

**Broadway Lofts
Evaluation of Global Climate Change Impacts**

**Table GHG-1
Summary of Annual GHG Emissions**

Emissions Scenario	Construction Emissions		Operational Direct Emissions		Operational Indirect Emissions				Total
	Total Construction (MTCO ₂ e)	Amortized* Construction (MTCO ₂ e)	Motor Vehicles (MTCO ₂ e/yr)	Area Sources (MTCO ₂ e/yr)	Electricity (MTCO ₂ e/yr)	Solid Waste (MTCO ₂ e/yr)	Water (MTCO ₂ e/yr)	Wastewater (MTCO ₂ e/yr)	Emissions (MTCO ₂ e/yr)
Without AB32 Measures									
BAU Project	1,663.05	55.44	4,802	706	893	240	105	14	6,817
Proposed Project	1,663.05	55.44	3,818	591	674	240	95	14	5,487
Project Reduction from BAU	-	-	984	116	219	-	11	(0)	1,329
Percent Reduction from BAU	0.0%	0.0%	20.5%	16.4%	24.5%	0.0%	10.0%	0.0%	19.5%
With AB32 Measures									
BAU Project	1,663.05	55.44	4,802	706	893	240	105	14	6,817
Proposed Project	1,663.05	55.44	2,684	535	427	240	95	14	4,050
Project Reduction from BAU	-	-	2,118	172	466	-	11	(0)	2,767
Percent Reduction from BAU	0.0%	0.0%	44.1%	24.3%	52.2%	0.0%	10.0%	0.0%	40.6%

* Amortized over the "project lifetime" (30 years). Included in the total emissions.

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**Table GHG-2
AB 32 Measures¹**

Emissions Source	California Legislation	Reduction from 2020 GHG Inventory (%)	Land Use End Use Sector	Included in Project Reductions?
Mobile	AB 1493 (Pavley Phase 1 and 2) Passenger Vehicle Efficiency Low Carbon Fuel Standard	19.7%	On-road transportation (passenger, light-duty)	YES
Mobile		2.8%	On-road transportation (passenger, light-duty)	YES
Mobile		7.2%	On-road transportation (passenger, light-duty)	YES
Mobile	Heavy/Medium Duty Efficiency Low Carbon Fuel Standard	2.9%	On-road transportation (heavy- and medium-duty)	NO
Mobile		7.2%	On-road transportation (heavy- and medium-duty)	YES
Area	Energy Efficiency - Natural Gas	9.5%	Natural gas (residential)	YES
Area		9.5%	Natural gas (commercial)	YES
Indirect	Energy Efficiency - Electricity	15.7%	Electricity	YES
Indirect	Renewables Portfolio Standard (33%) ²	21.0%	Electricity (exclude Cogen)	YES
Indirect	Solar Roof Initiative	1.5%	Electricity (exclude Cogen)	NO

Sources:

1. California Air Resources Board, *Climate Change Scoping Plan*, (2008).
2. California Energy Commission, *2007 Net System Power Report, Commission Report*, (2008) 4-5.

The CEC estimated that about 12 percent of California's retail electric load was met with renewable resources, including wind, solar, geothermal, small hydroelectric, biomass, and biogas.

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**Table GHG-3
Construction Exhaust GHG Emission Factors**

Equipment Type	CO₂ Emission Factor¹ (kg/gal)	CH₄ Emission Factor^{2,3} (kg/gal)	N₂O Emission Factor^{2,3} (kg/gal)	CO₂ to CO₂e Ratio (GWP CH₄ = 21) (GWP N₂O = 310)
Off-Road	10.15	0.00058	0.00026	0.991
On-Road	10.15	0.000031	0.000029	0.999
Vendor	10.15	0.000031	0.000029	0.999
Autos ⁴	n/a	n/a	n/a	0.950

Sources:

1. California Climate Action Registry, *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions Version 3.1*, (2009) 96.
2. California Climate Action Registry, *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions Version 3.1*, (2009) 98, 100.
3. California Energy Commission, *Diesel Use in California, Remarks by Commissioner James D. Boyd*, (2002). It was assumed that heavy duty on-road trucks have a fuel economy of 6 miles per gallon based on this data source.
4. U.S. Environmental Protection Agency, *Emission Facts - Greenhouse Gas Emissions from a Typical Passenger Vehicle*, (2005) 4. It is assumed that CO₂ accounts for 95% of the greenhouse gas emissions, while CH₄, N₂O, and HFCs account for 5% of emissions.

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Table GHG-4
Construction Exhaust GHG Emissions

Construction Year	Equipment Type	Annual CO ₂ Emissions ¹ (Tons CO ₂ /yr)	Annual CO ₂ Emissions (MTCO ₂ /yr)	CO ₂ to CO ₂ e Ratio	Annual CO ₂ e Emissions (MTCO ₂ e/yr)
2010	Off-Road	68.85	62.46	0.991	63.03
2010	On-Road	130.89	118.74	0.999	118.85
2010	Vendor	-	-	0.999	-
2010	Worker/Autos	3.72	3.37	0.950	3.55
Total 2010		203.46	184.58		185.44
2011	Off-Road	321.16	291.35	0.991	294.01
2011	On-Road	61.33	55.64	0.999	55.69
2011	Vendor	116.47	105.66	0.999	105.76
2011	Worker/Autos	418.97	380.08	0.950	400.09
Total 2011		917.93	832.73		855.55
2012	Off-Road	260.97	236.75	0.991	238.91
2012	On-Road	0.12	0.11	0.999	0.11
2012	Vendor	85.28	77.36	0.999	77.44
2012	Worker/Autos	192.65	174.77	0.950	183.97
Total 2012		539.02	488.99		500.43
Total					1,541.42
Total over "Project Lifetime" (30 years)					51.38

Sources:

1. Estimated CO₂ emissions from URBEMIS2007.

Where:

CH ₄	Methane	kg	Kilograms
CO ₂	Carbon dioxide	MT	Metric ton
CO ₂ e	Carbon dioxide equivalent	N ₂ O	Nitrous oxide
gal	Gallons	yr	Year
GWP	Global warming potential		

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**Table GHG-5
Construction Water GHG Emissions**

Construction Phase	Area (acres)	Duration (days)	Water Intensity ¹ (gal/acre)	Water Frequency (#/day)	Water Consumption (gal)	Electrical Consumption Factor ^{2,3,4} (kW-hr/MG)	Electrical Consumption (MW-hr)	CO ₂ Emission Factor ⁵ GWP = 1 (lbs/MW-hr)	CH ₄ Emission Factor ⁶ GWP = 21 (lbs/MW-hr)	N ₂ O Emission Factor ⁶ GWP = 310 (lbs/MW-hr)	CO ₂ e Emissions (MTCO ₂ e)
Grading/Excavation/Trenching	0.80	44	213.81	3							
Supply & Conveyance					22,578.51	9,727	219.62	1,065.00	0.029	0.011	106.49
Treatment					22,578.51	111	2.51	1,065.00	0.029	0.011	1.22
Distribution					22,578.51	1,272	28.72	1,065.00	0.029	0.011	13.93
Recycled Water					-	875	-	1,065.00	0.029	0.011	-
Subtotal											121.64
Total											121.64
Total over "Project Lifetime" (30 years)											4.05

Sources:

- U.S. Environmental Protection Agency, *User's Guide: Emission Control Technologies and Emission Factors for Unpaved Road Fugitive Emissions*, (1987) 20. Water intensity is based on 0.2 liters per square meter and converted to gallons per acre.
- California Energy Commission, *California's Water-Energy Relationship, Final Staff Report*, CEC-700-2005-011-SF, (2005) 26.
- California Energy Commission, *Refining Estimates of Water-Related Energy Use in California, PIER Final Project Report*, CEC-500-2006-118, (2006) 22.
- R. C. Wilkinson, et. al, California Department of Water Resources, *Water Sources "Powering" Southern California*, n.d. Recycled water is estimated to use 285 kW-hr per acre-foot (West Basin Municipal Water District).
- California Climate Action Registry, "Climate Action Registry Reporting Online Tool," <https://www.climateregistry.org/CARROT/public/reports.aspx>. 2010. See *2005 Annual Entity Emissions: Electric Power Generation/Electric Utility Sector, Glendale Water & Power*. The CO₂ factor is for Glendale Water & Power. The CO₂ factor is based on the 2005 value, the latest year for which data is available.
- The Climate Registry, *Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories*, Version 1.1, (2010) 208. For BAU Project: The CH₄ and N₂O factors are based on the average of the 2002-2004 values. For Proposed Project: The CH₄ and N₂O factors are based on the 2004 values.

Where:

CH ₄	Methane	lbs	Pounds
CO ₂	Carbon dioxide	MG	Million gallons
CO ₂ e	Carbon dioxide equivalent	MW-hr	Megawatt-hour
gal	Gallons	MT	Metric ton
GWP	Global warming potential	N ₂ O	Nitrous oxide
kW-hr	Kilowatt-hour		

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Table GHG-6
Operational Motor Vehicle GHG Emissions

Emissions Scenario	ITE Code	Units	Base Trip Rate ¹ (ADT/unit)	Annual CO ₂ Emissions ² (Tons CO ₂ /yr)	AB 32 Reductions in Place ³ (%)	CO ₂ to CO ₂ e Ratio ⁴	Annual CO ₂ e Emissions (MTCO ₂ e/yr)	
							w/o AB 32	w/ AB 32
BAU Project								
Apartments (mid rise)	230	248.00 DU	6.65	2,702.65	0.0%	0.95	2,580.85	2,580.85
High-turnover (sit-down) Rest.	932	14.06 ksf	127.15	1,227.28	0.0%	0.95	1,171.97	1,171.97
Restaurant/Entertainment	N/A	12.59 ksf	127.15	1,098.97	0.0%	0.95	1,049.44	1,049.44
Subtotal				5,028.90			4,802.26	4,802.26
Proposed Project								
Apartments (mid rise)	230	248.00 DU	3.33	1,231.81	29.7%	0.95	1,176.29	826.93
High-turnover (sit-down) Rest.	932	14.06 ksf	63.60	1,180.87	29.7%	0.95	1,127.65	792.74
Restaurant/Entertainment	N/A	12.59 ksf	95.35	1,585.28	29.7%	0.95	1,513.83	1,064.23
Subtotal				3,997.96			3,817.78	2,683.90
Proposed Project Reduction from BAU							984.48	2,118.36
Percent Reduction from BAU							20.5%	44.1%

Sources:

1. Linscott, Law & Greenspan, Engineers, *Traffic and Parking Analysis: Broadway Lofts Project*, (2010).
2. Estimated CO₂ emissions from URBEMIS2007 Environmental Management Software.
3. California Air Resources Board, *Climate Change Scoping Plan*, (2008). See Table GHG-2.
4. U.S. Environmental Protection Agency, *Emission Facts - Greenhouse Gas Emissions from a Typical Passenger Vehicle*, (2005) 4. It is assumed that CO₂ accounts for 95% of the greenhouse gas emissions, while CH₄, N₂O, and HFCs account for 5% of the emissions.

Where:

ADT Average daily trips
CO₂ Carbon dioxide
CO₂e Carbon dioxide equivalent

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**Table GHG-7
Vehicle Miles Traveled Adjustment in URBEMIS2007**

Emissions Scenario	Trip Type	Urban			Rural		
		VMT Reduction ¹ (%)	Base Trip Length ² (miles/trip)	Adjusted Trip Length (miles/trip)	VMT Reduction ¹ (%)	Base Trip Length ² (miles/trip)	Adjusted Trip Length (miles/trip)
BAU Project	Home-based Work	0.0%	12.7	12.7	0.0%	16.8	16.8
	Home-based Shop	0.0%	7.0	7.0	0.0%	7.1	7.1
	Home-based Other	0.0%	9.5	9.5	0.0%	7.9	7.9
	Commercial-based Commute	0.0%	13.3	13.3	0.0%	14.7	14.7
	Commercial-based Non-Work	0.0%	7.4	7.4	0.0%	6.6	6.6
	Commercial-based Customer	0.0%	8.9	8.9	0.0%	6.6	6.6
Proposed Project	Home-based Work	20.0%	12.7	10.2	0.0%	16.8	16.8
	Home-based Shop	20.0%	7.0	5.6	0.0%	7.1	7.1
	Home-based Other	20.0%	9.5	7.6	0.0%	7.9	7.9
	Commercial-based Commute	20.0%	13.3	10.6	0.0%	14.7	14.7
	Commercial-based Non-Work	20.0%	7.4	5.9	0.0%	6.6	6.6
	Commercial-based Customer	20.0%	8.9	7.1	0.0%	6.6	6.6

Sources:

- California Air Pollution Control Officer's Association, *CEQA and Climate Change*, (2008).
Vehicle Miles Traveled-Reduction Features include:
- *MM D-12: Infill Development - Infill development reduces VMT by 20%.*
- URBEMIS2007 (version 9.2.4) Environmental Management Software. Project was modeled using the "urban" setting.

Where:

VMT Vehicle miles traveled

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**Table GHG-8
Area Source GHG Emissions**

Emissions Scenario	Efficiency Standards ^{1,2}			CO ₂ Emission Factor GWP = 1 (kg/MMBtu)	CH ₄ Emission Factor GWP = 21 (kg/MMBtu)	N ₂ O Emission Factor GWP = 310 (kg/MMBtu)	Annual CO ₂ Emissions (Tons CO ₂ /yr)	AB 32 Reductions in Place ⁶ (%)	Annual CO ₂ e Emissions (MTCO ₂ e/yr)	
	Title 24 2008 (%)	Other Features (%)	Cumulative Efficiency (%)						w/o AB 32	w/ AB 32
	BAU Project									
Natural Gas ³	0.00%	0.00%	0.00%	56.06	0.005	0.0001	774.39	0.0%	704.22	704.22
Landscape Maintenance ⁴	-	-	-	70.88	0.011	0.0006	1.51	0.0%	1.38	1.38
Hearths (Natural Gas) ³	-	-	-	56.06	0.005	0.0001	0.88	0.0%	0.80	0.80
Hearths (Wood) ⁵	-	-	-	93.87	0.316	0.0042	-	0.0%	-	-
Subtotal							776.78		706.40	706.40
Proposed Project										
Natural Gas ³ (Non-Res.)	9.40%	10.00%	18.46%	56.06	0.005	0.0001	647.10	9.5%	588.46	532.56
(Multi-Fam Res.)	7.00%	10.00%	16.30%	(Multi-family nat. gas emissions included in above calcs; Title 24 efficiency shown for informational purposes.)						
Landscape Maintenance ⁴	-	-	-	70.88	0.011	0.0006	1.54	0.0%	1.41	1.41
Hearths (Natural Gas) ³	-	-	-	56.06	0.005	0.0001	0.88	0.0%	0.80	0.80
Hearths (Wood) ⁵	-	-	-	93.87	0.316	0.0042	-	0.0%	-	-
Subtotal							649.52		590.67	534.76
Proposed Project Reduction from BAU									115.73	171.63
Percent Reduction from BAU									16.4%	24.3%

Sources:

- California Energy Commission, *Impact Analysis: 2008 Update to the California Energy Efficiency Standards*, (2007) 6.
- The project would be designed to achieve LEED Silver Certification, which is assumed to achieve a minimum 10% reduction in energy consumption.
- URBEMIS2007 uses a CO₂ emission factor of 120,000 pounds per million cubic feet for natural gas. This value was converted to kg/MMBtu based on 1.03 therms per cubic feet.
- California Climate Action Registry, *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions*, Version 3.1, (2009) 101, 103. Landscape maintenance equipment were assumed to be fueled with motor gasoline.
- California Climate Action Registry, *General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions*, Version 3.1, (2009) 102, 103.
- California Air Resources Board, *Climate Change Scoping Plan*, (2008).

Where:

CH ₄	Methane	MMBtu	Million British thermal units
CO ₂	Carbon dioxide	MT	Metric ton
CO ₂ e	Carbon dioxide equivalent	N ₂ O	Nitrous oxide
GWP	Global warming potential	yr	Year
kg	Kilogram		

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**Table GHG-9
Electrical Consumption GHG Emissions**

Emissions Scenario	Units	Efficiency Standards ¹ Title 24 2008 (%)	Energy Efficiency Features ² (%)	Electricity Consumption Factor ^{3,4} (kW-hr/unit/yr)	Annual Consumption Factor (MW-hr/yr)	CO ₂ Emission Factor ⁵ GWP = 1 (lbs/MW-hr)	CH ₄ Emission Factor ⁶ GWP = 21 (lbs/MW-hr)	N ₂ O Emission Factor ⁶ GWP = 310 (lbs/MW-hr)	AB 32 Reductions in Place ⁷ (%)	Annual CO ₂ e Emissions (MTCO ₂ e/yr)	
										w/o AB 32	w/ AB 32
BAU Project											
Multi-Family Housing	248 DU	0.0%	0.0%	5,626.50	1,395.37	1,065.00	0.030	0.011	0.0%	676.57	676.57
Other Commercial	26,642 sf	0.0%	0.0%	16.75	446.25	1,065.00	0.030	0.011	0.0%	216.37	216.37
Subtotal					1,841.63					892.94	892.94
Proposed Project											
Multi-Family Housing	248 DU	19.7%	10.0%	4,066.27	1,008.44	1,065.00	0.029	0.011	36.7%	488.99	309.53
Other Commercial	26,642 sf	4.9%	10.0%	14.34	381.95	1,065.00	0.029	0.011	36.7%	185.21	117.24
Subtotal					1,390.38					674.20	426.77
Proposed Project Reduction from BAU										218.74	466.17
Percent Reduction from BAU										24.5%	52.2%

Sources:

- California Energy Commission, *Impact Analysis: 2008 Update to the California Energy Efficiency Standards*, (2007) 4.
- The project would be designed to achieve LEED Silver Certification, which is assumed to achieve a minimum 10% reduction in energy consumption.
- California Air Pollution Control Officer's Association, *CEQA and Climate Change*, (2008) 61.
- South Coast Air Quality Management District, *CEQA Air Quality Handbook*, (1993) A9-114.
- California Climate Action Registry, "Climate Action Registry Reporting Online Tool," <https://www.climateregistry.org/CARROT/public/reports.aspx>. 2010. See *2005 Annual Entity Emissions: Electric Power Generation/Electric Utility Sector, Glendale Water & Power*.
The CO₂ factor is for Glendale Water & Power. The CO₂ factor is based on the 2005 value, the latest year for which data is available.
- The Climate Registry, *Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories*, Version 1.1, (2010) 208.
For BAU Project: The CH₄ and N₂O factors are based on the statewide average of the 2002-2004 values. For Proposed Project: The CH₄ and N₂O factors are based on the statewide 2004 values.
- California Air Resources Board, *Climate Change Scoping Plan*, (2008).

Where:

CH ₄	Methane	Pounds
CO ₂	Carbon dioxide	Megawatt-hour
CO ₂ e	Carbon dioxide equivalent	Metric ton
gsf	Gross square feet	Not applicable
GWP	Global warming potential	Nitrous oxide
kW-hr	Kilowatt-hour	Year

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**Table GHG-10
Solid Waste GHG Emissions**

Emissions Scenario	Units	Solid Waste Generation¹ (MT/yr)	CO₂e Emission Factor² (MT CO₂e/MT waste)	Annual CO₂e Emissions (MT CO₂e/yr)
BAU Project				
Multi-Family Housing	248 DU	77.11	0.37	28.53
Other Commercial	26,642 sf	9.98	0.37	3.69
Subtotal		648.46		239.93
Proposed Project				
Multi-Family Housing	248 DU	77.11	0.37	28.53
Other Commercial	26,642 sf	9.98	0.37	3.69
Subtotal		648.46		239.93
Proposed Project Reduction from BAU				-
Percent Reduction from BAU				0.0%

Sources:

1. Impact Sciences, *Broadway Lofts Project Draft EIR, Section 4.9, Utilities and Service Systems*, (2010). Values converted to metric tons.
2. U.S. Environmental Protection Agency, *Solid Waste Management and Greenhouse Gases: A Lifecycle Assessment of Emissions and Sinks* (2006) 93. The net CO₂e emission factors are based on mixed municipal solid waste (MSW) as disposed in landfills without landfill gas recovery.

Where:

CO ₂ e	Carbon dioxide equivalent
gsf	Gross square feet
MT	Metric ton
yr	Year

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**Table GHG-11
Potable Water Supply, Conveyance, Treatment, and Distribution GHG Emissions**

Emissions Scenario	Water Saving Features ¹ (%)	Potable Water Estimate ² (MG/yr)	Electrical Consumption Factor ^{3,4,5} (kW-hr/MG)	Annual Electrical Consumption (MW-hr/yr)	CO ₂ Emission Factor ⁶ GWP = 1 (lbs/MW-hr)	CH ₄ Emission Factor ⁷ GWP = 21 (lbs/MW-hr)	N ₂ O Emission Factor ⁷ GWP = 310 (lbs/MW-hr)	Annual CO ₂ e Emissions (MTCO ₂ e/yr)
BAU Project								
Supply & Conveyance	0.00%	19.55	9,727	190.16	1,065.00	0.030	0.011	92.20
Treatment		19.55	111	2.17	1,065.00	0.030	0.011	1.05
Distribution		19.55	1,272	24.87	1,065.00	0.030	0.011	12.06
Recycled Water		-	875	-	1,065.00	0.030	0.011	-
Subtotal								105.31
Proposed Project								
Supply & Conveyance	10.00%	17.60	9,727	171.15	1,065.00	0.029	0.011	82.99
Treatment		17.60	111	1.95	1,065.00	0.029	0.011	0.95
Distribution		17.60	1,272	22.38	1,065.00	0.029	0.011	10.85
Recycled Water		-	875	-	1,065.00	0.029	0.011	-
Subtotal								94.79
Proposed Project Reduction from BAU								10.52
Percent Reduction from BAU								9.99%

Sources:

- Project Applicant.
Water-Saving Features include:
- The project would be designed to achieve LEED Silver Certification. (assumed 10% reduction in water demand).
- Impact Sciences, *Broadway Lofts Project Draft EIR, Section 4.9 Utilities and Service Systems*, (2010).
- California Energy Commission, *California's Water-Energy Relationship, Final Staff Report*, CEC-700-2005-011-SF, (2005) 26.
- California Energy Commission, *Refining Estimates of Water-Related Energy Use in California, PIER Final Project Report*, CEC-500-2006-118, (2006) 22.
- R. C. Wilkinson, et. al, California Department of Water Resources, *Water Sources "Powering" Southern California*, n.d.
Recycled water is estimated to use 285 kW-hr per acre-foot (West Basin Municipal Water District).
- California Climate Action Registry, "Climate Action Registry Reporting Online Tool," <https://www.climateregistry.org/CARROT/public/reports.aspx>. 2010. See *2005 Annual Entity Emissions: Electric Power Generation/Electric Utility Sector, Glendale Water & Power*.
The CO₂ factor is for Glendale Water & Power. The CO₂ factor is based on the 2005 value, the latest year for which data is available.
- The Climate Registry, *Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories*, Version 1.1, (2010) 208.

For BAU Project: The CH₄ and N₂O factors are based on the average of the 2002-2004 values. For Proposed Project: The CH₄ and N₂O factors are based on the 2004 values.

Where:

CH ₄	Methane	MG	Million gallons
CO ₂	Carbon dioxide	MW-hr	Megawatt-hour
CO ₂ e	Carbon dioxide equivalent	MT	Metric ton
GWP	Global warming potential	n/a	Not applicable
KW-hr	Kilowatt-hour	N ₂ O	Nitrous oxide
lbs	Pounds	yr	Year

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**Table GHG-12
Wastewater Treatment Electrical Demand GHG Emissions**

Emissions Scenario	Net Wastewater Generation Rate¹ (MG/yr)	Electrical Demand Factor² (kW-hr/MG)	Annual Demand Factor (MW-hr/yr)	CO₂ Emission Factor³ GWP = 1 (lbs/MW-hr)	CH₄ Emission Factor⁴ GWP = 21 (lbs/MW-hr)	N₂O Emission Factor⁴ GWP = 310 (lbs/MW-hr)	Annual CO₂e Emissions (MT CO₂e/yr)
BAU Project							
Multi-Family Housing	7.24	1,911	13.84	1,065.00	0.030	0.011	6.71
Other Commercial	8.40	1,911	16.05	1,065.00	0.030	0.011	7.78
Subtotal	15.64						14.49
Proposed Project							
Multi-Family Housing	7.24	1,911	13.84	1,065.00	0.029	0.011	6.71
Other Commercial	8.40	1,911	16.05	1,065.00	0.029	0.011	7.78
Subtotal	15.64						14.49
Proposed Project Reduction from BAU							(0.00)
Percent Reduction from BAU							-0.01%

Sources:

1. Impact Sciences, *Broadway Lofts Project Draft EIR, Section 4.9, Utilities and Service Systems*, (2010).
2. California Energy Commission, *Refining Estimates of Water-Related Energy Use in California, PIER Final Project Report (CEC-500-2006-118)*. Prepared by Navigant Consulting, Inc., (2006) 22.
3. California Climate Action Registry, "Climate Action Registry Reporting Online Tool," <https://www.climateregistry.org/CARROT/public/reports.aspx>. 2010. See *2005 Annual Entity Emissions: Electric Power Generation/Electric Utility Sector, Glendale Water & Power*.
The CO₂ factor is for Glendale Water & Power. The CO₂ factor is based on the 2005 value, the latest year for which data is available.
4. The Climate Registry, *Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories, Version 1.1*, (2010) 208.
For BAU Project: The CH₄ and N₂O factors are based on the statewide average of the 2002-2004 values. For Proposed Project: The CH₄ and N₂O factors are based on the statewide 2004 values.

Where:

CH ₄	Methane	MG	Million gallons
CO ₂	Carbon dioxide	MT	Metric ton
CO ₂ e	Carbon dioxide equivalent	MW-hr	Megawatt-hour
GWP	Global warming potential	N ₂ O	Nitrous oxide
kW-hr	Kilowatt-hour	yr	Year
lbs	Pounds		

Combined Annual Emissions Reports (Tons/Year)

File Name: Z:\Air Quality\1067.01 Broadway Lofts\Emissions\Broadway Lofts Construction - Project.urb924

Project Name: Broadway Lofts - Construction

Project Location: South Coast AQMD

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

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	<u>CO2</u>
2010 TOTALS (tons/year unmitigated)	203.46
2010 TOTALS (tons/year mitigated)	203.46
Percent Reduction	0.00
2011 TOTALS (tons/year unmitigated)	917.93
2011 TOTALS (tons/year mitigated)	917.93
Percent Reduction	0.00
2012 TOTALS (tons/year unmitigated)	539.02
2012 TOTALS (tons/year mitigated)	539.02
Percent Reduction	0.00

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	<u>CO2</u>
2010	203.46
Demolition 11/01/2010-11/30/2010	75.62
Fugitive Dust	0.00
Demo Off Road Diesel	10.80
Demo On Road Diesel	63.72
Demo Worker Trips	1.11
Mass Grading 12/01/2010-01/31/2011	127.84
Mass Grading Dust	0.00
Mass Grading Off Road Diesel	58.06
Mass Grading On Road Diesel	67.17
Mass Grading Worker Trips	2.61
2011	917.93
Mass Grading 12/01/2010-01/31/2011	116.72
Mass Grading Dust	0.00
Mass Grading Off Road Diesel	53.01
Mass Grading On Road Diesel	61.33
Mass Grading Worker Trips	2.38
Building 02/01/2011-08/31/2011	573.14
Building Off Road Diesel	170.54
Building Vendor Trips	74.07
Building Worker Trips	328.53

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Building 09/01/2011-08/31/2012	228.07
Building Off Road Diesel	97.61
Building Vendor Trips	42.40
Building Worker Trips	88.06
2012	539.02
Building 09/01/2011-08/31/2012	458.72
Building Off Road Diesel	196.35
Building Vendor Trips	85.28
Building Worker Trips	177.09
Asphalt 03/01/2012-08/31/2012	76.38
Paving Off-Gas	0.00
Paving Off Road Diesel	64.63
Paving On Road Diesel	0.12
Paving Worker Trips	11.63
Coating 03/01/2012-08/31/2012	3.92
Architectural Coating	0.00
Coating Worker Trips	3.92

Phase Assumptions

Phase: Demolition 11/1/2010 - 11/30/2010 - Default Demolition Description

Building Volume Total (cubic feet): 2161701

Building Volume Daily (cubic feet): 98397.69

On Road Truck Travel (VMT): 1366.63

Off-Road Equipment:

1 Air Compressors (106 hp) operating at a 0.48 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

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Phase: Mass Grading 12/1/2010 - 1/31/2011 - Default Mass Site Grading/Excavation Description

Total Acres Disturbed: 0.8

Maximum Daily Acreage Disturbed: 0.8

Fugitive Dust Level of Detail: High

Onsite Haulage: 125.35 ton-miles/day; Offsite haulage: 0 ton-mils/day

On Road Truck Travel (VMT): 1378.12

Off-Road Equipment:

- 1 Air Compressors (106 hp) operating at a 0.48 load factor for 8 hours per day
- 1 Bore/Drill Rigs (291 hp) operating at a 0.75 load factor for 8 hours per day
- 1 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 8 hours per day
- 1 Cranes (399 hp) operating at a 0.43 load factor for 8 hours per day
- 1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day
- 1 Other Equipment (190 hp) operating at a 0.62 load factor for 8 hours per day
- 2 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: Paving 3/1/2012 - 8/31/2012 - Default Paving Description

Acres to be Paved: 0.2

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
- 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 9/1/2011 - 8/31/2012 - Building Construction (Latter)

Off-Road Equipment:

- 2 Air Compressors (106 hp) operating at a 0.48 load factor for 8 hours per day
- 2 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 8 hours per day
- 1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day
- 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 Pumps (53 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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Phase: Building Construction 2/1/2011 - 8/31/2011 - Building Construction (Initial)

Off-Road Equipment:

- 2 Air Compressors (106 hp) operating at a 0.48 load factor for 8 hours per day
- 2 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 8 hours per day
- 1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day
- 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 Pumps (53 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

Phase: Architectural Coating 3/1/2012 - 8/31/2012 - 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

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	<u>CO2</u>
2010	203.46
Demolition 11/01/2010-11/30/2010	75.62
Fugitive Dust	0.00
Demo Off Road Diesel	10.80
Demo On Road Diesel	63.72
Demo Worker Trips	1.11
Mass Grading 12/01/2010-01/31/2011	127.84
Mass Grading Dust	0.00
Mass Grading Off Road Diesel	58.06
Mass Grading On Road Diesel	67.17
Mass Grading Worker Trips	2.61

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2011	917.93
Mass Grading 12/01/2010-01/31/2011	116.72
Mass Grading Dust	0.00
Mass Grading Off Road Diesel	53.01
Mass Grading On Road Diesel	61.33
Mass Grading Worker Trips	2.38
Building 02/01/2011-08/31/2011	573.14
Building Off Road Diesel	170.54
Building Vendor Trips	74.07
Building Worker Trips	328.53
Building 09/01/2011-08/31/2012	228.07
Building Off Road Diesel	97.61
Building Vendor Trips	42.40
Building Worker Trips	88.06
2012	539.02
Building 09/01/2011-08/31/2012	458.72
Building Off Road Diesel	196.35
Building Vendor Trips	85.28
Building Worker Trips	177.09
Asphalt 03/01/2012-08/31/2012	76.38
Paving Off-Gas	0.00
Paving Off Road Diesel	64.63
Paving On Road Diesel	0.12
Paving Worker Trips	11.63
Coating 03/01/2012-08/31/2012	3.92
Architectural Coating	0.00
Coating Worker Trips	3.92

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Mass Grading 12/1/2010 - 1/31/2011 - Default Mass Site Grading/Excavation Description

For Soil Stabilizing Measures, the Water exposed surfaces 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

For Soil Stabilizing Measures, the Equipment loading/unloading mitigation reduces emissions by:

PM10: 69% PM25: 69%

For Unpaved Roads Measures, the Manage haul road dust 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: Z:\Air Quality\1067.01 Broadway Lofts\GHG Emissions\Broadway Lofts Operational - BAU.urb924

Project Name: Broadway Lofts - Operational BAU

Project Location: South Coast AQMD

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

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

	<u>CO2</u>
TOTALS (tons/year, unmitigated)	776.78

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	<u>CO2</u>
TOTALS (tons/year, unmitigated)	5,028.90

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	<u>CO2</u>
TOTALS (tons/year, unmitigated)	5,805.68

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

<u>Source</u>	<u>CO2</u>
Natural Gas	774.39
Hearth	0.88
Landscape	1.51
Consumer Products	
Architectural Coatings	
TOTALS (tons/year, unmitigated)	776.78

Area Source Changes to Defaults

Percent residential using natural gas changed from 78% to 100%

Percentage of residences with wood stoves changed from 10% to 0%

Percentage of residences with wood fireplaces changed from 5% to 0%

Percentage of residences with natural gas fireplaces changed from 85% to 100%

The number of persons per household for consumer product use changed from 3 persons to 1.17 persons

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

<u>Source</u>	<u>CO2</u>
Apartments mid rise	2,702.65
High turnover (sit-down) rest.	1,227.28
Restaurant/Entertainment	1,098.97
TOTALS (tons/year, unmitigated)	5,028.90

Operational Settings:

Includes correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2005 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Apartments mid rise	6.53	6.65	dwelling units	248.00	1,649.20	14,587.18
High turnover (sit-down) rest.		127.15	1000 sq ft	14.06	1,787.73	6,543.53
Restaurant/Entertainment		127.15	1000 sq ft	12.59	1,600.82	5,859.39
					5,037.75	26,990.10

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	52.5	2.9	96.7	0.4
Light Truck < 3750 lbs	7.5	6.7	89.3	4.0
Light Truck 3751-5750 lbs	22.1	1.4	98.1	0.5
Med Truck 5751-8500 lbs	10.2	2.0	98.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	1.8	0.0	83.3	16.7
Lite-Heavy Truck 10,001-14,000 lbs	0.5	0.0	60.0	40.0
Med-Heavy Truck 14,001-33,000 lbs	1.0	0.0	20.0	80.0
Heavy-Heavy Truck 33,001-60,000 lbs	0.6	0.0	0.0	100.0
Other Bus	0.1	0.0	100.0	0.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	2.7	85.2	14.8	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	0.8	12.5	75.0	12.5

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	12.7	7.0	9.5	13.3	7.4	8.9
Rural Trip Length (miles)	17.6	12.1	14.9	15.4	9.6	12.6
Trip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
High turnover (sit-down) rest.				5.0	2.5	92.5
Restaurant/Entertainment				5.0	2.5	92.5

Combined Annual Emissions Reports (Tons/Year)

File Name: N:\Work\Pasadena Server-Air Quality\1067.01 Broadway Lofts\Emissions\Broadway Lofts Operational - Project.urb924

Project Name: Broadway Lofts - Operational

Project Location: South Coast AQMD

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

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

AREA SOURCE EMISSION ESTIMATES

	<u>CO2</u>
TOTALS (tons/year, unmitigated)	776.81
TOTALS (tons/year, mitigated)	649.52
Percent Reduction	16.39

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	<u>CO2</u>
TOTALS (tons/year, unmitigated)	3,997.96
TOTALS (tons/year, mitigated)	3,997.96
Percent Reduction	0.00

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	<u>CO2</u>
TOTALS (tons/year, unmitigated)	4,774.77
TOTALS (tons/year, mitigated)	4,647.48
Percent Reduction	2.67

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

<u>Source</u>	<u>CO2</u>
Natural Gas	774.39
Hearth	0.88
Landscape	1.54
Consumer Products	
Architectural Coatings	
TOTALS (tons/year, unmitigated)	776.81

Area Source Mitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Mitigated

<u>Source</u>	<u>CO2</u>
Natural Gas	647.10
Hearth	0.88
Landscape	1.54
Consumer Products	
Architectural Coatings	
TOTALS (tons/year, mitigated)	649.52

Area Source Changes to Defaults

Percent residential using natural gas changed from 78% to 100%

Percentage of residences with wood stoves changed from 10% to 0%

Percentage of residences with wood fireplaces changed from 5% to 0%

Percentage of residences with natural gas fireplaces changed from 85% to 100%

The number of persons per household for consumer product use changed from 3 persons to 1.17 persons

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Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

<u>Source</u>	CO2
Apartments mid rise	1,231.81
High turnover (sit-down) rest.	1,180.87
Restaurant/Entertainment	1,585.28
TOTALS (tons/year, unmitigated)	3,997.96

Operational Mitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Mitigated

<u>Source</u>	CO2
Apartments mid rise	1,231.81
High turnover (sit-down) rest.	1,180.87
Restaurant/Entertainment	1,585.28
TOTALS (tons/year, mitigated)	3,997.96

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2012 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Apartments mid rise	6.53	3.33	dwelling units	248.00	825.84	6,685.50
High turnover (sit-down) rest.		63.60	1000 sq ft	14.06	894.22	6,478.59
Restaurant/Entertainment		95.35	1000 sq ft	12.59	1,200.46	8,697.31
					2,920.52	21,861.40

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	51.5	0.6	99.2	0.2
Light Truck < 3750 lbs	7.3	1.4	95.9	2.7
Light Truck 3751-5750 lbs	23.0	0.4	99.6	0.0
Med Truck 5751-8500 lbs	10.7	0.9	99.1	0.0
Lite-Heavy Truck 8501-10,000 lbs	1.6	0.0	81.2	18.8
Lite-Heavy Truck 10,001-14,000 lbs	0.5	0.0	60.0	40.0
Med-Heavy Truck 14,001-33,000 lbs	0.9	0.0	22.2	77.8
Heavy-Heavy Truck 33,001-60,000 lbs	0.5	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	2.8	60.7	39.3	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	0.9	0.0	88.9	11.1

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.2	5.6	7.6	10.6	5.9	7.1
Rural Trip Length (miles)	17.6	12.1	14.9	15.4	9.6	12.6
Trip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
High turnover (sit-down) rest.				5.0	2.5	92.5
Restaurant/Entertainment				5.0	2.5	92.5