0.3	0.05	0.14	0.14	0.01	14.4
				Small Boring Machine	150	0.75	1	8	793	0.335	2.634	3.087	0.221	426.608	0.7	5.2	6.1	0.4	0.03	0.26	0.30	0.02	41.9
				Suction Excavator	60	0.57	1	8	793	1.319	3.933	3.371	0.331	324.222	0.8	2.4	2.0	0.2	0.04	0.12	0.10	0.01	9.7
				Compressor	106	0.48	1	8	793	0.548	1.925	3.270	0.301	273.029	0.5	1.7	2.9	0.3	0.02	0.09	0.15	0.01	12.1
Trenching	7	67,563	153	Trencher	63	0.75	1	8	1,223	2.263	5.534	4.636	0.504	426.606	1.9	4.6	3.9	0.4	0.14	0.35	0.30	0.03	27.2
				Backhoe	108	0.55	1	8	1,223	0.504	2.170	3.198	0.289	312.846	0.5	2.3	3.4	0.3	0.04	0.17	0.26	0.02	25.0
				Roller	95	0.56	1	8	1,223	0.608	2.233	3.782	0.330	318.534	0.6	2.1	3.5	0.3	0.04	0.16	0.27	0.02	22.8
				Water Truck	189	0.50	1	8	1,223	0.423	1.972	3.088	0.189	324.222	0.7	3.3	5.1	0.3	0.05	0.25	0.39	0.02	41.3
				Compressor	106	0.48	1	8	1,223	0.548	1.925	3.270	0.301	273.029	0.5	1.7	2.9	0.3	0.04	0.13	0.22	0.02	18.7
														Douglas Totals	***7.7***	***28.4***	***36.2***	***3.1***	***0.5***	***1.8***	***2.3***	***0.2***	***229.5***

Carson City County Off Road Emissions

Activity	Crew Size	Size (lf)	Duration (days)	Equipment						Emission Factors (g/bhp-hr)					Emissions (lbs/d)				Emissions (tpy)				
				Type	BHP	Load Factor	# per crew	hrs/ day	total hrs/yr	ROG	CO	NO_X	PM	CO_2	ROG	CO	NO_X	PM_{10}	ROG	CO	NO_X	PM	CO_2
Boring	7	4,952	11	Backhoe	108	0.55	1	8	86	0.504	2.170	3.198	0.289	312.846	0.5	2.3	3.4	0.3	0.00	0.01	0.02	0.00	1.8
				Slurry Pump	53	0.74	1	8	86	1.510	4.055	4.182	0.384	420.920	1.0	2.8	2.9	0.3	0.01	0.02	0.02	0.00	1.6
				Small Boring Machine	150	0.75	1	8	86	0.335	2.634	3.087	0.221	426.608	0.7	5.2	6.1	0.4	0.00	0.03	0.03	0.00	4.6
				Suction Excavator	60	0.57	1	8	86	1.319	3.933	3.371	0.331	324.222	0.8	2.4	2.0	0.2	0.00	0.01	0.01	0.00	1.1
				Compressor	106	0.48	1	8	86	0.548	1.925	3.270	0.301	273.029	0.5	1.7	2.9	0.3	0.00	0.01	0.02	0.00	1.3
Trenching	7	38,602	87	Trencher	63	0.75	1	8	699	2.263	5.534	4.636	0.504	426.606	1.9	4.6	3.9	0.4	0.08	0.20	0.17	0.02	15.5
				Backhoe	108	0.55	1	8	699	0.504	2.170	3.198	0.289	312.846	0.5	2.3	3.4	0.3	0.02	0.10	0.15	0.01	14.3
				Roller	95	0.56	1	8	699	0.608	2.233	3.782	0.330	318.534	0.6	2.1	3.5	0.3	0.02	0.09	0.15	0.01	13.1
				Water Truck	189	0.50	1	8	699	0.423	1.972	3.088	0.189	324.222	0.7	3.3	5.1	0.3	0.03	0.14	0.22	0.01	23.6
				Compressor	106	0.48	1	8	699	0.548	1.925	3.270	0.301	273.029	0.5	1.7	2.9	0.3	0.02	0.08	0.13	0.01	10.7
														Carson City Totals	***7.7***	***28.4***	***36.2***	***3.1***	***0.2***	***0.7***	***0.9***	***0.1***	***87.5***

Mono County Off Road Emissions

Activity	Crew Size	Size (lf)	Duration (days)	Equipment						Emission Factors (g/bhp-hr)					Emissions (lbs/d)				Emissions (tpy)				
				Type	BHP	Load Factor	# per crew	hrs/ day	total hrs/yr	ROG	CO	NO_X	PM	CO_2	ROG	CO	NO_X	PM_{10}	ROG	CO	NO_X	PM	CO_2
Boring In Dirt	7	157,117	342	Backhoe	108	0.55	1	8	2,738	0.504	2.170	3.198	0.289	312.846	0.5	2.3	3.4	0.3	0.09	0.39	0.57	0.05	56.1
				Slurry Pump	53	0.74	1	8	2,738	1.510	4.055	4.182	0.384	420.920	1.0	2.8	2.9	0.3	0.18	0.48	0.50	0.05	49.8
				Small Boring Machine	150	0.75	1	8	2,738	0.335	2.634	3.087	0.221	426.608	0.7	5.2	6.1	0.4	0.11	0.89	1.05	0.08	144.9
				Suction Excavator	60	0.57	1	8	2,738	1.319	3.933	3.371	0.331	324.222	0.8	2.4	2.0	0.2	0.14	0.41	0.35	0.03	33.5
				Compressor	106	0.48	1	8	2,738	0.548	1.925	3.270	0.301	273.029	0.5	1.7	2.9	0.3	0.08	0.30	0.50	0.05	41.9
Boring--Solid Rock	7	28,340	140	Backhoe	108	0.55	1	8	1,122	0.504	2.170	3.198	0.289	312.846	0.5	2.3	3.4	0.3	0.04	0.16	0.24	0.02	23.0
				Slurry Pump	53	0.74	1	8	1,122	1.510	4.055	4.182	0.384	420.920	1.0	2.8	2.9	0.3	0.07	0.20	0.20	0.02	20.4
				Big Boring Machine	291	0.75	1	8	1,122	0.202	0.781	2.297	0.073	428.608	0.8	3.0	8.8	0.3	0.05	0.21	0.62	0.02	115.7
				Suction Excavator	60	0.57	1	8	1,122	1.319	3.933	3.371	0.331	324.222	0.8	2.4	2.0	0.2	0.06	0.17	0.14	0.01	13.7
				Roller	95	0.56	1	8	1,122	0.608	2.233	3.782	0.330	318.534	0.6	2.1	3.5	0.3	0.04	0.15	0.25	0.02	21.0
Trenching	7	953,003	2,156	Trencher	63	0.75	1	8	17,249	2.263	5.534	4.636	0.504	426.606	1.9	4.6	3.9	0.4	2.03	4.97	4.16	0.45	383.3
				Backhoe	108	0.55	1	8	17,249	0.504	2.170	3.198	0.289	312.846	0.5	2.3	3.4	0.3	0.57	2.45	3.61	0.33	353.3
				Roller	95	0.56	1	8	17,249	0.608	2.233	3.782	0.330	318.534	0.6	2.1	3.5	0.3	0.62	2.26	3.83	0.33	322.2
				Water Truck	189	0.50	1	8	17,249	0.423	1.972	3.088	0.189	324.222	0.7	3.3	5.1	0.3	0.76	3.54	5.55	0.34	582.6
				Compressor	106	0.48	1	8	17,249	0.548	1.925	3.270	0.301	273.029	0.5	1.7	2.9	0.3	0.53	1.86	3.16	0.29	264.1
														Mono Totals	***11.4***	***41.0***	***56.8***	***4.5***	***5.4***	***18.4***	***24.7***	***2.1***	***2,425.5***

Inyo County Off Road Emissions

Activity	Crew Size	Size (lf)	Duration (days)	Equipment						Emission Factors (g/bhp-hr)					Emissions (lbs/d)				Emissions (tpy)				
				Type	BHP	Load Factor	# per crew	hrs/ day	total hrs/yr	ROG	CO	NO_X	PM	CO_2	ROG	CO	NO_X	PM_{10}	ROG	CO	NO_X	PM	CO_2
Boring In Dirt	7	75,460	164	Backhoe	108	0.55	1	8	1,315	0.504	2.170	3.198	0.289	312.846	0.5	2.3	3.4	0.3	0.04	0.19	0.28	0.02	26.9
				Slurry Pump	53	0.74	1	8	1,315	1.510	4.055	4.182	0.384	420.920	1.0	2.8	2.9	0.3	0.09	0.23	0.24	0.02	23.9
				Small Boring Machine	150	0.75	1	8	1,315	0.335	2.634	3.087	0.221	426.608	0.7	5.2	6.1	0.4	0.05	0.43	0.50	0.04	69.6
				Suction Excavator	60	0.57	1	8	1,315	1.319	3.933	3.371	0.331	324.222	0.8	2.4	2.0	0.2	0.07	0.20	0.17	0.02	16.1
				Compressor	106	0.48	1	8	1,315	0.548	1.925	3.270	0.301	273.029	0.5	1.7	2.9	0.3	0.04	0.14	0.24	0.02	20.1
Boring--Solid Rock	7	13,242	66	Backhoe	108	0.55	1	8	524	0.504	2.170	3.198	0.289	312.846	0.5	2.3	3.4	0.3	0.02	0.07	0.11	0.01	10.7
				Slurry Pump	53	0.74	1	8	524	1.510	4.055	4.182	0.384	420.920	1.0	2.8	2.9	0.3	0.03	0.09	0.09	0.01	9.5
				Big Boring Machine	291	0.75	1	8	524	0.202	0.781	2.297	0.073	428.608	0.8	3.0	8.8	0.3	0.03	0.10	0.29	0.01	54.1
				Suction Excavator	60	0.57	1	8	524	1.319	3.933	3.371	0.331	324.222	0.8	2.4	2.0	0.2	0.03	0.08	0.07	0.01	6.4
				Roller	95	0.56	1	8	524	0.608	2.233	3.782	0.330	318.534	0.6	2.1	3.5	0.3	0.02	0.07	0.12	0.01	9.8
Trenching	7	544,639	1,232	Trencher	63	0.75	1	8	9,858	2.263	5.534	4.636	0.504	426.606	1.9	4.6	3.9	0.4	1.16	2.84	2.38	0.26	219.0
				Backhoe	108	0.55	1	8	9,858	0.504	2.170	3.198	0.289	312.846	0.5	2.3	3.4	0.3	0.33	1.40	2.06	0.19	201.9
				Roller	95	0.56	1	8	9,858	0.608	2.233	3.782	0.330	318.534	0.6	2.1	3.5	0.3	0.35	1.29	2.19	0.19	184.1
				Water Truck	189	0.50	1	8	9,858	0.423	1.972	3.088	0.189	324.222	0.7	3.3	5.1	0.3	0.43	2.02	3.17	0.19	332.9
				Compressor	106	0.48	1	8	9,858	0.548	1.925	3.270	0.301	273.029	0.5	1.7	2.9	0.3	0.30	1.06	1.81	0.17	151.0
														Inyo Totals	***11.4***	***41.0***	***56.8***	***4.5***	***3.0***	***10.2***	***13.7***	***1.2***	***1,336.2***

East Kern County Off Road Emissions

Activity	Crew Size	Size (lf)	Duration (days)	Equipment						Emission Factors (g/bhp-hr)					Emissions (lbs/d)				Emissions (tpy)				
				Type	BHP	Load Factor	# per crew	hrs/ day	total hrs/yr	ROG	CO	NO_X	PM	CO_2	ROG	CO	NO_X	PM_{10}	ROG	CO	NO_X	PM	CO_2
Boring In Dirt	7	52,211	114	Backhoe	108	0.55	1	8	910	0.504	2.170	3.198	0.289	312.846	0.5	2.3	3.4	0.3	0.03	0.13	0.19	0.02	18.6
				Slurry Pump	53	0.74	1	8	910	1.510	4.055	4.182	0.384	420.920	1.0	2.8	2.9	0.3	0.06	0.16	0.16	0.02	16.6
				Small Boring Machine	150	0.75	1	8	910	0.335	2.634	3.087	0.221	426.608	0.7	5.2	6.1	0.4	0.04	0.30	0.35	0.02	48.1
				Suction Excavator	60	0.57	1	8	910	1.319	3.933	3.371	0.331	324.222	0.8	2.4	2.0	0.2	0.05	0.13	0.12	0.01	11.1
				Compressor	106	0.48	1	8	910	0.548	1.925	3.270	0.301	273.029	0.5	1.7	2.9	0.3	0.03	0.10	0.17	0.02	13.9
Boring--Solid Rock	7	967	5	Backhoe	108	0.55	1	8	38	0.504	2.170	3.198	0.289	312.846	0.5	2.3	3.4	0.3	0.00	0.01	0.01	0.00	0.8
				Slurry Pump	53	0.74	1	8	38	1.510	4.055	4.182	0.384	420.920	1.0	2.8	2.9	0.3	0.00	0.01	0.01	0.00	0.7
				Big Boring Machine	291	0.75	1	8	38	0.202	0.781	2.297	0.073	428.608	0.8	3.0	8.8	0.3	0.00	0.01	0.02	0.00	3.9
				Suction Excavator	60	0.57	1	8	38	1.319	3.933	3.371	0.331	324.222	0.8	2.4	2.0	0.2	0.00	0.01	0.00	0.00	0.5
				Roller	95	0.56	1	8	38	0.608	2.233	3.782	0.330	318.534	0.6	2.1	3.5	0.3	0.00	0.01	0.01	0.00	0.7
Trenching	7	487,928	1,104	Trencher	63	0.75	1	8	8,831	2.263	5.534	4.636	0.504	426.606	1.9	4.6	3.9	0.4	1.04	2.55	2.13	0.23	196.2
				Backhoe	108	0.55	1	8	8,831	0.504	2.170	3.198	0.289	312.846	0.5	2.3	3.4	0.3	0.29	1.25	1.85	0.17	180.9
				Roller	95	0.56	1	8	8,831	0.608	2.233	3.782	0.330	318.534	0.6	2.1	3.5	0.3	0.31	1.16	1.96	0.17	165.0
				Water Truck	189	0.50	1	8	8,831	0.423	1.972	3.088	0.189	324.222	0.7	3.3	5.1	0.3	0.39	1.81	2.84	0.17	298.3
				Compressor	106	0.48	1	8	8,831	0.548	1.925	3.270	0.301	273.029	0.5	1.7	2.9	0.3	0.27	0.95	1.62	0.15	135.2
														San Bern Totals	***11.4***	***41.0***	***56.8***	***4.5***	***2.5***	***8.6***	***11.4***	***1.0***	***1,090.6***

San Bernardino County Off Road Emissions

Activity	Crew Size	Size (lf)	Duration (days)	Equipment						Emission Factors (g/bhp-hr)					Emissions (lbs/d)				Emissions (tpy)				
				Type	BHP	Load Factor	# per crew	hrs/ day	total hrs/yr	ROG	CO	NO_X	PM	CO_2	ROG	CO	NO_X	PM_{10}	ROG	CO	NO_X	PM	CO_2
Boring In Dirt	7	45,478	99	Backhoe	108	0.55	1	8	793	0.504	2.170	3.198	0.289	312.846	0.5	2.3	3.4	0.3	0.03	0.11	0.17	0.01	16.2
				Slurry Pump	53	0.74	1	8	793	1.510	4.055	4.182	0.384	420.920	1.0	2.8	2.9	0.3	0.05	0.14	0.14	0.01	14.4
				Small Boring Machine	150	0.75	1	8	793	0.335	2.634	3.087	0.221	426.608	0.7	5.2	6.1	0.4	0.03	0.26	0.30	0.02	41.9
				Suction Excavator	60	0.57	1	8	793	1.319	3.933	3.371	0.331	324.222	0.8	2.4	2.0	0.2	0.04	0.12	0.10	0.01	9.7
				Compressor	106	0.48	1	8	793	0.548	1.925	3.270	0.301	273.029	0.5	1.7	2.9	0.3	0.02	0.09	0.15	0.01	12.1
Boring--Solid Rock	7	728	4	Backhoe	108	0.55	1	8	29	0.504	2.170	3.198	0.289	312.846	0.5	2.3	3.4	0.3	0.00	0.00	0.01	0.00	0.6
				Slurry Pump	53	0.74	1	8	29	1.510	4.055	4.182	0.384	420.920	1.0	2.8	2.9	0.3	0.00	0.01	0.01	0.00	0.5
				Big Boring Machine	291	0.75	1	8	29	0.202	0.781	2.297	0.073	428.608	0.8	3.0	8.8	0.3	0.00	0.01	0.02	0.00	3.0
				Suction Excavator	60	0.57	1	8	29	1.319	3.933	3.371	0.331	324.222	0.8	2.4	2.0	0.2	0.00	0.00	0.00	0.00	0.4
				Roller	95	0.56	1	8	29	0.608	2.233	3.782	0.330	318.534	0.6	2.1	3.5	0.3	0.00	0.00	0.01	0.00	0.5
Trenching	7	243,159	550	Trencher	63	0.75	1	8	4,401	2.263	5.534	4.636	0.504	426.606	1.9	4.6	3.9	0.4	0.52	1.27	1.06	0.12	97.8
				Backhoe	108	0.55	1	8	4,401	0.504	2.170	3.198	0.289	312.846	0.5	2.3	3.4	0.3	0.15	0.63	0.92	0.08	90.2
				Roller	95	0.56	1	8	4,401	0.608	2.233	3.782	0.330	318.534	0.6	2.1	3.5	0.3	0.16	0.58	0.98	0.09	82.2
				Water Truck	189	0.50	1	8	4,401	0.423	1.972	3.088	0.189	324.222	0.7	3.3	5.1	0.3	0.19	0.90	1.42	0.09	148.6
				Compressor	106	0.48	1	8	4,401	0.548	1.925	3.270	0.301	273.029	0.5	1.7	2.9	0.3	0.14	0.48	0.81	0.07	67.4
														San Bern Totals	***11.4***	***41.0***	***56.8***	***4.5***	***1.3***	***4.6***	***6.1***	***0.5***	***585.6***

The fuel consumption rate for a piece of equipment depends on the engine size, load factor, the condition of the equipment, operator's habit, environmental conditions, and the basic design of equipment.

To determine the hourly fuel cost, the total fuel cost is divided by the productive time of the equipment. If fuel consumption records are not available, the following formula can be used to estimate liters of fuel used per machine hour,

$$LMPH = \frac{K \times GHP \times LF}{KPL}$$

where:

- LMPH is the liters used per machine hour,
- K is the kg of fuel used per brake hp/hour,
- GHP is the gross engine horsepower at governed engine rpm,
- LF is the load factor in percent, and
- KPL is the weight of fuel in kg/liter.

Typical values are given in Table 3.3. The load factor is the ratio of the average horsepower used to gross horsepower available at the flywheel.

TABLE 3.3. Weights, fuel consumption rates, and load factors for diesel and gasoline engines.

Engine	Weight (KPL) kg/liter	Fuel Consumption (K) kg/brake hp-hour	Load Factor (LF)		
			Low	Med	High
Gasoline	0.72	0.21	0.38	0.54	0.7
Diesel	0.84	0.17	0.38	0.54	0.7

Source:

Cost Control in Forest Harvesting and Road Construction. Food and Agriculture Organization of the United Nations. Rome, 1992

Offroad Emission Factors

EquipmentType	BHP	Load Factor	Emission Factor (g/bhp-hr)				
			ROG	CO	NO_X	PM	CO_2
Airman 185	106	0.48	0.548	1.925	3.270	0.301	273.029
Back Hoe	108	0.55	0.504	2.170	3.198	0.289	312.846
Big Boring Machine	291	0.75	0.202	0.781	2.297	0.073	428.608
Compressor	106	0.48	0.548	1.925	3.270	0.301	273.029
Plow	300	0.55	0.280	0.769	2.785	0.095	324.222
Roller	95	0.56	0.608	2.233	3.782	0.330	318.534
Slurry Pump	53	0.74	1.510	4.055	4.182	0.384	420.920
Small Boring Machine	150	0.75	0.335	2.634	3.087	0.221	426.608
Suction Excavator	60	0.57	1.319	3.933	3.371	0.331	324.222
Trencher	63	0.75	2.263	5.534	4.636	0.504	426.606
Water Truck	189	0.50	0.423	1.972	3.088	0.189	324.222

From: URBEMIS Manual Appendices for Year 2011 Data

Construction Employee Commute Emissions Summary

County	Emissions										GHG		
	Pounds per day					Tons per year					CO_2	CH_4	CO_2e
	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	tons	tons	tonnes
San Bernardino	0.05	2.29	0.24	0.03	0.03	0.01	0.25	0.03	0.00	0.00	76.8	0.004	69.7
Kern	0.05	2.29	0.24	0.03	0.03	0.01	0.47	0.05	0.01	0.01	143.8	0.007	130.5
Inyo	0.10	4.58	0.48	0.06	0.05	0.03	1.12	0.12	0.01	0.01	343.9	0.016	312.3
Mono	0.10	4.58	0.48	0.06	0.05	0.05	2.01	0.21	0.03	0.02	620.6	0.028	563.6
Dougas	0.05	2.03	0.21	0.03	0.02	0.00	0.09	0.01	0.00	0.00	29.2	0.001	26.6
Carson City	0.02	1.02	0.11	0.01	0.01	0.00	0.02	0.00	0.00	0.00	7.7	0.000	7.0
TOTAL	***0.38***	***16.79***	***1.76***	***0.22***	***0.20***	***0.09***	***3.96***	***0.41***	***0.05***	***0.05***	***1,222.0***	***0.056***	***1,109.7***

Construction Employee Commute Emissions

San Bernardino County

Activity	# of Crew	Duration (days)	RT Mileage	RT* per Day	Total VMT/d	Total VMT/yr
Boring In Dirt	7	99	30	7	210	20,807
Boring--Solid Rock	7	4	30	7	210	757
Trenching	7	550	30	7	210	115,528
TOTAL	***21***			***21***	***630***	***137,092***

EMISSIONS

Pounds per day					Tons per year				
ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
0.02	0.76	0.08	0.01	0.01	0.00	0.04	0.00	0.00	0.00
0.02	0.76	0.08	0.01	0.01	0.00	0.00	0.00	0.00	0.00
0.02	0.76	0.08	0.01	0.01	0.00	0.21	0.02	0.00	0.00
0.05	***2.29***	***0.24***	***0.03***	***0.03***	***0.01***	***0.25***	***0.03***	***0.00***	***0.00***

GHG - All

CO_2	CH_4	CO_2e
tpy	tpy	MT/Y
11.7	0.001	10.6
0.4	0.000	0.4
64.7	0.003	58.7
76.8	***0.004***	***69.7***

East Kern County

Activity	# of Crew	Duration (days)	RT Mileage	RT* per Day	Total VMT/d	Total VMT/yr
Boring In Dirt	7	114	30	7	210	23,887
Boring--Solid Rock	7	5	30	7	210	1,005
Trenching	7	1,104	30	7	210	231,821
TOTAL	***21***			***21***	***630***	***256,714***

EMISSIONS

Pounds per day					Tons per year				
ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
0.02	0.76	0.08	0.01	0.01	0.00	0.04	0.00	0.00	0.00
0.02	0.76	0.08	0.01	0.01	0.00	0.00	0.00	0.00	0.00
0.02	0.76	0.08	0.01	0.01	0.01	0.42	0.04	0.01	0.01
0.05	***2.29***	***0.24***	***0.03***	***0.03***	***0.01***	***0.47***	***0.05***	***0.01***	***0.01***

GHG - All

CO_2	CH_4	CO_2e
tpy	tpy	MT/Y
13.4	0.001	12.1
0.6	0.000	0.5
129.8	0.006	117.9
143.8	***0.007***	***130.5***

Inyo County

Activity	# of Crew	Duration (days)	RT Mileage	RT* per Day	Total VMT/d	Total VMT/yr
Boring In Dirt	7	164	60	7	420	69,048
Boring--Solid Rock	7	66	60	7	420	27,533
Trenching	7	1,232	60	7	420	517,530
TOTAL	***21***			***21***	***1,260***	***614,112***

EMISSIONS

Pounds per day					Tons per year				
ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
0.03	1.53	0.16	0.02	0.02	0.00	0.13	0.01	0.00	0.00
0.03	1.53	0.16	0.02	0.02	0.00	0.05	0.01	0.00	0.00
0.03	1.53	0.16	0.02	0.02	0.02	0.94	0.10	0.01	0.01
0.10	***4.58***	***0.48***	***0.06***	***0.05***	***0.03***	***1.12***	***0.12***	***0.01***	***0.01***

GHG - All

CO_2	CH_4	CO_2e
tpy	tpy	MT/Y
38.7	0.002	35.1
15.4	0.001	14.0
289.8	0.013	263.2
343.9	***0.016***	***312.3***

Mono County

Activity	# of Crew	Duration (days)	RT Mileage	RT* per Day	Total VMT/d	Total VMT/yr
Boring In Dirt	7	342	60	7	420	143,767
Boring--Solid Rock	7	140	60	7	420	58,925
Trenching	7	2,156	60	7	420	905,568
TOTAL	***21***			***21***	***1,260***	***1,108,260***

EMISSIONS

Pounds per day					Tons per year				
ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
0.03	1.53	0.16	0.02	0.02	0.01	0.26	0.03	0.00	0.00
0.03	1.53	0.16	0.02	0.02	0.00	0.11	0.01	0.00	0.00
0.03	1.53	0.16	0.02	0.02	0.04	1.65	0.17	0.02	0.02
0.10	***4.58***	***0.48***	***0.06***	***0.05***	***0.05***	***2.01***	***0.21***	***0.03***	***0.02***

GHG - All

CO_2	CH_4	CO_2e
tpy	tpy	MT/Y
80.5	0.004	73.1
33.0	0.002	30.0
507.1	0.023	460.5
620.6	***0.028***	***563.6***

Douglas County

Activity	# of Crew	Duration (days)	RT Mileage	RT* per Day	Total VMT/d	Total VMT/yr
Boring In Dirt	7	34	40	7	280	9,424
Trenching	7	153	40	7	280	42,800
TOTAL	***14***			***14***	***560***	***52,224***

EMISSIONS

Pounds per day					Tons per year				
ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
0.02	1.02	0.11	0.01	0.01	0.00	0.02	0.00	0.00	0.00
0.02	1.02	0.11	0.01	0.01	0.00	0.08	0.01	0.00	0.00
0.05	***2.03***	***0.21***	***0.03***	***0.02***	***0.00***	***0.09***	***0.01***	***0.00***	***0.00***

GHG - All

CO_2	CH_4	CO_2e
tpy	tpy	MT/Y
5.3	0.000	4.8
24.0	0.001	21.8
29.2	***0.001***	***26.6***

Carson City County

Activity	# of Crew	Duration (days)	RT Mileage	RT* per Day	Total VMT/d	Total VMT/yr
Boring In Dirt	7	11	20	7	140	1,510
Trenching	7	87	20	7	140	12,227
TOTAL	***14***			***14***	***280***	***13,737***

EMISSIONS

Pounds per day					Tons per year				
ROG	CO	NO_X	PM_{10}	$PM_{2.5}$	ROG	CO	NO_X	PM_{10}	$PM_{2.5}$
0.01	0.51	0.05	0.01	0.01	0.00	0.00	0.00	0.00	0.00
0.01	0.51	0.05	0.01	0.01	0.00	0.02	0.00	0.00	0.00
0.02	***1.02***	***0.11***	***0.01***	***0.01***	***0.00***	***0.02***	***0.00***	***0.00***	***0.00***

GHG - All

CO_2	CH_4	CO_2e
tpy	tpy	MT/Y
0.8	0.000	0.8
6.8	0.000	6.2
7.7	***0.000***	***7.0***

					Grand Total	***4,620***	***2,182,139***	***0.38***	***16.79***	***1.76***	***0.22***	***0.20***	***0.09***	***3.96***	***0.41***	***0.05***	***0.05***	***1,222.0***	***0.056***	***1,109.7***

Low Level Fugitive Dust Emission Estimate Approach from URBEMIS

Factors

0.11 tons of PM_{10} per acre-month

days / month = 30.4

Staging Areas Acreage Calculations

County	Total ft^2	Total acres	Months	Acres per month	Fugitive Dust (PM_{10})			$PM_{2.5}$*	
					tons/mo	tpy	lbs/d	tpy	lbs/d
San Bernardino	781,600	17.94	10.61	1.69	0.19	2.23	12.2	1.34	7.3
East Kern	849,927	19.51	13.93	1.40	0.15	1.85	10.1	1.11	6.1
Inyo	2,794,198	64.15	21.08	3.04	0.33	4.02	22.0	2.41	13.2
Mono	452,700	10.39	93.57	0.11	0.01	0.15	0.8	0.09	0.5
Douglas	125,000	2.87	5.41	0.53	0.06	0.70	3.8	0.42	2.3
Carson City	0	0.00	4.52	0.00	0	0	0	0	0
Washoe	0	0.00	0.00	0.00	0	0	0	0	0
			Totals	***6.78***	***0.75***	***8.94***	***49.0***	***5.37***	***29.4***

** Per CARB: for fugitive dust the fraction of PM_{10} that is considered $PM_{2.5}$ os 40%*

Staging Areas

Block	County	Dimensions	Square Feet	Surface	Current Use	Proposed Use
	Douglas	350 x 200	70,000	Gravel / Dirt	Truck parking	Equipment and Material Storage
N-111	Douglas	150 x 20	3,000	Gravel	Hwy Shoulder	Eguipment & Material
N-112	Douglas	250 x 20	5,000	Gravel	Hwy Shoulder	Eguipment & Material
N-112	Douglas	75 x 100	7,500	Gravel / Dirt	Clearing / Turnout	Equipment and Material Storage
N-113	Douglas	400 x 20	8,000	Gravel	Hwy Shoulder	Eguipment & Material
N-113	Douglas	450 x 70	31,500	Gravel	Hwy Shoulder	Eguipment & Material
	Douglas Total		**125,000**			
K-101	Inyo	96' x 96'	9,216	Gravel	SBA Cell Site 800-487-7483 info	Parking Equip & Material
I-101	Inyo	200x200	40,000	Dirt	Open territory	Parking Equip & Material
I-101	Inyo	200 x 150	30,000	Dirt	Open territory	Parking Equip & Material
I-101	Inyo	250 x 200	50,000	Dirt	Open territory	Parking Equip & Material
I-101	Inyo	300 x 200	60,000	Dirt	Open territory	Parking Equip & Material
I-101	Inyo	150 x 150	22,500	Dirt	Open territory	Parking Equip & Material
I-101	Inyo	150 x 150	22,500	Dirt	Open territory	Parking Equip & Material
I-101	Inyo	100 x 200	20,000	Dirt	Open territory	Parking Equip & Material
I102	Inyo	175 x 300	52,500	Dirt	Open territory	Parking Equip & Material
I103	Inyo	150 x 150	22,500	Dirt	Open territory	Parking Equip & Material
I103	Inyo	175 x 250	43,750	Dirt	Open territory	Parking Equip & Material
I103	Inyo	175 x 300	52,500	Dirt	Open territory	Parking Equip & Material
I103	Inyo	100 x 175	17,500	Dirt	Open territory	Parking Equip & Material
I104	Inyo	150 x 200	30,000	Dirt	Open territory	Parking Equip & Material
I104	Inyo	100 x 175	17,500	Dirt	Open territory	Parking Equip & Material
I105	Inyo	200 x 250	50,000	Dirt	Open territory	Parking Equip & Material
I105	Inyo	150 x 150	22,500	Dirt	Open territory	Parking Equip & Material

Staging Areas

Block	County	Dimensions	Square Feet	Surface	Current Use	Proposed Use
I105	Inyo	150 x 200	30,000	Dirt	Open territory	Parking Equip & Material
I105	Inyo	100 x 200	20,000	Dirt	Open territory	Parking Equip & Material
I105	Inyo	150 x 175	26,250	Dirt	Open territory	Parking Equip & Material
I105	Inyo	150 x 150	22,500	Dirt	Open territory	Parking Equip & Material
I105	Inyo	100 x 250	25,000	Dirt	Open territory	Parking Equip & Material
I105	Inyo	100 x 175	17,500	Dirt	Open territory	Parking Equip & Material
I106	Inyo	75 x 150 / 175 x 275	59,375	Dirt	Open territory	Parking Equip & Material
I106	Inyo	75 x 400	30,000	Dirt	Turn Out	Parking Equip & Material
I106	Inyo	60 x 200	12,000	Dirt	Turn Out	Parking Equip & Material
I106	Inyo	50 x 200	10,000	Dirt	Turn Out	Parking Equip & Material
I106	Inyo	200 x 300	60,000	Dirt / Gravel	Parking lot for park	Parking Equip & Material
I108	Inyo	75 x 175	13,125	Dirt	Open territory	Parking Equip & Material
I108	Inyo	75 x 175	13,125	Dirt	Turn Out	Parking Equip & Material
I108	Inyo	75 x 200	15,000	Dirt	Turn Out	Parking Equip & Material
I108	Inyo	250 x 300	75,000	Dirt	OHV use	Parking Equip & Material
I108	Inyo	75 x 200	15,000	Dirt	Turn Out	Parking Equip & Material
I109	Inyo	50 x 150	7,500	Dirt	Turn Out	Parking Equip & Material
I113	Inyo	300 x 300	90,000	Dirt	Open territory	Parking Equip & Material
I113	Inyo	300 x 300	90,000	Dirt	Open territory	Parking Equip & Material
I114	Inyo	250 x 250	62,500	Dirt	Open territory	Parking Equip & Material
I114	Inyo	100 x 150	15,000	Dirt	Open territory	Parking Equip & Material
I114	Inyo	100 x 200	20,000	Dirt	Open territory	Parking Equip & Material
I114	Inyo	300 x 300	90,000	Dirt	Open territory	Parking Equip & Material
I114	Inyo	200 x 200	40,000	Dirt	Open territory	Parking Equip & Material

Staging Areas

Block	County	Dimensions	Square Feet	Surface	Current Use	Proposed Use
I114	Inyo	200 x 250	50,000	Dirt	Open territory	Parking Equip & Material
I114	Inyo	150 x 175	26,250	Dirt	Open territory	Parking Equip & Material
I114	Inyo	150 x 250	37,500	Dirt	Open territory	Parking Equip & Material
I114	Inyo	75 x 150	11,250	Dirt	Open territory	Parking Equip & Material
I115	Inyo	50 x 100	5,000	Dirt	Turn Out	Parking Equip & Material
I115	Inyo	75 x 175	13,125	Dirt / Gravel	Turn Out	Parking Equip & Material
I115	Inyo	75 x 250	18,750	Dirt	Turn Out	Parking Equip & Material
I115	Inyo	100 x 150	15,000	Dirt / Gravel	Parking, open territory	Parking Equip & Material
I116	Inyo	175 x 300	52,500	Dirt	Open territory	Parking Equip & Material
I116	Inyo	50 x 100	5,000	Dirt	Turn Out	Parking Equip & Material
I116	Inyo	50 x 350	17,500	Dirt / Gravel	Turn Out	Parking Equip & Material
I116	Inyo	75 x 200	15,000	Dirt	Turn Out	Parking Equip & Material
I116	Inyo	50 x 200	10,000	Dirt	Turn Out	Parking Equip & Material
I116	Inyo	300 x 300	90,000	Dirt	Parking / Open	Parking Equip & Material
I-104	Inyo	300 x 200 / 350 x 200	130,000	Asphalt / Gravel	DWP Operation facilities	Parking Equip & Material
I-106	Inyo	150 x 100	15,000	Asphalt	Rear Parking / Fire dept	Parking Equip & Material
I-106	Inyo	100 x 100	10,000	Dirt / Gravel	DWP yard	Parking Equip & Material
I-106	Inyo	150 x 200	30,000	Asphalt	Parking lot	Parking Equip & Material
I-107	Inyo	75 x 50	3,750	Dirt	Off Hwy turnout	Parking Equip & Material
I-108	Inyo	60 x 120	7,200	Gravel / Dirt	Truck parking / Rest Stop	Parking Equip & Material
I-109	Inyo	100 x 150	15,000	Gravel / Dirt	Old clearing for staging	Parking Equip & Material
I-109	Inyo	250 x 250	62,500	Dirt	Truck Parking / Material Sotorage	Parking Equip & Material
I-109	Inyo	175 x 175	30,625	Asphalt	Parking lot	Parking Equip & Material
I-109	Inyo	100 x 50	5,000	Asphalt	Airport Parking	Parking Equip & Material

Staging Areas

Block	County	Dimensions	Square Feet	Surface	Current Use	Proposed Use
I-110	Inyo	300 x 250	75,000	Asphalt / Gravel	DWP Operation facilities	Parking Equip & Material
I-110	Inyo	50 x 100	5,000	Gravel/Dirt	County Maint Yard	Parking Equip & Material
I-111	Inyo	100 200	20,000	Asphalt/Gravel	County Storage	Parking Equip & Material
I-113	Inyo	75 x 100	7,500	Asphalt	Fenced in vacant schoolyard	Parking Equip & Material
I-113	Inyo	250 x 250	62,500	Asphalt / Gravel	DWP Operation facilities	Parking Equip & Material
I-114	Inyo	75 x 150	11,250	Dirt / Gravel	Overflow parking	Parking Equip & Material
I-114	Inyo	50' x 300'	15,000	Paved	Storage areas at Airport	Parking Equip & Material
I-114	Inyo	232' x 460'	106,720	Gravel	Some Over night Truck Parking	Parking Equip & Material
I-117	Inyo	114' x 268 & 30' x 350'	41,052	Gravel	Shoulder Parking	Parking Equip & Material
I-117	Inyo	170' x 129'	21,930	Gravel	Frequent Truck Parking Nights	Parking Equip & Material
I-117	Inyo	About 130' x 20	2,600	Gravel	Olancha Fire Department	Parking Equip & Material
I-118	Inyo	32'	640	Gravel	Dead End Road off Hwy	Parking Equip & Material
I-118	Inyo	About 5 Acres Access	217,800	Paved & Gravel	Big Rig Parking and Vacant	Parking Equip & Material
I-119	Inyo	150' x 28 & 150' x 24'	7,800	Gravel	Off Hwy Turn Outs	Parking Equip & Material
I-120	Inyo	216' x 121'	26,136	Gravel	Lg Vacant Rocked area	Parking Equip & Material
I-120	Inyo	415' x 40	16,600	Gravel	Turn Out	Parking Equip & Material
I-120	Inyo	319' x 121'	38,599	Gravel	Turn Out	Parking Equip & Material
I-120	Inyo	520' x 39'	20,280	Gravel	Turn Out	Parking Equip & Material
	Inyo Total		**2,794,198**			
K-101	Kern	387' x 419' x 267'	81,077	Gravel	Prior Storage & Staging	Staging & Storage
K-103	Kern	40 x 300	12,000	Dirt	None, no parking sign	Equipment and Material
K-103	Kern	200 x 200	40,000	Dirt	Vacant Lot	Equipment and Material
K-103	Kern	100 x 300	30,000	Dirt	Vacant Lot	Equipment and Material
K-102	Kern	About 175' x 50 +	8,750	Gravel	County Maint Yard	Parking Equip & Material

Staging Areas

Block	County	Dimensions	Square Feet	Surface	Current Use	Proposed Use
K-103	Kern	300 x 300	90,000	Gravel	Open area Conc Plant	Equipment and Material
K-102	Kern	100 x 250	25,000	Dirt, Gravel & AC	Parking Area	Equipment and Material
K-102	Kern	100 x 150	15,000	Gravel & Dirt	Parking	Equipment and Material
K-102	Kern	N/A	2,000	Paved	County Senior Ctr - Parking Lot	Vehicle Parking Only
K-104	Kern	140 x 400	56,000	Dirt/Sand	Vacant, some parking	Equipment and Material
K104	Kern	2ea at 200' x 150'	60,000	Gravel & Dirt	Vacant Fenced County Property	Parking Equip & Material
K-104	Kern	150 x 150	22,500	Dirt	Vacant	Equipment and Material
K-104	Kern	25' x 70'	1,750	Dirt & Gravel	COUNTY PROPERTY Well	Material Storage
K-104	Kern	100' x 215'	21,500	Gravel	COUNTY PROPERTY	Material Storage
K-104	Kern	100 x 100 x 100	10,000	Gravel	Vacant	Equipment and Material
K-105	Kern	50 x 200	10,000	Dirt	Drop off area for ATV's	Equipment and Material
K-106	Kern	150 x 250	37,500	Gravel	Cal Trans Srorage	Equipment and Material
K-106	Kern	140 x 140	19,600	Gravel	Cal Trans Srorage	Equipment and Material
K-107	Kern	500 x 125	62,500	Gravel	hwy Shoulder	Equipment and Material
K-107	Kern	150 x 450	67,500	Gravel	Cal Trans Srorage	Equipment and Material
K-108	Kern	450 x 60	27,000	Gravel	Cal Trans Srorage	Equipment and Material
K-108	Kern	200 x 200	40,000	Dirt/Gravel	Vacant, some parking	Equipment and Material
K-109	Kern	500 x 150	75,000	Dirt	Vaccant	Equipment and Material
K-109	Kern	150 x 85	12,750	AC	Parking Lot	Equipment and Material
K-109	Kern	150 x 150	22,500	AC	Parking Lot	Equipment and Material
	Kern Total		**849,927**			
M-101	Mono	100 x 150	15,000	Asphalt	High School Parking Lot	Equipment and Material Storage
M-102	Mono	200 x 75	15,000	Asphalt / Dirt	Fire Station Parking	Equipment and Material Storage
M-103	Mono	50 x 150	7,500	Dirt	Clearing / Turnout	Equipment and Material Storage

Staging Areas

Block	County	Dimensions	Square Feet	Surface	Current Use	Proposed Use
M-103	Mono	40 x 150	6,000	Asphalt / Dirt	Clearing / Turnout	Equipment and Material Storage
M-127	Mono	150 x 250	37,500	Asphalt / Dirt	Equipment parking	Equipment and Material Storage
M-106	Mono	150 x 150	22,500	Gravel / Dirt	Equipment parking	Equipment and Material Storage
M-107	Mono	100 x 200	20,000	Asphalt / Gravel	Equipment parking	Equipment and Material Storage
M-107	Mono	100 x 200	20,000	Asphalt / Gravel	Cal Trans Equipment parking	Equipment and Material Storage
M-128	Mono	100 x 200	20,000	Asphalt / Gravel / Dir	Yard Parking and Storage	Equipment and Material Storage
M-109	Mono	75 x 100	7,500	Dirt	Clearing / Turnout	Equipment and Material Storage
M-108	Mono	40 x 80	3,200	Dirt	Clearing / Turnout	Equipment and Material Storage
M-111	Mono	150 x 150	22,500	Asphalt	Cal Trans Equipment parking	Equipment and Material Storage
M-112	Mono	50 x 150 / 60 x 100	13,500	Gravel / Dirt	Yard Parking and Storage	Equipment and Material Storage
M-124	Mono	75 x 100	7,500	Dirt	Clearing / Turnout	Equipment and Material Storage
M-113	Mono	75 x 200	15,000	Asphalt	Resort Parking	Equipment and Material Storage
M-117	Mono	100 x 200	20,000	Gravel / Dirt	Yard Parking and Storage	Equipment and Material Storage
M-117	Mono	250 x 250	62,500	Asphalt / Gravel / Dir	Cal Trans Equipment parking	Equipment and Material Storage
	Mono	75 x 100	7,500	Dirt	Clearing / Turnout	Equipment and Material Storage
M123	Mono	125 x 125	15,625	Dirt	Open Space	Equipment and Material Storage
M123	Mono	100 x 125	12,500	Dirt	Open Space	Equipment and Material Storage
M130	Mono	60 x 350 / 75 x 150	32,250	Dirt	Turnout	Equipment and Material Storage
M131	Mono	60 x 350	21,000	Dirt	Turnout	Equipment and Material Storage
M131	Mono	75 x 175	13,125	Dirt	Turnout	Equipment and Material Storage
M131	Mono	60 x 300	18,000	Dirt	Turnout	Equipment and Material Storage
M132	Mono	50 x 350	17,500	Dirt / Gravel	Turnout	Equipment and Material Storage
	Mono Total		**452,700**			
S-101	San Bern	400 x 50	20,000	Gravel	Cal Trans Srorage	Equipment and Material

Staging Areas

Block	County	Dimensions	Square Feet	Surface	Current Use	Proposed Use
S-101	San Bern	150 x 150	22,500	Dirt	Off Load area for ATVs	Equipment and Material
S-101	San Bern	60 x 400	24,000	Gravel	Cal Trans Srorage	Equipment and Material
S-102	San Bern	100 x 300	30,000	Dirt	Drop off area for ATV's	Equipment and Material
S-103	San Bern	150 x 60	9,000	Gravel	Vacant Area, parking	Equipment and Material
S-103	San Bern	100 x 40	4,000	Gravel	Shoulder	Equipment and Material
S-105	San Bern	400 x 400	160,000	Dirt	Vacant Area, parking	Equipment and Material
S-105	San Bern	50 x 1000	50,000	AC & Gravel	Cal Trans Storage	Equipment and Material
S-105	San Bern	75 x 800	60,000	Dirt	Fut W bound lanes	Equipment and Material
S-106	San Bern	40 x 40	1,600	AC & Dirt	Fut road, N side	Equipment and Material
S-106	San Bern	30 x 400	12,000	Dirt	Wide/turn out area	Equipment and Material
S-107	San Bern	40 x 300	12,000	Gravel	Wide/turn out area	Equipment and Material
S-107	San Bern	150 x 150	22,500	AC & Dirt	Fut road, N side	Equipment and Material
S-107	San Bern	150 x 150	22,500	AC & Dirt	Fut road, N side	Equipment and Material
S-108	San Bern	700 x 30	21,000	Dirt	Wide spot, turn out	Equipment and Material
S-108	San Bern	160 x 100	16,000	Dirt & Concrete	Vacant Area	Equipment and Material
S-107	San Bern	40 x 200	8,000	Gravel	Parking Area	Equipment and Material
S-107	San Bern	50 x 300	15,000	Dirt & Gravel	Wide area/driveway	Equipment and Material
S-109	San Bern	400 x 400	160,000	Dirt	Vacant Area	Equipment and Material
S-109	San Bern	300 x 150	45,000	Dirt	Vacant Lot	Equipment and Material
S-109	San Bern	50 x 150	7,500	Dirt	Vacant Area	Equipment and Material
S-109	San Bern	250 x 200	50,000	Dirt & Gravel	Vacant Area	Equipment and Material
S-109	San Bern	180 x 50	9,000	dirt	Vacant Cor Lot	Equipment and Material
San Bern Total			**781,600**			
Grand Total			***5,003,425***			

Air Quality/Climate Change Calculations

APPENDIX

Construction Equipment/Crew Information

Trenching

Productivity 442 feet per day

Machines	#	Equip Type
Trencher	1	
Back Hoe	1	RT450
Roller	1	R
Truck	3	F750
Trailer	3	
Reel Trailer	1	
Water Truck	1	
Stakebed for Traffic	1	
Compressor	1	

Labor	#
Foreman/Trencher	1
Trencher OP	1
Helper	2
Truck Driver	1
Traffic Control	2
Total Crew Size	7

Boring--Solid Rock

Productivity 202 feet per day

Machines	#	Equip Type
Back Hoe	1	RT450
Slurry Pump	1	FM25
Big Boring Machine	1	JT4020
Sucker	1	FX60
Roller	1	R
Trucks	4	F750
Stakebed for Traffic	1	Stakebed
Reel Trailer	1	Reel Trailer
Trailer	1	Trailer

Labor	#
Locator (Wand)	1
Back Hoe	1
Helper	1
Boring machine	1
Helper	2
Traffic Control	1
Total Crew Size	7

Boring In Dirt

Productivity 459 feet per day

Machines	#	Equip Type
Back Hoe	1	RT450
Slurry Pump	1	FM25
Small Boring Machine	1	
Sucker	1	FX60
Trucks for hauling eq.	3	
Stakebed for Traffic	1	F750
Trucks for hauling eq.	1	
Reel Trailer	1	
Eq Trailer	2	
Compressor	1	

Labor	#
Locator (Wand)	1
Back Hoe	1
Helper	1
Boring machine	1
Helper	2
Traffic Control	1
Total Crew Size	7

Attainment Satus for California Standards

Planning Area	Ozone	PM_{10}	$PM_{2.5}$	CO	NO_2	SO_2	SO_4	Lead	H_2S	VRP
Western San Bernardino Co	**N**	**N**	**N**	A	A	A	A	A	U	U
Trona Planning Area	**N**	**N**	U	A	A	A	A	A	**N**	U
Indian Wells Valley Planning Area	**N**	**N**	U	U	A	A	A	A	U	U
Eastern Kern County	**N**	**N**	U	U	A	A	A	A	U	U
Coso Junction Planning Area	**N**	**N**	A	A	A	A	A	A	A	U
Inyo County (Except for Owens Valley)	**N**	**N**	A	A	A	A	A	A	A	U
Owens Valley Planning Area	**N**	**N**	A	A	A	A	A	A	A	U
Mono County (except for Mono Basin)	**N**	**N**	A	A	A	A	A	A	A	U
Mono Basin	**N**	**N**	A	A	A	A	A	A	A	U
Mammoth Lakes Planning Area	**N**	**N**	A	A	A	A	A	A	A	U

Notes: *N = Nonattainment*
A = Attainment
U = Unclassified

Attainment Status for National Standards

Area	O_3	PM_{10}	$PM_{2.5}$	CO	NO_2	SO_2
California Areas						
Western San Bernardino Co	**N-M**	**N-M**	U/A	U/A	U/A	U
Trona Planning Area	U/A	**N-M**	U/A	U/A	U/A	U
Indian Wells Valley Planning Area	U/A	A	U/A	U/A	U/A	U
Eastern Kern County	**N-I**	**N-S**	U/A	U/A	U/A	U
Coso Junction Planning Area	U/A	M	U/A	U/A	U/A	U
Inyo County (Except for Owens Valley)	U/A	U	U/A	U/A	U/A	U
Owens Valley Planning Area	U/A	**N-S**	U/A	U/A	U/A	U
Mono County (except for Mono Basin)	U/A	A	U/A	U/A	U/A	U
Mono Basin	U/A	**N-M**	U/A	U/A	U/A	U
Mammoth Lakes Planning Area	U/A	**N-M**	U/A	U/A	U/A	U
Nevada Areas						
Douglas County	U/A	U	U/A	U/A	U/A	U
Carson City County	U/A	U	U/A	U/A	U/A	U
Washoe County	U/A	U	U/A	U/A	U/A	U

Notes:
N = Nonattainment
N-I = Nonattainment - Subpart I
N-M = Nonattainment - Moderate
N-S = Nonattainment - Serious
U/A = Unclassifiable/Attainment
A = Attainment
M = Maintenance
U = Unclassifiable

Air Quality Monitoring Data - Ozone

Monitoring Site	2004	2005	2006	2007	2008	2009
Incline Village, Nevada						
Max 1 Hour (ppm)	0.073	0.073	—	—	0.092	0.073
Days > NAAQS (0.12 ppm)	0	0	—	—	0	0
Max 8 Hour (ppm)	0.066	0.065	—	—	0.075	0.068
Days > NAAQS (0.08 ppm)	0	0	—	—	0	0
Carson City - E Fifth St						
Max 1 Hour (ppm)	—	—	—	—	0.106	—
Days > NAAQS (0.12 ppm)	—	—	—	—	0	—
Max 8 Hour (ppm)	—	—	—	—	0.079	—
Days > NAAQS (0.08 ppm)	—	—	—	—	0	—
Carson City - E Long St						
Max 1 Hour (ppm)	0.082	0.072	0.086	0.080	—	—
Days > NAAQS (0.12 ppm)	0	0	0	0	—	—
Max 8 Hour (ppm)	0.072	0.066	0.075	0.072	—	—
Days > NAAQS (0.08 ppm)	0	0	0	0	—	—
South Lake Tahoe - Sandy Way						
Max 1 Hour (ppm)	0.066	—	—	—	—	—
Days > CAAQS (0.09 ppm)	0	—	—	—	—	—
Max 8 Hour (ppm)	0.058	—	—	—	—	—
Days > NAAQS (0.08 ppm)	0	—	—	—	—	—
Days > CAAQS (0.070 ppm)	0	—	—	—	—	—
Echo Summit						
Max 1 Hour (ppm)	**0.096**	0.079	**0.096**	0.082	**0.096**	0.078
Days > CAAQS (0.09 ppm)	1	0	1	0	1	0
Max 8 Hour (ppm)	**0.082**	**0.070**	**0.083**	**0.079**	**0.081**	**0.075**
Days > NAAQS (0.08 ppm)	1	0	3	3	5	0
Days > CAAQS (0.070 ppm)	13	2	12	9	9	1
Mammoth Lakes - Gateway HC						
Max 1 Hour (ppm)	0.092	—	—	—	—	—
Days > CAAQS (0.09 ppm)	0	—	—	—	—	—
Max 8 Hour (ppm)	**0.083**	—	—	—	—	—
Days > NAAQS (0.08 ppm)	12	—	—	—	—	—
Days > CAAQS (0.070 ppm)	23	—	—	—	—	—
Barstow						
Max 1 Hour (ppm)	**0.100**	**0.099**	**0.112**	**0.099**	**0.104**	**0.095**
Days > CAAQS (0.09 ppm)	2	3	4	2	5	1
Max 8 Hour (ppm)	**0.083**	**0.092**	**0.094**	**0.088**	**0.096**	**0.086**
Days > NAAQS (0.08 ppm)	15	22	19	25	7	5
Days > CAAQS (0.070 ppm)	30	49	38	46	23	18

Air Quality Monitoring Data - Carbon Monoxide

Monitoring Site	2004	2005	2006	2007	2008	2009
Carson City - E Long St						
Max 1 Hour (ppm)	6	4.3	4.8	4.8	2.9	—
Days > NAAQS (35 ppm)	0	0	0	0	0	—
Max 8 Hour (ppm)	3.3	2.9	2.8	2.8	2.2	—
Days > NAAQS (9 ppm)	0	0	0	0	0	—
South Lake Tahoe - Sandy Way						
Max 8 Hour (ppm)	1.18	—	—	—	—	—
Days > NAAQS (9 ppm)	0	—	—	—	—	—
Days > CAAQS (9.0 ppm)	0	—	—	—	—	—
Echo Summit						
Max 8 Hour (ppm)	4.35	—	—	—	—	—
Days > NAAQS (9 ppm)	0	—	—	—	—	—
Days > CAAQS (9.0 ppm)	0	—	—	—	—	—
Barstow						
Max 8 Hour (ppm)	1.18	1.34	1.19	0.7	1.23	0.89
Days > NAAQS (9 ppm)	0	0	0	0	0	0
Days > CAAQS (9.0 ppm)	0	0	0	0	0	0

Air Quality Monitoring Data - $PM_{2.5}$

Monitoring Site	2004	2005	2006	2007	2008	2009
South Lake Tahoe - Sandy Way						
Max 24 Hour Measurement	20.0	—	—	—	—	—
Days > NAAQS (35 $\mu g/m^3$)	0	—	—	—	—	—
Mammoth Lakes - Gateway HC						
Max 24 Hour Measurement	27.0	27.0	—	—	—	—
Days > NAAQS (35 $\mu g/m^3$)	0	0	—	—	—	—
Keeler-Cerro Gordo Road						
Max 24 Hour Measurement	**81.0**	22.0	**193.0**	**57.0**	**58.0**	**69.0**
Days > NAAQS (35 $\mu g/m^3$)	1	0	1	2	4	2
Ridgecrest - 100 West California Avenue						
Max 24 Hour Measurement	15.2	26.1	14.9	22.4	26.8	14.2
Days > NAAQS (35 $\mu g/m^3$)	0	0	0	0	0	0

Air Quality Monitoring Data - PM_{10}

Monitoring Site	2004	2005	2006	2007	2008	2009
South Lake Tahoe - Sandy Way						
National First High	47.0	38.0	—	—	—	—
Days > NAAQS (150 µg/m^3)	0	0	—	—	—	—
California First High	**81.2**	33.0	**66.6**	**55.6**	**96.7**	**52.8**
Days > CAAQS (50 µg/m^3)	2	0	3	2	10	1
Echo Summit						
National First High	24.0	—	—	—	—	—
Days > NAAQS (150 µg/m^3)	0	—	—	—	—	—
California First High	19.0	—	—	—	—	—
Days > CAAQS (50 µg/m^3)	0	—	—	—	—	—
Lee Vining -SMS						
National First High	72.0	30.0	95.0	46.0	78.0	51.0
Days > NAAQS (150 µg/m^3)	0	0	0	0	0	0
California First High	**60.0**	26.0	**75.0**	36.0	**62.0**	42.0
Days > CAAQS (50 µg/m^3)	2	0	1	0	2	0
Mono Lake - Simis Residence						
National First High	61.0	110.0	35.0	120.0	59.0	—
Days > NAAQS (150 µg/m^3)	0	0	0	0	0	—
California First High	**51.0**	**89.0**	29.0	**99.0**	47.0	—
Days > CAAQS (50 µg/m^3)	1	1	0	3	0	—
Mono Lake North Shore						
National First High	**987.0**	**2,108.0**	**4,300.0**	**10,020.0**	**2,769.0**	**1,461.0**
Days > NAAQS (150 µg/m^3)	10	4	16	14	7	16
California First High	**803.0**	**1,720.0**	**3,643.0**	**8,338.0**	**2,342.0**	—
Days > CAAQS (50 µg/m^3)	20	22	27	26	24	—
Mammoth Lakes - Gateway HC						
National First High	86.0	85.0	78.0	67.0	138.0	118.0
Days > NAAQS (150 µg/m^3)	0	0	0	0	0	0
California First High	**73.0**	**70.0**	**65.0**	**56.0**	**79.0**	**97.0**
Days > CAAQS (50 µg/m^3)	3	6	3	1	6	5
Lone Pine - E Locust St						
National First High	76.0	36.0	33.0	66.0	**399.0**	**264.0**
Days > NAAQS (150 µg/m^3)	0	0	0	0	1	2
California First High	**68.0**	31.0	29.0	**61.0**	—	—
Days > CAAQS (50 µg/m^3)	1	0	0	1	—	—

Air Quality Monitoring Data - PM_{10}

Monitoring Site	2004	2005	2006	2007	2008	2009
Keeler-Cerro Gordo Road						
National First High	**214.0**	**166.0**	124.0	**220.0**	**781.0**	**463.0**
Days > NAAQS (150 µg/m^3)	1	1	0	5	9	9
California First High	**192.0**	**152.0**	**115.0**	**198.0**	**713.0**	**433.0**
Days > CAAQS (50 µg/m^3)	2	2	2	10	23	25
Flat Rock - Highway 190						
National First High	**610.0**	**330.0**	**5,920.0**	**727.0**	**532.0**	**389.0**
Days > NAAQS (150 µg/m^3)	3	2	6	1	3	5
California First High	**535.0**	**306.0**	**5,482.0**	**633.0**	—	—
Days > CAAQS (50 µg/m^3)	14	9	11	5	—	—
Shell Cut - Highway 190						
National First High	**2,682.0**	**878.0**	**8,299.0**	136.0	**693.0**	**397.0**
Days > NAAQS (150 µg/m^3)	19	12	9	0	5	3
California First High	**2,439.0**	**738.0**	**7,709.0**	**119.0**	—	—
Days > CAAQS (50 µg/m^3)	32	22	18	2	—	—
Dirty Sox						
National First High	**5,225.0**	**673.0**	**6,338.0**	**497.0**	**499.0**	**556.0**
Days > NAAQS (150 µg/m^3)	15	14	13	2	9	7
California First High	**4,797.0**	**600.0**	**5,889.0**	**476.0**	—	—
Days > CAAQS (50 µg/m^3)	32	34	36	10	—	—
Olancha - Walker Creek Road						
National First High	**409.0**	67.0	91.0	114.0	**357.0**	**650.0**
Days > NAAQS (150 µg/m^3)	1	0	0	0	5	2
California First High	**370.0**	**60.0**	**83.0**	**105.0**	—	—
Days > CAAQS (50 µg/m^3)	2	2	2	2	—	—
Coso Junction - Highway 395 Rest Area						
National First High	66.0	97.0	77.0	**283.0**	137.0	**168.0**
Days > NAAQS (150 µg/m^3)	0	0	0	2	0	1
California First High	**63.0**	**91.0**	**73.0**	—	—	—
Days > CAAQS (50 µg/m^3)	2	2	1	—	—	—
China Lake - Powerline Road						
National First High	27.0	—	—	—	—	—
Days > NAAQS (150 µg/m^3)	0	—	—	—	—	—
California First High	25.0	—	—	—	—	—
Days > CAAQS (50 µg/m^3)	0	—	—	—	—	—

Air Quality Monitoring Data - PM_{10}

Monitoring Site	2004	2005	2006	2007	2008	2009
Ridgecrest - 100 West California Avenue						
National First High	47.0	55.0	65.0	72.0	57.0	46.3
Days > NAAQS (150 µg/m^3)	0	0	0	0	0	0
California First High	44.0	**51.0**	**61.0**	**68.0**	**53.5**	**44.0**
Days > CAAQS (50 µg/m^3)	0	1	1	1	1	0
Barstow						
National First High	40.0	78.0	80.0	**202.0**	93.0	76.0
Days > NAAQS (150 µg/m^3)	0	0	0	1	0	0
California First High	38.0	**70.0**	**77.0**	**194.0**	**88.0**	**72.0**
Days > CAAQS (50 µg/m^3)	0	3	2	5	2	2

Notes:

State and national statistics may differ for the following reasons:

** State statistics are based on California approves samplers, whereas national statistics are based on samplers using federal or equivalent methods*

** Since 1998, State statistics are based on local conditions and national statistics are based on standard conditions*

District - Site Name	Location		From Proposed Project		Pollutants Monitored
	Lattitude	Longitude	Dist (miles)	Direction	
Washoe AQMD					
Incline Village	39°15'0.95"N	119°57'24.45"W	11	ESE	O_3
Nevada Dept of Environmental Protection					
Carson City - E Fifth St	39.167116N	119.731451W	0.5	E	O_3
Carson City - E Long St	39.173056N	119.759167W	0.4	N	CO, O_3
El Dorado County APCD					
South Lake Tahoe-Sandy Way	38°56'42.00"N	119°58'13.08"W	11	W	CO, O_3, PM_{10}, $PM_{2.5}$
Mountain Counties AQMD					
Echo Summit	38°48'42.12"N	120° 1'59.16"W	17	SW	CO, O_3, PM_{10}, $PM_{2.5}$
Great Basin AQMD					
Lee Vining-SMS	37°57'34.92"N	119° 7'13.08"W	0.05	W	PM_{10}
Mono Lake-Simis Residence	38° 5'27.96"N	118°59'52.08"W	9	ENE	PM_{10}
Mono Lake North Shore	38° 4'11.00"N	118°56'53.01"W	12	ENE	PM_{10}
Mammoth Lakes-Gateway HC	37°38'44.88"N	118°57'59.04"W	0.2	E	CO, O_3, PM_{10}, $PM_{2.5}$
Lone Pine-E Locust Street	36°36'32.76"N	118° 3'29.16"W	0.1	WSW	PM_{10}
Keeler-Cerro Gordo Road	36°29'16.00"N	117°52'15.99"W	9	W	PM_{10}, $PM_{2.5}$
Flat Rock-Highway 190	36°25'19.00"N	117°50'12.00"W	11	W	PM_{10}
Shell Cut-Highway 190	36°22'5.00"N	117°53'52.00"W	7	W	PM_{10}
Dirty Sox	36°19'33.96"N	117°57'18.00"W	4	W	PM_{10}
Olancha-Walker Creek Road	36°15'59.00"N	117°59'30.01"W	0.3	WSW	PM_{10}
Coso Junction-Highway 395 Rest Area	36° 2'59.00"N	117°56'37.99"W	0.2	WSW	PM_{10}
East Kern APCD					
China Lake-Powerline Road	35°42'37.00"N	117°38'23.01"W	4	NNE	PM_{10}
Ridgecrest-100 West California Avenue	35°37'15.96"N	117°40'23.16"W	0.2	W	PM_{10}, $PM_{2.5}$
Mojave Desert AQMD					
Barstow	34°53'37.68"N	117° 1'27.84"W	3	W	CO, O_3, PM_{10}

Air Quality/Climate Change

Site Name	Location		Max Temp (°F)			Min Temp (°F)			Rainfall (in)			Snowfall (in)		
	Lattitude	Longitude	High	Low	Avg	High	Low	Avg	Nov-Apr	% of Ann	Annual	Dec-Mar	% of Ann	Annual
Carson City	39°09'N	119°46'W	89.1	45.3	66.1	50.0	20.5	33.9	8.12	78%	10.38	22.5	86%	26.1
Mindin	38°58'N	119°46'W	90.7	45.3	67.4	47.9	17.5	31.6	6.32	74%	8.51	18.7	86%	21.8
Bridgeport Dam	38°19'N	119°13'W	83.7	38.2	61.4	45.2	10.4	27.6	7.37	74%	9.90	52.3	80%	65.6
Mono Lake	38°00'N	119°09'W	83.8	40.4	61.7	49.6	19.7	33.3	10.70	77%	13.91	54.2	82%	66.1
Lee Vining	37°57'N	119°07'W	84.3	40.6	61.5	53.7	19.6	35.3	11.22	80%	14.07	60.4	88%	69.0
Bishop Airport	37°22'N	118°22'W	97.8	53.0	74.5	56.2	21.8	37.6	4.16	79%	5.25	7.7	92%	8.4
Independence	36°48'N	118°12'W	97.8	54.1	75.1	64.1	27.5	44.6	4.21	81%	5.18	3.2	100%	3.2
Hiawee	36°08'N	117°57'W	95.6	51.8	73.1	65.9	29.0	46.1	5.12	79%	6.50	4.1	82%	5.0
Inyokern	35°39'N	117°49'W	102.7	59.6	80.5	66.2	30.2	47.2	3.38	81%	4.17	0.6	100%	0.6
Randsburg	35°22'N	117°39'W	98.4	54.0	74.9	68.7	35.7	50.4	5.38	84%	6.38	3.0	94%	3.2
Barstow	34°54'N	117°02'W	102.4	59.8	80.3	66.6	31.3	47.5	3.01	70%	4.33	1.3	100%	1.3
Barstow Fire Station	34°54'N	117°01'W	102.2	59.0	80.3	69.3	33.4	50.5	3.68	74%	4.96	1.3	100%	1.3
		Averages	***94.0***	***50.1***	***71.4***	***58.6***	***24.7***	***40.5***	***6.06***	***77.7%***	***7.80***	***19.1***	***90.7%***	***22.6***

Sources and Assumptions

- Off road equipment BHP and load factors were obtained from the URBEMIS Model defaults
- Equipment type was supplied by client
- Linear feet, duration, hours per day, and duration information was supplied by client
- Off-road equipment emission factors were obtained from the URBEMIS Model defaults
- On-road mobile emission factors were derived from CARB's EMFAC model
- Fugitive emissions from the staging areas was estimated using the low-level dust estimate approach as listed in the URBEMIS model