

AIR QUALITY METHODOLOGY AND ASSUMPTIONS

CONSTRUCTION EMISSIONS

Maximum daily emissions from grading equipment and grading dust were estimated using the URBEMIS-2002 program.¹ The grading and site preparation work on the entire site were assumed to be completed during one summer, and the maximum area being graded at one time was assumed to be 20.25 acres. Equipment estimates for each phase of construction were based on published guidance.² Default values were used for other parameters. Standard watering was assumed to reduce dust emissions by 50%.

NEW REGIONAL AIR POLLUTANT EMISSIONS

Estimates of regional emissions generated by project construction and operation were made using a program called URBEMIS-2002.³ URBEMIS-2002 is a program that estimates the emissions that result from various land use development projects. Land use project can include residential uses such as single-family dwelling units, apartments and condominiums, and nonresidential uses such as shopping centers, office buildings, and industrial parks. URBEMIS-2002 contains default values for much of the information needed to calculate emissions. However, project-specific, user-supplied information can also be used when it is available.

Inputs to the URBEMIS-2002 program include trip generation rates, vehicle mix, average trip length by trip type and average speed. Trip generation rates developed by the project transportation engineer were used. Average trip lengths and vehicle mixes for Mountain Counties were used. Average speed for all types of trips was assumed to be 35 MPH.

The URBEMIS-2002 program was run to calculate daily emission during the summer months with an ambient temperature of 85 degrees Fahrenheit and for winter months with an ambient temperature of 40 degrees Fahrenheit. Analysis year was 2010. A separate model run was made for summer emissions and winter emissions. The URBEMIS-2002 output is attached.

The paved road dust emission factor used by the URBEMIS-2002 program was modified in the winter model run. The silt loading value was changed to 0.6

¹ Jones and Stokes Associates, Software Users Guide: UBEMIS2002 for Windows with Enhanced Construction Module, Version 8.7, April 2005.

² Sacramento Metropolitan Air Quality Management District, Guide to Air Quality Assessment in Sacramento County, July 2004.

³ Ibid.

grams/square meter, which is the Ubiquitous Winter Baseline value during months with frozen precipitation for roads with ADTs of 500 to 5,000 in AP-42.⁴

Although the URBEMIS-2002 program will produce estimates of wood smoke emissions they were calculated using a spreadsheet program to ensure consistency with the assumptions and methods contained in the Town of Truckee Particulate Matter Air Quality Management Plan. Because of existing county policies regarding woodstoves, it was assumed all residences would use EPA Phase-II Certified appliances. Residences were assumed to burn 4.5 cords per year. Using the average density of wood of 1446.4 kilogram/cord, an annual average throughput of 14,321 pounds of wood per residence was obtained. This was multiplied by emission factors developed by the U. S. Environmental Protection Agency, assuming that half of the devices use catalytic converters and half do not. The resulting emissions were divided by the assumed burning season of 155 days to obtain a daily emission. The spreadsheet printout is attached.

⁴ U.S. Environmental Protection Agency, Compilation of Air Pollutant Emissions Factors, AP-42, Chapter 13.2.1, December 2003.

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Program Files\URBEMIS 2002 Version
 8.7\Projects2k2\canyonspringssummer.urb
 Project Name: Canyon Springs Summer
 Project Location: Mountain Counties and Rural Counties
 On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
 (Pounds/Day - Summer)

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST
PM10 *** 2007 *** DUST TOTALS (lbs/day,unmitigated) 252.51	17.20	119.50	144.58	0.00	257.82	5.31

	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST
PM10 *** 2008 *** DUST TOTALS (lbs/day,unmitigated) 0.32	22.94	143.74	157.10	0.03	5.92	5.60

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	26.25	3.52	10.29	0.10	0.04

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	24.00	37.55	302.43	0.25	44.66

SUM OF AREA AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	50.25	41.08	312.72	0.35	44.70

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Program Files\URBEMIS 2002 Version
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Project Name: Canyon Springs Summer
Project Location: Mountain Counties and Rural Counties
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Summer)

Construction Start Month and Year: May, 2007
Construction Duration: 12
Total Land Use Area to be Developed: 101 acres
Maximum Acreage Disturbed Per Day: 25.25 acres
Single Family Units: 213 Multi-Family Units: 107
Retail/Office/Institutional/Industrial Square Footage: 0

CONSTRUCTION EMISSION ESTIMATES UNMITIGATED (lbs/day)

Source	ROG	NOx	CO	SO2	PM10 TOTAL	PM10 EXHAUST	PM10 DUST
*** 2007***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	252.50	-	252.50
Off-Road Diesel	17.03	109.83	140.78	-	4.32	4.32	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.17	0.34	3.80	0.00	0.02	0.01	0.01
Maximum lbs/day	17.20	110.17	144.58	0.00	256.84	4.33	252.51
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	15.57	118.79	115.21	-	5.29	5.29	0.00
Bldg Const Worker Trips	1.17	0.71	15.00	0.00	0.31	0.01	0.30
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	0.00	-	-	-	-	-	-
Asphalt Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
Asphalt On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	16.74	119.50	130.20	0.00	5.61	5.31	0.30
Max lbs/day all phases	17.20	119.50	144.58	0.00	257.82	5.31	252.51
*** 2008***							
Phase 1 - Demolition Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 2 - Site Grading Emissions							
Fugitive Dust	-	-	-	-	0.00	-	0.00
Off-Road Diesel	0.00	0.00	0.00	-	0.00	0.00	0.00
On-Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum lbs/day	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Phase 3 - Building Construction							
Bldg Const Off-Road Diesel	15.57	113.03	119.41	-	4.83	4.83	0.00
Bldg Const Worker Trips	1.07	0.66	13.98	0.00	0.31	0.01	0.30
Arch Coatings Off-Gas	0.00	-	-	-	-	-	-
Arch Coatings Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Asphalt Off-Gas	2.86	-	-	-	-	-	-
Asphalt Off-Road Diesel	2.68	15.56	22.81	-	0.43	0.43	0.00
Asphalt On-Road Diesel	0.79	14.60	2.91	0.03	0.35	0.33	0.02
Asphalt Worker Trips	0.02	0.01	0.18	0.00	0.00	0.00	0.00
Maximum lbs/day	22.94	143.74	157.10	0.03	5.92	5.60	0.32
Max lbs/day all phases	22.94	143.74	157.10	0.03	5.92	5.60	0.32

Phase 1 - Demolition Assumptions: Phase Turned OFF

Phase 2 - Site Grading Assumptions

Start Month/Year for Phase 2: May '07

Phase 2 Duration: 1.3 months

On-Road Truck Travel (VMT): 0

Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
3	Crawler Tractors	143	0.575	8.0
3	Graders	174	0.575	8.0
3	Off Highway Trucks	417	0.490	8.0

Phase 3 - Building Construction Assumptions

Start Month/Year for Phase 3: Jun '07

Phase 3 Duration: 10.7 months

Start Month/Year for SubPhase Building: Jun '07

SubPhase Building Duration: 10.7 months

Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
8	Other Equipment	190	0.620	8.0

SubPhase Architectural Coatings Turned OFF

Start Month/Year for SubPhase Asphalt: Apr '08

SubPhase Asphalt Duration: 0.5 months

Acres to be Paved: 12

Off-Road Equipment

No.	Type	Horsepower	Load Factor	Hours/Day
1	Pavers	132	0.590	8.0
1	Rollers	114	0.430	8.0

AREA SOURCE EMISSION ESTIMATES (Summer Pounds per Day, Unmitigated)					
Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.27	3.48	1.48	0	0.01
Hearth - No summer emissions					
Landscaping	1.35	0.05	8.81	0.10	0.03
Consumer Prdcts	15.66	-	-	-	-
Architectural Coatings	8.97	-	-	-	-
TOTALS (lbs/day, unmitigated)	26.25	3.52	10.29	0.10	0.04

UNMITIGATED OPERATIONAL EMISSIONS

	ROG	NOx	CO	SO2	PM10
Single family housing	17.58	27.76	223.57	0.19	33.01
Secondary Units	6.42	9.79	78.86	0.07	11.64
TOTAL EMISSIONS (lbs/day)	24.00	37.55	302.43	0.25	44.66

Does not include correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2010 Temperature (F): 75 Season: Summer

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type	Acreage	Trip Rate	No. Units	Total Trips
Single family housing	71.00	9.57 trips/dwelling unit	213.00	2,038.41
Secondary Units	6.69	6.72 trips/dwelling unit	107.00	719.04
			Sum of Total Trips	2,757.45
			Total Vehicle Miles Traveled	29,460.87

Vehicle Assumptions:

Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	54.70	1.10	98.70	0.20
Light Truck < 3,750 lbs	15.20	2.00	96.00	2.00
Light Truck 3,751- 5,750	16.20	1.20	98.10	0.70
Med Truck 5,751- 8,500	7.30	1.40	95.90	2.70
Lite-Heavy 8,501-10,000	1.10	0.00	81.80	18.20
Lite-Heavy 10,001-14,000	0.30	0.00	66.70	33.30
Med-Heavy 14,001-33,000	1.00	0.00	20.00	80.00
Heavy-Heavy 33,001-60,000	0.90	0.00	11.10	88.90
Line Haul > 60,000 lbs	0.00	0.00	0.00	100.00
Urban Bus	0.20	0.00	50.00	50.00
Motorcycle	1.60	68.80	31.20	0.00
School Bus	0.10	0.00	0.00	100.00
Motor Home	1.40	7.10	85.70	7.20

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip Speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			

Changes made to the default values for Land Use Trip Percentages

The Trip Rate and/or Acreage values for Apartments low rise
have changed from the defaults 6.9/6.69 to 6.72/6.69

Changes made to the default values for Construction

Changes made to the default values for Area

Changes made to the default values for Operations

The operational emission year changed from 2005 to 2010.
The operational winter selection item changed from 2 to 1.
The operational summer temperature changed from 60 to 75.
The operational summer selection item changed from 4 to 5.

URBEMIS 2002 For Windows 8.7.0

File Name: C:\Program Files\URBEMIS 2002 Version
8.7\Projects2k2\canyonspringswinter.urb
Project Name: Canyon Springs Winter
Project Location: Mountain Counties and Rural Counties
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

SUMMARY REPORT
(Pounds/Day - Winter)

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	24.90	3.48	1.48	0.00	0.01

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	29.86	52.37	365.66	0.25	137.77

SUM OF AREA AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10
TOTALS (lbs/day,unmitigated)	54.76	55.85	367.14	0.25	137.78

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Project Name: Canyon Springs Winter
Project Location: Mountain Counties and Rural Counties
On-Road Motor Vehicle Emissions Based on EMFAC2002 version 2.2

DETAIL REPORT
(Pounds/Day - Winter)

AREA SOURCE EMISSION ESTIMATES (Winter Pounds per Day, Unmitigated)					
Source	ROG	NOx	CO	SO2	PM10
Natural Gas	0.27	3.48	1.48	0	0.01
Hearth	0.00	0.00	0.00	0.00	0.00
Landscaping - No winter emissions					
Consumer Prdcts	15.66	-	-	-	-
Architectural Coatings	8.97	-	-	-	-
TOTALS (lbs/day, unmitigated)	24.90	3.48	1.48	0.00	0.01

UNMITIGATED OPERATIONAL EMISSIONS

	ROG	NOx	CO	SO2	PM10
Single family housing	22.08	38.72	270.31	0.19	101.85
Secondary Units	7.79	13.66	95.35	0.07	35.93
TOTAL EMISSIONS (lbs/day)	29.86	52.37	365.66	0.25	137.77

Does not include correction for passby trips.
Does not include double counting adjustment for internal trips.

OPERATIONAL (Vehicle) EMISSION ESTIMATES

Analysis Year: 2010 Temperature (F): 40 Season: Winter

EMFAC Version: EMFAC2002 (9/2002)

Summary of Land Uses:

Unit Type	Acreage	Trip Rate	No. Units	Total Trips
Single family housing	71.00	9.57 trips/dwelling unit	213.00	2,038.41
Secondary Units	6.69	6.72 trips/dwelling unit	107.00	719.04
			Sum of Total Trips	2,757.45
			Total Vehicle Miles Traveled	29,460.87

Vehicle Assumptions:

Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	54.70	1.10	98.70	0.20
Light Truck < 3,750 lbs	15.20	2.00	96.00	2.00
Light Truck 3,751- 5,750	16.20	1.20	98.10	0.70
Med Truck 5,751- 8,500	7.30	1.40	95.90	2.70
Lite-Heavy 8,501-10,000	1.10	0.00	81.80	18.20
Lite-Heavy 10,001-14,000	0.30	0.00	66.70	33.30
Med-Heavy 14,001-33,000	1.00	0.00	20.00	80.00
Heavy-Heavy 33,001-60,000	0.90	0.00	11.10	88.90
Line Haul > 60,000 lbs	0.00	0.00	0.00	100.00
Urban Bus	0.20	0.00	50.00	50.00
Motorcycle	1.60	68.80	31.20	0.00
School Bus	0.10	0.00	0.00	100.00
Motor Home	1.40	7.10	85.70	7.20

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip Speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			

Changes made to the default values for Land Use Trip Percentages

The Trip Rate and/or Acreage values for Apartments low rise
have changed from the defaults 6.9/6.69 to 6.72/6.69

Changes made to the default values for Area

The hearth option switch changed from on to off.

Changes made to the default values for Operations

The operational emission year changed from 2005 to 2010.
The operational winter selection item changed from 2 to 1.
The operational summer temperature changed from 60 to 75.
The operational summer selection item changed from 4 to 5.
The paved road silt loading factor changed from 0.1 to 0.6

Spreadsheet to Calculate Emissions from Woodstoves and Fire Places

Project: Canyon Springs

Residences: 213

	Emission Factors (lbs/ton)*				Emissions (Pounds/Year)			
	ROC	NOx	CO	PM10	ROC	NOx	CO	PM10
Percent Conventional	0	2.8	230.8	30.6				
Percent Phase I	0	2	123.9	19.8				
Percent Phase II	100	2	122.6	15.4	20590	3050	186987	23487
Pounds Wood/Residence/Year	14321							
From Table 1.10-A EPA AP-42, Average of Noncatalytic and Catalytic"					132.8	19.6	12063.	151.5

(lbs/day)

