

APPENDIX D

Air Quality Worksheets

Greenhouse Gas (GHG) Emissions Calculations

Project Name: Lancaster

Greenhouse Gas (GHG) Emissions from Area Sources and Vehicles

	Annual Emissions		
	pounds (lbs.)	Tons	Metric Tons
URBEMIS2007 Area Emissions	6,402,000	3,201	2,904
URBEMIS2007 Vehicle Emissions	225,548,000	112,774	102,307
Total Emissions (area sources + vehicles)	231,950,000	115,975	105,211

Indirect Greenhouse Gas (GHG) Emissions from Project use of Electricity (Power Plant Emissions)

Estimated Project Annual Electrical Use: 2,083,927 kWh (kilowatt hours)/year
2,084 mWh (megawatt hours)/year

Indirect GHG gases	Emission Factor lb/mWh	Annual		CO2 Equivalent Factor	Annual
		Project Electricity mWh	GHGs metric tons		CO2 Equivalent Emissions (metric tons)
Carbon Dioxide (CO2)	878.71	2,084	831	1	831
Nitrous Oxide (N2O)	0.0037	2,084	0.0	296	1
Methane (CH4)	0.0067	2,084	0.0	23	0
Total Indirect GHG Emissions from Project Electricity Use=					832

Total Annual Greenhouse Gas (GHG) Emission from Project Operations -- All Sources (CO2 equivalent Metric Tons)

Area Sources	2,904	2.7%
Vehicles	102,307	96.5%
Electrical Use	832	0.8%
Total=	106,043	100.0%

Notes and References:

Total Emissions from Indirect Electricity Use
Formula and Emission Factor from The California Climate Action Registry Report Protocol 2006

Pg. 32 (CCARRP) gives Equations

Pg. 36 (CCARRP - April 2008 update) gives CO2 output emission rate (lbs/mWh)
878.71 (lbs/mWh)

Pg. 85 (CCARRP) gives CO2 equivalency factors

Pg. 87 (CCARRP) gives Methane and Nitrous Oxide electricity emission factors (lbs/mWh)
Methane - 0.0067 (lbs/mWh)
Nitrous Oxide - 0.0037 (lbs/mWh)

lbs/metric ton = 2204.62

Percentage of 25,000 424.2%
Percentage of 174 Million 0.061%

Construction CO2	Tons from URBEMIS 22530	Metric Tons 20439
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Detail Report for Summer Construction Mitigated Emissions (Pounds/Day)

File Name: H:\Projects\206xxx\D206453.00 - Lancaster Commercial Shopping Center EIR\04 Work Products\04.1 Technical Data\Air and Noise\new with fuel market.urb924

Project Name: Lancaster

Project Location: Los Angeles County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Mitigated)

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10 Dust</u>	<u>PM10 Exhaust</u>	<u>PM10 Total</u>	<u>PM2.5 Dust</u>	<u>PM2.5 Exhaust</u>	<u>PM2.5 Total</u>	<u>CO2</u>
Time Slice 3/3/2008-3/21/2008 Active Days: 15	1.36	8.76	6.15	0.00	0.01	0.68	0.69	0.00	0.63	0.63	824.75
Demolition 03/03/2008-03/21/2008	1.36	8.76	6.15	0.00	0.01	0.68	0.69	0.00	0.63	0.63	824.75
Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Off Road Diesel	1.31	8.68	4.91	0.00	0.00	0.68	0.68	0.00	0.62	0.62	700.30
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Worker Trips	0.04	0.08	1.24	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.45
Time Slice 3/24/2008-6/20/2008 Active Days: 65	3.36	28.08	14.81	0.00	63.41	1.41	64.82	13.24	1.30	14.54	2,371.76
Mass Grading 03/24/2008-06/20/2008	3.36	28.08	14.81	0.00	63.41	1.41	64.82	13.24	1.30	14.54	2,371.76
Mass Grading Dust	0.00	0.00	0.00	0.00	63.40	0.00	63.40	13.24	0.00	13.24	0.00
Mass Grading Off Road Diesel	3.31	28.00	13.56	0.00	0.00	1.41	1.41	0.00	1.30	1.30	2,247.32
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.04	0.08	1.24	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.45

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Time Slice 6/23/2008-8/1/2008	3.36	28.08	14.81	0.00	63.41	1.41	64.82	13.24	1.30	14.54	2,371.76
Active Days: 30											
Fine Grading 06/23/2008-08/01/2008	3.36	28.08	14.81	0.00	63.41	1.41	64.82	13.24	1.30	14.54	2,371.76
Fine Grading Dust	0.00	0.00	0.00	0.00	63.40	0.00	63.40	13.24	0.00	13.24	0.00
Fine Grading Off Road Diesel	3.31	28.00	13.56	0.00	0.00	1.41	1.41	0.00	1.30	1.30	2,247.32
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.04	0.08	1.24	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.45
Time Slice 8/4/2008-8/15/2008	2.37	20.19	9.71	0.00	0.01	1.00	1.01	0.00	0.92	0.92	1,839.09
Active Days: 10											
Trenching 08/04/2008-08/15/2008	2.37	20.19	9.71	0.00	0.01	1.00	1.01	0.00	0.92	0.92	1,839.09
Trenching Off Road Diesel	2.33	20.12	8.46	0.00	0.00	1.00	1.00	0.00	0.92	0.92	1,714.64
Trenching Worker Trips	0.04	0.08	1.24	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.45
Time Slice 8/18/2008-8/29/2008	4.63	24.38	15.06	0.01	0.03	1.93	1.96	0.01	1.77	1.78	2,180.75
Active Days: 10											
Asphalt 08/18/2008-08/29/2008	4.63	24.38	15.06	0.01	0.03	1.93	1.96	0.01	1.77	1.78	2,180.75
Paving Off-Gas	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	3.37	20.00	10.53	0.00	0.00	1.73	1.73	0.00	1.59	1.59	1,418.44
Paving On Road Diesel	0.33	4.21	1.73	0.00	0.02	0.19	0.21	0.01	0.18	0.18	482.30
Paving Worker Trips	0.09	0.17	2.80	0.00	0.01	0.01	0.02	0.00	0.01	0.01	280.01
Time Slice 9/1/2008-12/31/2008	5.13	23.11	36.70	0.03	0.12	1.55	1.67	0.04	1.42	1.46	4,384.35
Active Days: 88											
Building 09/01/2008-04/24/2009	5.13	23.11	36.70	0.03	0.12	1.55	1.67	0.04	1.42	1.46	4,384.35
Building Off Road Diesel	4.07	18.22	11.80	0.00	0.00	1.33	1.33	0.00	1.22	1.22	1,621.20
Building Vendor Trips	0.32	3.53	2.92	0.01	0.02	0.16	0.18	0.01	0.15	0.15	565.24
Building Worker Trips	0.74	1.36	21.98	0.02	0.10	0.06	0.16	0.04	0.05	0.09	2,197.91
Time Slice 1/1/2009-4/24/2009	4.84	21.90	34.73	0.03	0.12	1.48	1.60	0.04	1.36	1.40	4,383.31
Active Days: 82											
Building 09/01/2008-04/24/2009	4.84	21.90	34.73	0.03	0.12	1.48	1.60	0.04	1.36	1.40	4,383.31
Building Off Road Diesel	3.87	17.35	11.50	0.00	0.00	1.28	1.28	0.00	1.17	1.17	1,621.20
Building Vendor Trips	0.30	3.31	2.72	0.01	0.02	0.15	0.16	0.01	0.13	0.14	565.30
Building Worker Trips	0.67	1.24	20.51	0.02	0.10	0.06	0.16	0.04	0.05	0.09	2,196.82

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Time Slice 4/27/2009-5/22/2009	<u>266.15</u>	0.24	4.01	0.00	0.02	0.01	0.03	0.01	0.01	0.02	429.07
Active Days: 20											
Coating 04/27/2009-05/22/2009	266.15	0.24	4.01	0.00	0.02	0.01	0.03	0.01	0.01	0.02	429.07
Architectural Coating	266.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.13	0.24	4.01	0.00	0.02	0.01	0.03	0.01	0.01	0.02	429.07

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Architectural Coating 4/27/2009 - 5/22/2009 - Default Architectural Coating

Description
For Nonresidential Architectural Coating Measures, the Nonresidential Exterior: Use Low VOC Coatings mitigation reduces emissions by:
ROG: 10%

For Nonresidential Architectural Coating Measures, the Nonresidential Interior: Use Low VOC Coatings mitigation reduces emissions by:
ROG: 10%

Phase Assumptions

Phase: Demolition 3/3/2008 - 3/21/2008 - Default Demolition Description

- Building Volume Total (cubic feet): 0
- Building Volume Daily (cubic feet): 0
- On Road Truck Travel (VMT): 0
- Off-Road Equipment:
 - 1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day
 - 1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day
 - 2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Fine Grading 6/23/2008 - 8/1/2008 - Default Fine Site Grading/Excavation Description

- Total Acres Disturbed: 12.67
- Maximum Daily Acreage Disturbed: 3.17
- Fugitive Dust Level of Detail: Default
- 20 lbs per acre-day
- On Road Truck Travel (VMT): 0
- Off-Road Equipment:
 - 1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day
 - 1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day
 - 1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

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1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 3/24/2008 - 6/20/2008 - Default Mass Site Grading/Excavation Description

Total Acres Disturbed: 12.67

Maximum Daily Acreage Disturbed: 3.17

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 8/4/2008 - 8/15/2008 - Default Trenching Description

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Paving 8/18/2008 - 8/29/2008 - Default Paving Description

Acres to be Paved: 3.17

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 9/1/2008 - 4/24/2009 - Default Building Construction Description

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

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3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 4/27/2009 - 5/22/2009 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100

Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50

Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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Summary Report for Annual Emissions (Tons/Year)

File Name: H:\Projects\206xxx\D206453.00 - Lancaster Commercial Shopping Center EIR\04 Work Products\04.1 Technical Data\Air and Noise\new with fuel market.urb924

Project Name: Lancaster

Project Location: Los Angeles County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10 Dust</u>	<u>PM10 Exhaust</u>	<u>PM10</u>	<u>PM2.5 Dust</u>	<u>PM2.5 Exhaust</u>	<u>PM2.5</u>	<u>CO2</u>
2008 TOTALS (tons/year unmitigated)	0.43	2.64	2.49	0.00	3.02	0.16	3.17	0.63	0.14	0.77	331.85
2008 TOTALS (tons/year mitigated)	0.43	2.64	2.49	0.00	3.02	0.16	3.17	0.63	0.14	0.77	331.85
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2009 TOTALS (tons/year unmitigated)	3.16	0.90	1.46	0.00	0.01	0.06	0.07	0.00	0.06	0.06	184.01
2009 TOTALS (tons/year mitigated)	2.86	0.90	1.46	0.00	0.01	0.06	0.07	0.00	0.06	0.06	184.01
Percent Reduction	9.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AREA SOURCE EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (tons/year, unmitigated)	0.38	0.50	1.00	0.00	0.00	0.00	585.21

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OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (tons/year, unmitigated)	23.44	35.00	267.68	0.22	37.83	7.49	21,944.98

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (tons/year, unmitigated)	23.82	35.50	268.68	0.22	37.83	7.49	22,530.19

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Summary Report for Summer Emissions (Pounds/Day)

File Name: H:\Projects\206xxx\D206453.00 - Lancaster Commercial Shopping Center EIR\04 Work Products\04.1 Technical Data\Air and Noise\new with fuel market.urb924

Project Name: Lancaster

Project Location: Los Angeles County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10 Dust</u>	<u>PM10 Exhaust</u>	<u>PM10</u>	<u>PM2.5 Dust</u>	<u>PM2.5 Exhaust</u>	<u>PM2.5</u>	<u>CO2</u>
2008 TOTALS (lbs/day unmitigated)	5.13	28.08	36.70	0.03	63.41	1.93	64.82	13.24	1.77	14.54	4,384.35
2008 TOTALS (lbs/day mitigated)	5.13	28.08	36.70	0.03	63.41	1.93	64.82	13.24	1.77	14.54	4,384.35
2009 TOTALS (lbs/day unmitigated)	295.70	21.90	34.73	0.03	0.12	1.48	1.60	0.04	1.36	1.40	4,383.31
2009 TOTALS (lbs/day mitigated)	266.15	21.90	34.73	0.03	0.12	1.48	1.60	0.04	1.36	1.40	4,383.31

AREA SOURCE EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	2.07	2.71	5.45	0.00	0.01	0.01	3,206.64

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	122.74	180.03	1,474.56	1.28	207.30	41.08	123,982.72

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	124.81	182.74	1,480.01	1.28	207.31	41.09	127,189.36

Urbemis 2007 Version 9.2.4

Summary Report for Winter Emissions (Pounds/Day)

File Name: H:\Projects\206xxx\D206453.00 - Lancaster Commercial Shopping Center EIR\04 Work Products\04.1 Technical Data\Air and Noise\new with fuel market.urb924

Project Name: Lancaster

Project Location: Los Angeles County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10 Dust</u>	<u>PM10 Exhaust</u>	<u>PM10</u>	<u>PM2.5 Dust</u>	<u>PM2.5 Exhaust</u>	<u>PM2.5</u>	<u>CO2</u>
2008 TOTALS (lbs/day unmitigated)	5.13	28.08	36.70	0.03	63.41	1.93	64.82	13.24	1.77	14.54	4,384.35
2008 TOTALS (lbs/day mitigated)	5.13	28.08	36.70	0.03	63.41	1.93	64.82	13.24	1.77	14.54	4,384.35
2009 TOTALS (lbs/day unmitigated)	295.70	21.90	34.73	0.03	0.12	1.48	1.60	0.04	1.36	1.40	4,383.31
2009 TOTALS (lbs/day mitigated)	266.15	21.90	34.73	0.03	0.12	1.48	1.60	0.04	1.36	1.40	4,383.31

AREA SOURCE EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	1.81	2.67	2.24	0.00	0.00	0.00	3,201.14

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	139.90	215.27	1,451.03	1.06	207.30	41.08	112,773.91

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	<u>ROG</u>	<u>NOx</u>	<u>CO</u>	<u>SO2</u>	<u>PM10</u>	<u>PM2.5</u>	<u>CO2</u>
TOTALS (lbs/day, unmitigated)	141.71	217.94	1,453.27	1.06	207.30	41.08	115,975.05