

*Revised Final Report*  
Analysis of Air Quality Impacts  
From Proposed Medical Clinic

Valley Springs, California

March 25, 2016

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## 1. INTRODUCTION

Air Permitting Specialists (APS) staff have been retained by Mark Twain Health Care District to evaluate air quality impacts associated with the proposed medical clinic in Calaveras County. The proposed 18,500 square foot medical clinic is to be located at the Southwest corner State Route 26 and Vista Lago West Road (see Figure 1-1). The medical clinic represents the first phase (Phase 1) of the overall development. The second phase (Phase 2) would include a hotel, restaurants, grocery store and a retail store. The full buildout is expected to occur by 2030.

APS issued a report in September 21, 2015 that presented the air quality impacts associated with the construction and occupancy of the proposed Mark Twain Medical Clinic. The previous analysis was based on traffic data from an alternate medical facility as a traffic analysis for this project was not available. In addition, the March 21<sup>st</sup>, 2015 analysis was limited to the Phase 1 (Clinic only) rather than the full buildout of the development.

Since the preparation of the previous report, a traffic study for Phases 1 and 2 has been completed<sup>1</sup>. The traffic impact analysis presented traffic trip generation data for the opening year of medical clinic (Phase 1) and for the completion of the full project (Phase 2 buildout). Calaveras County has requested that the previous Air Quality Impact analysis be updated to reflect the project specific traffic data. This report has been prepared in response to this request.

The proposed medical clinic is expected to serve 185 patients daily. The patients would come from Valley Springs and other nearby towns in the County. The clinic would be 18,500 square feet and would include parking for staff and visitors. A layout of the clinic is shown in Figure 1-2. Based on the current traffic study, it would generate 96 single trips or 48 round trips per day. It is estimated that construction would take place for 8 months.

The construction and operation of the Medical Clinic would release air pollutants, such as, carbon monoxide (CO), oxides of nitrogen (NOx), fine particulate (PM-10 and PM-2.5) and volatile organic compounds (VOCs or ROGs). The emissions of such air pollutants and their impacts on the local air quality are regulated by the Calaveras County Air Pollution Control District.

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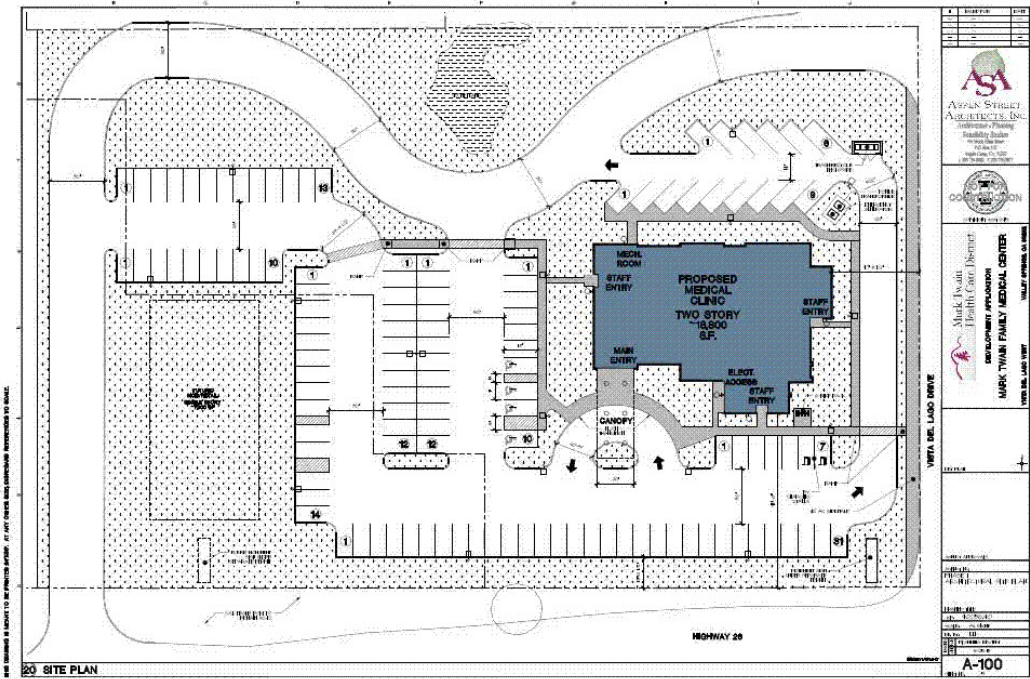
<sup>1</sup> "Transportation Impact Analysis – Mark Twain Medical Center", Kittelson & Associates, Inc. March 2016.

The report presents an estimate of emissions from this project and assesses the significance of these emissions within the context of applicable standards of significance. Both short-term (construction related impacts) and long-term impacts are evaluated.

Figure 1-1  
Project Location



Figure 1-2  
Site Plan



## 2. SUMMARY OF EMISSIONS

### 2.1 Construction Phase

There are two broad categories of emission sources for the construction phase:

- a. Mobile Sources - Cars and Trucks
- b. Construction Equipment – for grading, paving, trenching, etc .

The ROADWAY construction model was used to calculate emissions during the construction phase of the medical clinic. Annual construction emissions associated with the Clinic are representative of typical construction emissions expected in subsequent years.

The main air pollutant released during construction is dust (PM-10 and PM-2.5). An estimate of daily and annual emissions is presented in Table 2-1. A copy of the detailed model calculations are provided in the Appendix.

<b>Table 2-1 Estimate of Construction Related Emissions</b>		
<b>Pollutant</b>	<b>Construction Emissions (lbs/day)</b>	<b>Construction Emissions (tons/yr)</b>
Reactive Organic Compounds (ROG)	3.2	Less Than 0.05
Oxides of Nitrogen (NOx)	39.9	0.1
Particulate Matter (PM-10)	11.6	0.7
Fine Particulate Matter (PM-2.5)	3.6	0.1
Carbon Monoxide (CO)	17.5	0.1

### 2.2 Occupancy Phase (Phase 1 - Opening Year)

The main source of emissions during the occupancy phase is vehicles driven by employees and clinic visitors. There would be small amount of emissions from on-site equipment, such as, natural gas fired hot water heaters and space heating equipment. Such emissions are insignificant when compared to emissions from vehicular traffic. As a result, emissions from on-site heaters, boilers, etc., were not included.

Based on traffic analysis conducted by Kittelson & Associates, Inc., it is estimated that 96 new single trips or 48 round trips per day would be generated during the opening year. Assuming each roundtrip vehicle trip is 25 miles, daily and annual emissions were estimated and are summarized in Table 2-2 and are based on 2017 tailpipe emission factors.

<b>Table 2-2 Summary of Phase 1 Occupancy Emissions</b>		
<b>Pollutant</b>	<b>Daily Emissions (lbs/day)</b>	<b>Annual Emissions (tons/yr)</b>
Reactive Organic Compounds (ROG)	0.1089	0.0119
Oxides of Nitrogen (NOx)	0.3978	0.0726
Particulate Matter (PM-10)	0.0058	0.0011
Fine Particulate Matter (PM-2.5)	0.0053	0.0010
Carbon Monoxide (CO)	3.819	0.697
<i>See Appendix Tables 1a – 1c for detailed calculations.</i>		

### 2.3 Occupancy Phase (Phase 2 Full Buildout)

The Based on traffic analysis conducted by Kittelson & Associates, Inc., it is estimated that 7,421 new single vehicle trips or 3,711 round trips per day would be generated during the final buildout by 2030. Assuming each roundtrip vehicle trip is 25 miles, daily and annual emissions were estimated. These emissions are summarized in Table 2-3 and are based on 2030 tailpipe emission factors.

<b>Table 2-3 Summary of Occupancy Emissions</b>		
<b>Pollutant</b>	<b>Daily Emissions (lbs/day)</b>	<b>Annual Emissions (tons/yr)</b>
Reactive Organic Compounds (ROG)	3.847	0.702
Oxides of Nitrogen (NOx)	18.83	3.44
Particulate Matter (PM-10)	0.613	0.112
Fine Particulate Matter (PM-2.5)	0.563	0.103
Carbon Monoxide (CO)	223.92	40.87
<i>See Appendix Tables 2a - 2c for detailed calculations.</i>		

### 2.4 Emissions of Toxic Air Pollutants

The clinic would not have any sources of toxic air emissions. In the event diesel fuelled emergency electric generators are used, such equipment would be subject to Calaveras County APCD permitting requirements. The emissions of toxic pollutants would be analyzed during the permitting process.



**2.5 Emissions of Greenhouse Gas Emissions**

Vehicular traffic to and from the clinic would generate approximately 148 tons of CO<sub>2</sub> per year during Phase 1 and 16,099 tons per year during Phase 2 after the buildout. Currently, there are no standards of significant for GHG emissions for mobile sources. These emissions would occur regardless of whether the clinic is built. Such emissions would be shifted to other locations as patients travel to other clinics.

**3. ANALYSIS OF ODOR IMPACTS**

There would not be any sources of odor emissions from the proposed clinic. As a result, no odor impacts are expected.

**4. SIGNIFICANCE OF IMPACTS TO AIR QUALITY**

The Thresholds of Significance for several air pollutants relevant to the current project are as follows:

<b>Table 5-1</b>		
<b>Pollutant</b>	<b>Construction Phase Significance Levels (lbs/day)</b>	<b>Occupancy Phase Significance Levels (lbs/day)</b>
ROG	150	150
NOx	150	150
PM-10	150	150
PM-2.5	No Threshold	No Threshold
CO	No Threshold	No Threshold

A comparison of maximum daily emissions with the thresholds are shown in Table 5-1.

<b>Table 5-2 Comparison of Maximum Project Emissions with Daily Thresholds of Significance</b>					
	<b>ROG</b>	<b>NOx</b>	<b>PM-10</b>	<b>PM-2.5</b>	<b>CO</b>
	<i>(lbs/day)</i>	<i>(lbs/day)</i>	<i>(lbs/day)</i>	<i>(lbs/day)</i>	<i>(lbs/day)</i>
Construction Emissions	3.2	39.9	11.6	3.6	17.5
Maximum Occupancy Emissions (Phase 2)	3.85	18.82	0.613	0.563	223.9
Threshold of Significance	150	150	150	N/A	N/A
Impact Significant?	No	No	No	N/A	N/A

A comparison of project emissions with the thresholds of significance demonstrates that air quality impacts (construction or production) associated with this project would not be significant. The project would not be a source of toxic air pollutants or nuisance odors.

# Appendix 1

## Construction Related Emission Calculations

## Road Construction Emissions Model, Version 7.1.5.1

Emission Estimates for -> Valley Springs Clinic				Total	Exhaust	Fugitive Dust	Total	Exhaust	Fugitive Dust	CO2 (lbs/day)
Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)	PM10 (lbs/day)	PM2.5 (lbs/day)	PM2.5 (lbs/day)	PM2.5 (lbs/day)	
Grubbing/Land Clearing	2.0	10.9	16.8	10.8	0.8	10.0	2.8	0.7	2.1	1,917.6
Grading/Excavation	3.2	17.5	39.9	11.6	1.6	10.0	3.6	1.5	2.1	4,191.4
Drainage/Utilities/Sub-Grade	0.9	5.4	7.3	10.5	0.5	10.0	2.6	0.5	2.1	1,027.9
Paving	1.2	7.9	11.2	0.6	0.6	-	0.6	0.6	-	1,385.1
<b>Maximum (pounds/day)</b>	<b>3.2</b>	<b>17.5</b>	<b>39.9</b>	<b>11.6</b>	<b>1.6</b>	<b>10.0</b>	<b>3.6</b>	<b>1.5</b>	<b>2.1</b>	<b>4,191.4</b>
<b>Total (tons/construction project)</b>	<b>0.0</b>	<b>0.1</b>	<b>0.1</b>	<b>0.7</b>	<b>0.0</b>	<b>0.7</b>	<b>0.1</b>	<b>0.0</b>	<b>0.1</b>	<b>11.1</b>

Notes: Project Start Year -> 2016  
 Project Length (months) -> 8  
 Total Project Area (acres) -> 1  
 Maximum Area Disturbed/Day (acres) -> 1  
 Total Soil Imported/Exported (yd<sup>3</sup>/day)-> 1

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates for -> Valley Springs Clinic				Total	Exhaust	Fugitive Dust	Total	Exhaust	Fugitive Dust	CO2 (kgs/day)
Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	PM10 (kgs/day)	PM10 (kgs/day)	PM10 (kgs/day)	PM2.5 (kgs/day)	PM2.5 (kgs/day)	PM2.5 (kgs/day)	
Grubbing/Land Clearing	0.9	4.9	7.6	4.9	0.4	4.5	1.3	0.3	0.9	871.6
Grading/Excavation	1.5	8.0	18.1	5.3	0.7	4.5	1.6	0.7	0.9	1,905.2
Drainage/Utilities/Sub-Grade	0.4	2.5	3.3	4.8	0.2	4.5	1.2	0.2	0.9	467.2
Paving	0.5	3.6	5.1	0.3	0.3	-	0.3	0.3	-	629.6
<b>Maximum (kilograms/day)</b>	<b>1.5</b>	<b>8.0</b>	<b>18.1</b>	<b>5.3</b>	<b>0.7</b>	<b>4.5</b>	<b>1.6</b>	<b>0.7</b>	<b>0.9</b>	<b>1,905.2</b>
<b>Total (megagrams/construction project)</b>	<b>0.0</b>	<b>0.0</b>	<b>0.1</b>	<b>0.6</b>	<b>0.0</b>	<b>0.6</b>	<b>0.1</b>	<b>0.0</b>	<b>0.1</b>	<b>10.0</b>

Notes: Project Start Year -> 2016  
 Project Length (months) -> 8  
 Total Project Area (hectares) -> 0  
 Maximum Area Disturbed/Day (hectares) -> 0  
 Total Soil Imported/Exported (meters<sup>3</sup>/day)-> 1

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

**Road Construction Emissions Model  
Data Entry Worksheet**

Version 7.1.5.1



Note: Required data input sections have a yellow background.  
Optional data input sections have a blue background. Only areas with a yellow or blue background can be modified. Program defaults have a white background.  
The user is required to enter information in cells C10 through C25.

**Input Type**

Project Name	Valley Springs Clinic	
Construction Start Year	2016	Enter a Year between 2009 and 2025 (inclusive)
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	8.00	months
Predominant Soil/Site Type: Enter 1, 2, or 3	2	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length	1.00	mile
Total Project Area	1.00	acre
Maximum Area Disturbed/Day	0.50	acres
Water Trucks Used?	2	1. Yes 2. No
Soil Imported	0.00	yd <sup>3</sup> /day
Soil Exported	1.00	yd <sup>3</sup> /day
Average Truck Capacity	20	yd <sup>3</sup> (assume 20 if unknown)

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

Construction Periods	User Override of	Program					
	Construction Months	Months	2005	%	2006	%	2007
Grubbing/Land Clearing	0.10	0.80	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.10	3.60	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.25	2.40	0.00	0.00	0.00	0.00	0.00
Paving	0.10	1.20	0.00	0.00	0.00	0.00	0.00
<b>Totals</b>	<b>0.55</b>	<b>8.00</b>					

Please note: You have entered a different number of months than the project length shown in cell C13.

**NOTE: soil hauling emissions are included in the Grading/Excavation Construction Period Phase, therefore the Construction Period for Grading/Excavation cannot be zero if hauling is part of the project**

Hauling emission default values can be overridden in cells C45 through C46.

<b>Soil Hauling Emissions</b>		User Override of					
User Input	Soil Hauling Defaults	Default Values					
Miles/round trip	30.00	30					
Round trips/day	5.00	0					
Vehicle miles traveled/day (calculated)			150				
Hauling Emissions	ROG	NOx	CO	PM10	PM2.5	CO2	
Emission rate (grams/mile)	0.16	8.25	0.70	0.17	0.10	1679.86	
Emission rate (grams/trip)	0.00	0.00	0.00	0.00	0.00	0.00	
Pounds per day	0.05	2.73	0.23	0.06	0.03	555.02	
Tons per construction period	0.00	0.00	0.00	0.00	0.00	0.61	

Worker commute default values can be overridden in cells C60 through C65.

<b>Worker Commute Emissions</b>		User Override of Worker					
	Commute Default Values	Default Values					
Miles/ one-way trip	20.00	20					
One-way trips/day	2.00	2					
No. of employees: Grubbing/Land Clearing	5.00	5					
No. of employees: Grading/Excavation	5.00	18					
No. of employees: Drainage/Utilities/Sub-Grade	5.00	15					
No. of employees: Paving	5.00	11					
	ROG	NOx	CO	PM10	PM2.5	CO2	
Emission rate - Grubbing/Land Clearing (grams/mile)	0.147	0.194	1.744	0.047	0.020	443.650	
Emission rate - Grading/Excavation (grams/mile)	0.147	0.194	1.744	0.047	0.020	443.650	
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.147	0.194	1.744	0.047	0.020	443.650	
Emission rate - Paving (grams/mile)	0.147	0.194	1.744	0.047	0.020	443.650	
Emission rate - Grubbing/Land Clearing (grams/trip)	0.505	0.323	4.200	0.004	0.003	95.592	
Emission rate - Grading/Excavation (grams/trip)	0.505	0.323	4.200	0.004	0.003	95.592	
Emission rate - Draining/Utilities/Sub-Grade (gr/trip)	0.505	0.323	4.200	0.004	0.003	95.592	
Emission rate - Paving (grams/trip)	0.505	0.323	4.200	0.004	0.003	95.592	
Pounds per day - Grubbing/Land Clearing	0.076	0.093	0.861	0.021	0.009	197.546	
Tons per const. Period - Grub/Land Clear	0.000	0.000	0.001	0.000	0.000	0.217	
Pounds per day - Grading/Excavation	0.076	0.093	0.861	0.021	0.009	197.546	
Tons per const. Period - Grading/Excavation	0.000	0.000	0.001	0.000	0.000	0.217	
Pounds per day - Drainage/Utilities/Sub-Grade	0.076	0.093	0.861	0.021	0.009	197.546	
Tons per const. Period - Drain/Util/Sub-Grade	0.000	0.000	0.002	0.000	0.000	0.543	
Pounds per day - Paving	0.076	0.093	0.861	0.021	0.009	197.546	
Tons per const. Period - Paving	0.000	0.000	0.001	0.000	0.000	0.217	
tons per construction period	0.000	0.001	0.005	0.000	0.000	1.195	

Water truck default values can be overridden in cells C91 through C93 and E91 through E93.

Water Truck Emissions	User Override of	Program Estimate of	User Override of Truck	Default Values			
	Default # Water Trucks	Number of Water Trucks	Miles Traveled/Day	Miles Traveled/Day			
Grubbing/Land Clearing - Exhaust	1.00	0	2.00	0			
Grading/Excavation - Exhaust	1.00	0	2.00	0			
Drainage/Utilities/Subgrade	1.00	0	2.00	0			
	<b>ROG</b>	<b>NOx</b>	<b>CO</b>	<b>PM10</b>	<b>PM2.5</b>	<b>CO2</b>	
Emission rate - Grubbing/Land Clearing (grams/mile)	0.16	8.25	0.70	0.17	0.10	1679.86	
Emission rate - Grading/Excavation (grams/mile)	0.16	8.25	0.70	0.17	0.10	1679.86	
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.16	8.25	0.70	0.17	0.10	1679.86	
Pounds per day - Grubbing/Land Clearing	0.00	0.04	0.00	0.00	0.00	7.40	
Tons per const. Period - Grub/Land Clear	0.00	0.00	0.00	0.00	0.00	0.01	
Pound per day - Grading/Excavation	0.00	0.04	0.00	0.00	0.00	7.40	
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.01	
Pound per day - Drainage/Utilities/Subgrade	0.00	0.04	0.00	0.00	0.00	7.40	
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00	0.00	0.02	

Fugitive dust default values can be overridden in cells C110 through C112.

Fugitive Dust	User Override of Max	Default	PM10	PM10	PM2.5	PM2.5
	Acreage Disturbed/Day	Maximum Acreage/Day	pounds/day	tons/per period	pounds/day	tons/per period
Fugitive Dust - Grubbing/Land Clearing		0.5	10.0	0.0	2.1	0.0
Fugitive Dust - Grading/Excavation		0.5	10.0	0.4	2.1	0.1
Fugitive Dust - Drainage/Utilities/Subgrade		0.5	10.0	0.3	2.1	0.1

## Off-Road Equipment Emissions

Grubbing/Land Clearing	Default Number of Vehicles		ROG	CO	NOx	PM10	PM2.5
Override of Default Number of Vehicles	Program-estimate	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00
	1	Crawler Tractors	0.74	4.47	9.52	0.37	0.34
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00
	1	Excavators	0.41	2.79	4.47	0.22	0.20
		Forklifts	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00
		Graders	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00
		Scrapers	0.00	0.00	0.00	0.00	0.00
	2	Signal Boards	0.73	2.73	2.64	0.19	0.18
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00
	Grubbing/Land Clearing	pounds per day	1.9	10.0	16.6	0.8	0.7
	Grubbing/Land Clearing	tons per phase	0.0	0.0	0.0	0.0	0.0



Grading/Excavation		Default	ROG	CO	NOx	PM10	PM2.5
Override of Default Number of Vehicles	Number of Vehicles	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
	<i>Program-estimate</i>						
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00
	0	Cranes	0.00	0.00	0.00	0.00	0.00
	1	Crawler Tractors	0.74	4.47	9.52	0.37	0.34
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00
0.00	3	Excavators	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00
0.00	1	Graders	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00
0.00	2	Rollers	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00
	1	Rubber Tired Loaders	0.52	3.12	6.51	0.22	0.20
1.00	2	Scrapers	1.46	7.25	17.70	0.71	0.66
0.00	2	Signal Boards	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00
1.00	2	Tractors/Loaders/Backhoes	0.36	1.57	3.27	0.25	0.23
		Trenchers	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00
	Grading/Excavation	pounds per day	3.1	16.4	37.0	1.6	1.4
	Grading	tons per phase	0.0	0.0	0.0	0.0	0.0

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day
	Number of Vehicles	Program-estimate					
0.00	1	Aerial Lifts	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00
		Crawler Tractors	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00
	1	Generator Sets	0.51	2.98	3.86	0.27	0.25
0.00	1	Graders	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00
0.00	1	Plate Compactors	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00
0.00	1	Pumps	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00
0.00	1	Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00
0.00	2	Scrapers	0.00	0.00	0.00	0.00	0.00
0.00	2	Signal Boards	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00
1.00	2	Tractors/Loaders/Backhoes	0.36	1.57	3.27	0.25	0.23
		Trenchers	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00
	Drainage	pounds per day	0.9	4.6	7.1	0.5	0.5
	Drainage	tons per phase	0.0	0.0	0.0	0.0	0.0



Equipment default values for horsepower and hours/day can be overridden in cells C289 through C322 and E289 through E322.

Equipment	Default Values Horsepower	Default Values Hours/day
Aerial Lifts	63	8
Air Compressors	106	8
Bore/Drill Rigs	206	8
Cement and Mortar Mixers	10	8
Concrete/Industrial Saws	64	8
Cranes	226	8
Crawler Tractors	208	8
Crushing/Proc. Equipment	142	8
Excavators	163	8
Forklifts	89	8
Generator Sets	66	8
Graders	175	8
Off-Highway Tractors	123	8
Off-Highway Trucks	400	8
Other Construction Equipment	172	8
Other General Industrial Equipment	88	8
Other Material Handling Equipment	167	8
Pavers	126	8
Paving Equipment	131	8
Plate Compactors	8	8
Pressure Washers	26	8
Pumps	53	8
Rollers	81	8
Rough Terrain Forklifts	100	8
Rubber Tired Dozers	255	8
Rubber Tired Loaders	200	8
Scrapers	362	8
Signal Boards	20	8
Skid Steer Loaders	65	8
Surfacing Equipment	254	8
Sweepers/Scrubbers	64	8
Tractors/Loaders/Backhoes	98	8
Trenchers	81	8
Welders	45	8

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END OF DATA ENTRY SHEET

## Appendix 2

# Occupancy Related Emission Calculations

Table 1a

Calculation of Emissions From Light Duty Vehicles Based on 96 Single Trips (48 Round Trips) per Day, 365 Days per year

(1.23E-02 means  $1.23 \times 10^{-2}$  or 0.0123)

	Round Trips	Annual Days	Round Trip	Reactive Organic Compounds (ROG)		Oxides of Nitrogen (NOx)		Fine Particulate (PM-10)		Carbon Dioxide (CO <sub>2</sub> )	
	(Trips/day)	(days)	(miles)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)
Employees/Visitors/Patients	48	365	25	1.09E-01	1.99E-02	3.98E-01	7.26E-02	5.77E-03	1.05E-03	810.9	148.0
<b>Totals</b>	<b>48</b>			<b>0.1089</b>	<b>0.0199</b>	<b>0.3978</b>	<b>0.0726</b>	<b>0.0058</b>	<b>0.0011</b>	<b>810.9</b>	<b>148.0</b>
SCHEDULE	7	days/week									
	52	weeks/year									
	364	days/year									
CALCULATIONS											
	Daily (lbs/day) = $\frac{\text{Trips/day} \times \text{Round Trip Distance} \times \text{Emissions Factor (g/mile)}}{454 \text{ grams/lb}}$										
	Annual (tons/yr) = $\frac{\text{Lbs/day} \times \text{Number of Days}}{2000 \text{ lbs/ton}}$										

**Table 1b**  
**Calculation of Emissions From Light Duty Vehicles**  
**Based on Average of 96 Single Trips (48 Round Trips) Trips per Day, 365 Days per Year**  
*( 1.23E-02 Means 1.23 x 10<sup>-2</sup> or 0.0123)*

	Round Trips (Trips/day)	Annual Days (days)	Round Trip (miles)	Carbon Monoxide (CO)		Fine Particulate (PM-2.5)		CO <sub>2</sub>	
				(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)
Employees/Visitors/Patients	48	365	25	3.82E+00	6.97E-01	5.31E-03	9.69E-04	810.9	148.0
<b>Totals</b>				<b>3.819</b>	<b>0.697</b>	<b>0.0053</b>	<b>0.0010</b>	<b>811</b>	<b>148</b>
SCHEDULE	7	days/week							
	52	weeks/year							
	364	days/year							
CALCULATIONS									
	Daily (lbs/day) = $\frac{\text{Trips/day} \times \text{Round Trip Distance} \times \text{Emissions Factor (g/mile)}}{454 \text{ grams/lb}}$								
	Annual (tons/yr) = $\frac{\text{Lbs/day} \times \text{Number of Days}}{2000 \text{ lbs/ton}}$								
	Emission Factors: Based on EMFAC 2014 for 2017 Calendar Year for Calaveras County								

# Table 1c

## EMFAC 2014 2017 Emission Factors (Phase 1 Opening Year) for Light Duty Vehicles

EMFAC2014 (v1.0.7) Emission Rates

Region Type: County

Region: Calaveras

Calendar Year: 2017

Season: Annual

Vehicle Classification: EMFAC2011 Categories

Units: miles/day for VMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HTSK a

Region	CalYr	VehClass	MdlYr	Speed	Fuel	Population	VMT	Trips
Calaveras	2017	LDA	Aggregater	Aggregater	GAS	11765.27	522481.4	72765.93

*(gram/mile)*

ROG\_RUNEX 0.041212

CO\_RUNEX 1.445043

NOx\_RUNEX 0.150543

CO2\_RUNEX 306.8542

PM10\_RUNEX 0.002183

PM2\_5\_RUNEX 0.002009



Table 2a - Phase 2

Calculation of Emissions From Light Duty Vehicles Based on 7421 Single Trips (3711 Round Trips) per Day, 365 Days per Year

(1.23E-02 means  $1.23 \times 10^{-2}$  or 0.0123)

	Round Trips	Annual Days	Round Trip	Reactive Organic Compounds (ROG)		Oxides of Nitrogen (NOx)		Fine Particulate (PM-10)	
	(Trips/day)	(days)	(miles)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)
Employees/Visitors/Patients	7421	365	25	3.85E+00	7.02E-01	1.88E+01	3.44E+00	6.13E-01	1.12E-01
<b>Totals</b>	<b>7,421</b>			<b>3.8466</b>	<b>0.7020</b>	<b>18.8259</b>	<b>3.4357</b>	<b>0.6126</b>	<b>0.1118</b>
SCHEDULE	7	days/week							
	52	weeks/year							
	364	days/year							
CALCULATIONS	<p>Daily (lbs/day) = <math>\frac{\text{Trips/day} \times \text{Round Trip Distance} \times \text{Emissions Factor (g/mile)}}{454 \text{ grams/lb}}</math></p> <p>Annual (tons/yr) = <math>\frac{\text{Lbs/day} \times \text{Number of Days}}{2000 \text{ lbs/ton}}</math></p>								

Carbon Dioxide (CO <sub>2</sub> )	
(lbs/day)	(tons/yr)
88,214.3	16,099.1
<b>88214.3</b>	<b>16099.1</b>

**Table 2b - Phase 2**  
**Calculation of Emissions From Light Duty Vehicles**  
**Based on 7421 Single Trips (3711 Round Trips) Trips per Day, 365 Days per Year**  
*( 1.23E-02 Means  $1.23 \times 10^{-2}$  or 0.0123)*

	Round Trips (Trips/day)	Annual Days (days)	Round Trip (miles)	Carbon Monoxide (CO)		Fine Particulate (PM-2.5)	
				(lbs/day)	(tons/yr)	(lbs/day)	(tons/yr)
Employees/Visitors/Patients	7421	365	25	2.24E+02	4.09E+01	5.63E-01	1.03E-01
<b>Totals</b>	<b>7,421</b>			<b>223.920</b>	<b>40.865</b>	<b>0.5631</b>	<b>0.1028</b>
<b>SCHEDULE</b> 7 days/week 52 weeks/year 364 days/year							
<b>CALCULATIONS</b> Daily (lbs/day) = $\frac{\text{Trips/day} \times \text{Round Trip Distance} \times \text{Emissions Factor (g/mile)}}{454 \text{ grams/lb}}$ Annual (tons/yr) = $\frac{\text{Lbs/day} \times \text{Number of Days}}{2000 \text{ lbs/ton}}$ Emission Factors: Based on EMFAC 2014 for 2017 Calendar Year for Calaveras County							

CO <sub>2</sub>	
(lbs/day)	(tons/yr)
88,214.3	16,099.1
<b>88,214</b>	<b>16,099</b>

## Table 2c EMFAC 2014 2030 (Phase 2 Buildout) Emission Factors for Light Duty Vehicles

EMFAC2014 (v1.0.7) Emission Rates

Region Type: County

Region: Calaveras

Calendar Year: 2030

Season: Annual

Vehicle Classification: EMFAC2011 Categories

Units: miles/day for VMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HT

Region	Cal` VehClass	Mdlyr	Speed	Fuel	Population	VMT	Trips
Calaveras	## LDA	Aggregate	Aggregate	GAS	14869.72	645505.3	92540.11

*(g/mile)*

ROG\_RUNEX            0.009413

CO\_RUNEX            0.547957

NOx\_RUNEX           0.046069

CO2\_RUNEX           215.8704

PM10\_RUNEX         0.001499

PM2\_5\_RUNEX        0.001378