APPENDIX D
AIR QUALITY DATA

Sares Site, Sunnyvale - 2016: Applicant Proposed

Santa Clara County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
Apartments Mid Rise	205	Dwelling Unit
Parking Structure	331	Space

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**		**Utility Company**	Pacific Gas & Electric Company
Climate Zone	4		2.2		
		Precipitation Freq (Days)			
			58		

1.3 User Entered Comments

Project Characteristics - CO2 Intensity Factor (370.00 lb/MWh) for 2016 obtained from CPUC GHG Calculator version 3c.

Land Use - Lot acreage from Project Description. Square footage from Project Description.

Construction Phase - Phasing schedule provided by project applicant.

Architectural Coating - Adjusted to 150 g/L VOC in accordance with BAAQMD, Regulation 8, Rule 3.

Vehicle Trips - Daily trip generation rate provided by TJKM.

Woodstoves - No woodstoves, no wood fireplaces, possible gas-powered fireplaces.

Area Coating - Adjusted to 150 g/L VOC in accordance with BAAQMD, Regulation 8, Rule 3.

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	3.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**3.56**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.03	0.02	1.56	0.00		0.00	0.01		0.00	0.01	0.00	2.51	2.51	0.00	0.00	2.57
Energy	0.01	0.10	0.04	0.00		0.00	0.01		0.00	0.01	0.00	242.87	242.87	0.01	0.01	244.94
Mobile	1.04	1.75	9.22	0.02	1.49	0.07	1.57	0.06	0.07	0.14	0.00	1,319.19	1,319.19	0.06	0.00	1,320.41
Waste						0.00	0.00		0.00	0.00	19.14	0.00	19.14	1.13	0.00	42.90
Water						0.00	0.00		0.00	0.00	0.00	17.23	17.23	0.41	0.01	29.11
Total	**3.08**	**1.87**	**10.82**	**0.02**	**1.49**	**0.07**	**1.59**	**0.06**	**0.07**	**0.16**	**19.14**	**1,581.80**	**1,600.94**	**1.61**	**0.02**	**1,639.93**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Area	2.03	0.02	1.56	0.00		0.00	0.01		0.00	0.01	0.00	2.51	2.51	0.00	0.00	2.57
Energy	0.01	0.09	0.04	0.00		0.00	0.01		0.00	0.01	0.00	219.40	219.40	0.01	0.01	221.28
Mobile	1.04	1.75	9.22	0.02	1.49	0.07	1.57	0.06	0.07	0.14	0.00	1,319.19	1,319.19	0.06	0.00	1,320.41
Waste						0.00	0.00		0.00	0.00	19.14	0.00	19.14	1.13	0.00	42.90
Water						0.00	0.00		0.00	0.00	0.00	17.23	17.23	0.41	0.01	29.11
Total	**3.08**	**1.86**	**10.82**	**0.02**	**1.49**	**0.07**	**1.59**	**0.06**	**0.07**	**0.16**	**19.14**	**1,558.33**	**1,577.47**	**1.61**	**0.02**	**1,616.27**

3.0 Construction Detail

3.2 Architectural Coating - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	3.56					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**3.56**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

4.0 Mobile Detail

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.04	1.75	9.22	0.02	1.49	0.07	1.57	0.06	0.07	0.14	0.00	1,319.19	1,319.19	0.06	0.00	1,320.41
Unmitigated	1.04	1.75	9.22	0.02	1.49	0.07	1.57	0.06	0.07	0.14	0.00	1,319.19	1,319.19	0.06	0.00	1,320.41
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	1,365.30	1,467.80	1244.35	3,041,965	3,041,965
Parking Structure	0.00	0.00	0.00		
Total	1,365.30	1,467.80	1,244.35	3,041,965	3,041,965

4.3 Trip Type Information

	Miles			Trip %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW
Apartments Mid Rise	12.40	4.30	5.40	26.10	29.10	44.80
Parking Structure	9.50	7.30	7.30	0.00	0.00	0.00

5.0 Energy Detail

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.00	0.00		0.00	0.00	0.00	114.83	114.83	0.01	0.00	116.07
Electricity Unmitigated						0.00	0.00		0.00	0.00	0.00	123.67	123.67	0.01	0.00	125.01
NaturalGas Mitigated	0.01	0.09	0.04	0.00		0.00	0.01		0.00	0.01	0.00	104.57	104.57	0.00	0.00	105.21
NaturalGas Unmitigated	0.01	0.10	0.04	0.00		0.00	0.01		0.00	0.01	0.00	119.20	119.20	0.00	0.00	119.93
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	tons/yr										MT/yr					
Apartments Mid Rise	2.23372e+006	0.01	0.10	0.04	0.00		0.00	0.01		0.00	0.01	0.00	119.20	119.20	0.00	0.00	119.93
Parking Structure	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		**0.01**	**0.10**	**0.04**	**0.00**		**0.00**	**0.01**		**0.00**	**0.01**	**0.00**	**119.20**	**119.20**	**0.00**	**0.00**	**119.93**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	tons/yr										MT/yr					
Apartments Mid Rise	1.9596e+006	0.01	0.09	0.04	0.00		0.00	0.01		0.00	0.01	0.00	104.57	104.57	0.00	0.00	105.21
Parking Structure	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		**0.01**	**0.09**	**0.04**	**0.00**		**0.00**	**0.01**		**0.00**	**0.01**	**0.00**	**104.57**	**104.57**	**0.00**	**0.00**	**105.21**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
Apartments Mid Rise	736883					123.67	0.01	0.00	125.01
Parking Structure	0					0.00	0.00	0.00	0.00
Total						**123.67**	**0.01**	**0.00**	**125.01**

Mitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
Apartments Mid Rise	684180					114.83	0.01	0.00	116.07
Parking Structure	0					0.00	0.00	0.00	0.00
Total						**114.83**	**0.01**	**0.00**	**116.07**

6.0 Area Detail

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.03	0.02	1.56	0.00		0.00	0.01		0.00	0.01	0.00	2.51	2.51	0.00	0.00	2.57
Unmitigated	2.03	0.02	1.56	0.00		0.00	0.01		0.00	0.01	0.00	2.51	2.51	0.00	0.00	2.57
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.36					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	1.62					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.05	0.02	1.56	0.00		0.00	0.01		0.00	0.01	0.00	2.51	2.51	0.00	0.00	2.57
Total	**2.03**	**0.02**	**1.56**	**0.00**		**0.00**	**0.01**		**0.00**	**0.01**	**0.00**	**2.51**	**2.51**	**0.00**	**0.00**	**2.57**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.36					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Consumer Products	1.62					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.05	0.02	1.56	0.00		0.00	0.01		0.00	0.01	0.00	2.51	2.51	0.00	0.00	2.57
Total	**2.03**	**0.02**	**1.56**	**0.00**		**0.00**	**0.01**		**0.00**	**0.01**	**0.00**	**2.51**	**2.51**	**0.00**	**0.00**	**2.57**

7.0 Water Detail

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr				MT/yr			
Mitigated					17.23	0.41	0.01	29.11
Unmitigated					17.23	0.41	0.01	29.11
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
Apartments Mid Rise	13.3566 / 8.42045					17.23	0.41	0.01	29.11
Parking Structure	0 / 0					0.00	0.00	0.00	0.00
Total						**17.23**	**0.41**	**0.01**	**29.11**

Mitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e

Land Use	Mgal	tons/yr				MT/yr			
Apartments Mid Rise	13.3566 / 8.42045					17.23	0.41	0.01	29.11
Parking Structure	0 / 0					0.00	0.00	0.00	0.00
Total						**17.23**	**0.41**	**0.01**	**29.11**

8.0 Waste Detail

Category/Year

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
	tons/yr				MT/yr			
Mitigated					19.14	1.13	0.00	42.90
Unmitigated					19.14	1.13	0.00	42.90
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
Apartments Mid Rise	94.3					19.14	1.13	0.00	42.90
Parking Structure	0					0.00	0.00	0.00	0.00
Total						**19.14**	**1.13**	**0.00**	**42.90**

Mitigated

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
Apartments Mid Rise	94.3					19.14	1.13	0.00	42.90
Parking Structure	0					0.00	0.00	0.00	0.00
Total						**19.14**	**1.13**	**0.00**	**42.90**

9.0 Vegetation

Sares Site, Sunnyvale - 2018: Full Buildout

Santa Clara County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
Parking Structure	419	Space
Apartments Mid Rise	259	Dwelling Unit

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**		**Utility Company**	Pacific Gas & Electric Company
Climate Zone	4		2.2		
		Precipitation Freq (Days)			
			58		

1.3 User Entered Comments

Project Characteristics - CO2 Intensity Factor (327.74 lb/MWh) for 2016 obtained from CPUC GHG Calculator version 3c.

Land Use - Lot acreage from Project Description. Square footage from Project Description.

Vehicle Trips - Daily trip generation rate provided by TJKM.

Woodstoves - No woodstoves, no wood fireplaces, possible gas-powered fireplaces.

Area Coating - Adjusted to 150 g/L VOC in accordance with BAAQMD, Regulation 8, Rule 3.

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.50	0.02	1.96	0.00		0.00	0.01		0.00	0.01	0.00	3.18	3.18	0.00	0.00	3.24
Energy	0.02	0.13	0.06	0.00		0.00	0.01		0.00	0.01	0.00	289.00	289.00	0.02	0.01	291.61
Mobile	1.13	1.88	9.80	0.02	1.86	0.09	1.95	0.03	0.08	0.11	0.00	1,536.85	1,536.85	0.07	0.00	1,538.28
Waste						0.00	0.00		0.00	0.00	24.18	0.00	24.18	1.43	0.00	54.20
Water						0.00	0.00		0.00	0.00	0.00	19.30	19.30	0.52	0.01	34.31
Total	**3.65**	**2.03**	**11.82**	**0.02**	**1.86**	**0.09**	**1.97**	**0.03**	**0.08**	**0.13**	**24.18**	**1,848.33**	**1,872.51**	**2.04**	**0.02**	**1,921.64**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.50	0.02	1.96	0.00		0.00	0.01		0.00	0.01	0.00	3.18	3.18	0.00	0.00	3.24
Energy	0.01	0.11	0.05	0.00		0.00	0.01		0.00	0.01	0.00	260.62	260.62	0.01	0.01	263.00
Mobile	1.13	1.88	9.80	0.02	1.86	0.09	1.95	0.03	0.08	0.11	0.00	1,536.85	1,536.85	0.07	0.00	1,538.28
Waste						0.00	0.00		0.00	0.00	24.18	0.00	24.18	1.43	0.00	54.20
Water						0.00	0.00		0.00	0.00	0.00	19.30	19.30	0.52	0.01	34.31
Total	**3.64**	**2.01**	**11.81**	**0.02**	**1.86**	**0.09**	**1.97**	**0.03**	**0.08**	**0.13**	**24.18**	**1,819.95**	**1,844.13**	**2.03**	**0.02**	**1,893.03**

4.0 Mobile Detail

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.13	1.88	9.80	0.02	1.86	0.09	1.95	0.03	0.08	0.11	0.00	1,536.85	1,536.85	0.07	0.00	1,538.28
Unmitigated	1.13	1.88	9.80	0.02	1.86	0.09	1.95	0.03	0.08	0.11	0.00	1,536.85	1,536.85	0.07	0.00	1,538.28
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	1,693.86	1,854.44	1572.13	3,793,705	3,793,705
Parking Structure	0.00	0.00	0.00		
Total	1,693.86	1,854.44	1,572.13	3,793,705	3,793,705

4.3 Trip Type Information

	Miles			Trip %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW
Apartments Mid Rise	12.40	4.30	5.40	26.10	29.10	44.80
Parking Structure	9.50	7.30	7.30	0.00	0.00	0.00

5.0 Energy Detail

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.00	0.00		0.00	0.00	0.00	128.50	128.50	0.01	0.00	130.08
Electricity Unmitigated						0.00	0.00		0.00	0.00	0.00	138.40	138.40	0.01	0.00	140.10
NaturalGas Mitigated	0.01	0.11	0.05	0.00		0.00	0.01		0.00	0.01	0.00	132.12	132.12	0.00	0.00	132.92
NaturalGas Unmitigated	0.02	0.13	0.06	0.00		0.00	0.01		0.00	0.01	0.00	150.60	150.60	0.00	0.00	151.52
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	tons/yr										MT/yr					
Apartments Mid Rise	2.82211e+006	0.02	0.13	0.06	0.00		0.00	0.01		0.00	0.01	0.00	150.60	150.60	0.00	0.00	151.52
Parking Structure	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		**0.02**	**0.13**	**0.06**	**0.00**		**0.00**	**0.01**		**0.00**	**0.01**	**0.00**	**150.60**	**150.60**	**0.00**	**0.00**	**151.52**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	tons/yr										MT/yr					
Apartments Mid Rise	2.47578e+006	0.01	0.11	0.05	0.00		0.00	0.01		0.00	0.01	0.00	132.12	132.12	0.00	0.00	132.92
Parking Structure	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Total		**0.01**	**0.11**	**0.05**	**0.00**		**0.00**	**0.01**		**0.00**	**0.01**	**0.00**	**132.12**	**132.12**	**0.00**	**0.00**	**132.92**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
Apartments Mid Rise	930988					138.40	0.01	0.00	140.10
Parking Structure	0					0.00	0.00	0.00	0.00
Total						**138.40**	**0.01**	**0.00**	**140.10**

Mitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
Apartments Mid Rise	864403					128.50	0.01	0.00	130.08
Parking Structure	0					0.00	0.00	0.00	0.00
Total						**128.50**	**0.01**	**0.00**	**130.08**

6.0 Area Detail

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.50	0.02	1.96	0.00		0.00	0.01		0.00	0.01	0.00	3.18	3.18	0.00	0.00	3.24
Unmitigated	2.50	0.02	1.96	0.00		0.00	0.01		0.00	0.01	0.00	3.18	3.18	0.00	0.00	3.24

Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.44					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	2.00					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.06	0.02	1.96	0.00		0.00	0.01		0.00	0.01	0.00	3.18	3.18	0.00	0.00	3.24
Total	**2.50**	**0.02**	**1.96**	**0.00**		**0.00**	**0.01**		**0.00**	**0.01**	**0.00**	**3.18**	**3.18**	**0.00**	**0.00**	**3.24**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.44					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	2.00					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.06	0.02	1.96	0.00		0.00	0.01		0.00	0.01	0.00	3.18	3.18	0.00	0.00	3.24
Total	**2.50**	**0.02**	**1.96**	**0.00**		**0.00**	**0.01**		**0.00**	**0.01**	**0.00**	**3.18**	**3.18**	**0.00**	**0.00**	**3.24**

7.0 Water Detail

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr				MT/yr			
Mitigated					19.30	0.52	0.01	34.31
Unmitigated					19.30	0.52	0.01	34.31
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
Apartments Mid Rise	16.8749 / 10.6385					19.30	0.52	0.01	34.31
Parking Structure	0 / 0					0.00	0.00	0.00	0.00
Total						**19.30**	**0.52**	**0.01**	**34.31**

Mitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
Apartments Mid Rise	16.8749 / 10.6385					19.30	0.52	0.01	34.31
Parking Structure	0 / 0					0.00	0.00	0.00	0.00
Total						**19.30**	**0.52**	**0.01**	**34.31**

8.0 Waste Detail

Category/Year

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
	tons/yr				MT/yr			
Mitigated					24.18	1.43	0.00	54.20
Unmitigated					24.18	1.43	0.00	54.20
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
Apartments Mid Rise	119.14					24.18	1.43	0.00	54.20
Parking Structure	0					0.00	0.00	0.00	0.00
Total						**24.18**	**1.43**	**0.00**	**54.20**

Mitigated

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
Apartments Mid Rise	119.14					24.18	1.43	0.00	54.20
Parking Structure	0					0.00	0.00	0.00	0.00
Total						**24.18**	**1.43**	**0.00**	**54.20**

9.0 Vegetation

Raintree Site, Sunnyvale - 2017: Applicant Proposed

Santa Clara County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
Apartments Mid Rise	465	Dwelling Unit
Parking Structure	811	Space

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**		**Utility Company**	Pacific Gas & Electric Company
Climate Zone	4		2.2		
		Precipitation Freq (Days)			
			58		

1.3 User Entered Comments

Project Characteristics - CO2 Intensity Factor (348.86 lb/MWh) for 2016 obtained from CPUC GHG Calculator version 3c.

Land Use - Lot acreage from Project Description. Square footage from Project Description.

Construction Phase - Phasing schedule provided by project applicant.

Architectural Coating - Adjusted to 150 g/L VOC in accordance with BAAQMD, Regulation 8, Rule 3.

Vehicle Trips - Daily trip generation rate provided by TJKM.

Woodstoves - No woodstoves, no wood fireplaces, possible gas-powered fireplaces.

Area Coating - Adjusted to 150 g/L VOC in accordance with BAAQMD, Regulation 8, Rule 3.

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2015	2.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2016	5.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**8.46**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	4.48	0.04	3.53	0.00		0.00	0.02		0.00	0.02	0.00	5.70	5.70	0.01	0.00	5.82
Energy	0.03	0.23	0.10	0.00		0.00	0.02		0.00	0.02	0.00	534.87	534.87	0.03	0.01	539.57
Mobile	2.22	3.66	19.26	0.04	3.39	0.16	3.55	0.14	0.16	0.30	0.00	2,891.35	2,891.35	0.13	0.00	2,894.00
Waste						0.00	0.00		0.00	0.00	43.42	0.00	43.42	2.57	0.00	97.31
Water						0.00	0.00		0.00	0.00	0.00	36.86	36.86	0.93	0.02	63.81
Total	**6.73**	**3.93**	**22.89**	**0.04**	**3.39**	**0.16**	**3.59**	**0.14**	**0.16**	**0.34**	**43.42**	**3,468.78**	**3,512.20**	**3.67**	**0.03**	**3,600.51**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	4.48	0.04	3.53	0.00		0.00	0.02		0.00	0.02	0.00	5.70	5.70	0.01	0.00	5.82
Energy	0.02	0.20	0.09	0.00		0.00	0.02		0.00	0.02	0.00	482.78	482.78	0.02	0.01	487.05
Mobile	2.22	3.66	19.26	0.04	3.39	0.16	3.55	0.14	0.16	0.30	0.00	2,891.35	2,891.35	0.13	0.00	2,894.00
Waste						0.00	0.00		0.00	0.00	43.42	0.00	43.42	2.57	0.00	97.31
Water						0.00	0.00		0.00	0.00	0.00	33.17	33.17	0.84	0.02	57.43
Total	**6.72**	**3.90**	**22.88**	**0.04**	**3.39**	**0.16**	**3.59**	**0.14**	**0.16**	**0.34**	**43.42**	**3,413.00**	**3,456.42**	**3.57**	**0.03**	**3,541.61**

3.0 Construction Detail

3.2 Architectural Coating - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.95					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**2.95**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.2 Architectural Coating - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	5.51					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**5.51**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

4.0 Mobile Detail

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.22	3.66	19.26	0.04	3.39	0.16	3.55	0.14	0.16	0.30	0.00	2,891.35	2,891.35	0.13	0.00	2,894.00
Unmitigated	2.22	3.66	19.26	0.04	3.39	0.16	3.55	0.14	0.16	0.30	0.00	2,891.35	2,891.35	0.13	0.00	2,894.00
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	3,096.90	3,329.40	2822.55	6,900,068	6,900,068
Parking Structure	0.00	0.00	0.00		
Total	3,096.90	3,329.40	2,822.55	6,900,068	6,900,068

4.3 Trip Type Information

	Miles			Trip %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW
Apartments Mid Rise	12.40	4.30	5.40	26.10	29.10	44.80
Parking Structure	9.50	7.30	7.30	0.00	0.00	0.00

5.0 Energy Detail

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.00	0.00		0.00	0.00	0.00	245.58	245.58	0.02	0.01	248.41
Electricity Unmitigated						0.00	0.00		0.00	0.00	0.00	264.49	264.49	0.02	0.01	267.54
NaturalGas Mitigated	0.02	0.20	0.09	0.00		0.00	0.02		0.00	0.02	0.00	237.20	237.20	0.00	0.00	238.64
NaturalGas Unmitigated	0.03	0.23	0.10	0.00		0.00	0.02		0.00	0.02	0.00	270.38	270.38	0.01	0.00	272.03
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	tons/yr										MT/yr					
Apartments Mid Rise	5.06673e+006	0.03	0.23	0.10	0.00		0.00	0.02		0.00	0.02	0.00	270.38	270.38	0.01	0.00	272.03
Parking Structure	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		**0.03**	**0.23**	**0.10**	**0.00**		**0.00**	**0.02**		**0.00**	**0.02**	**0.00**	**270.38**	**270.38**	**0.01**	**0.00**	**272.03**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Land Use	kBTU	tons/yr										MT/yr					
Apartments Mid Rise	4.44494e+006	0.02	0.20	0.09	0.00		0.00	0.02		0.00	0.02	0.00	237.20	237.20	0.00	0.00	238.64
Parking Structure	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		**0.02**	**0.20**	**0.09**	**0.00**		**0.00**	**0.02**		**0.00**	**0.02**	**0.00**	**237.20**	**237.20**	**0.00**	**0.00**	**238.64**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
Apartments Mid Rise	1.67147e+006					264.49	0.02	0.01	267.54
Parking Structure	0					0.00	0.00	0.00	0.00
Total						**264.49**	**0.02**	**0.01**	**267.54**

Mitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
Apartments Mid Rise	1.55192e+006					245.58	0.02	0.01	248.41
Parking Structure	0					0.00	0.00	0.00	0.00
Total						**245.58**	**0.02**	**0.01**	**248.41**

6.0 Area Detail

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Mitigated	4.48	0.04	3.53	0.00		0.00	0.02		0.00	0.02	0.00	5.70	5.70	0.01	0.00	5.82
Unmitigated	4.48	0.04	3.53	0.00		0.00	0.02		0.00	0.02	0.00	5.70	5.70	0.01	0.00	5.82
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.85					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	3.52					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.11	0.04	3.53	0.00		0.00	0.02		0.00	0.02	0.00	5.70	5.70	0.01	0.00	5.82
Total	**4.48**	**0.04**	**3.53**	**0.00**		**0.00**	**0.02**		**0.00**	**0.02**	**0.00**	**5.70**	**5.70**	**0.01**	**0.00**	**5.82**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.85					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	3.52					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.11	0.04	3.53	0.00		0.00	0.02		0.00	0.02	0.00	5.70	5.70	0.01	0.00	5.82
Total	**4.48**	**0.04**	**3.53**	**0.00**		**0.00**	**0.02**		**0.00**	**0.02**	**0.00**	**5.70**	**5.70**	**0.01**	**0.00**	**5.82**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

Use Water Efficient Irrigation System

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr				MT/yr			
Mitigated					33.17	0.84	0.02	57.43
Unmitigated					36.86	0.93	0.02	63.81
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
Apartments Mid Rise	30.2966 / 19.1					36.86	0.93	0.02	63.81
Parking Structure	0 / 0					0.00	0.00	0.00	0.00
Total						**36.86**	**0.93**	**0.02**	**63.81**

Mitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
Apartments Mid Rise	27.267 / 17.19					33.17	0.84	0.02	57.43
Parking Structure	0 / 0					0.00	0.00	0.00	0.00
Total						**33.17**	**0.84**	**0.02**	**57.43**

8.0 Waste Detail

Category/Year

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
	tons/yr				MT/yr			
Mitigated					43.42	2.57	0.00	97.31
Unmitigated					43.42	2.57	0.00	97.31
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
Apartments Mid Rise	213.9					43.42	2.57	0.00	97.31
Parking Structure	0					0.00	0.00	0.00	0.00
Total						**43.42**	**2.57**	**0.00**	**97.31**

Mitigated

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
Apartments Mid Rise	213.9					43.42	2.57	0.00	97.31
Parking Structure	0					0.00	0.00	0.00	0.00
Total						**43.42**	**2.57**	**0.00**	**97.31**

9.0 Vegetation

Raintree Site, Sunnyvale - 2019: Full Buildout

Santa Clara County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
Parking Structure	1186	Space
Apartments Mid Rise	679	Dwelling Unit

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Utility Company**	Pacific Gas & Electric Company
Climate Zone	4	**Precipitation Freq (Days)**	58		

1.3 User Entered Comments

Project Characteristics - CO2 Intensity Factor (306.68 lb/MWh) for 2016 obtained from CPUC GHG Calculator version 3c.

Land Use - Lot acreage from Project Description. Square footage from Project Description.

Construction Phase - Phasing schedule provided by project applicant.

Vehicle Trips - Daily trip generation rate provided by TJKM.

Woodstoves - No woodstoves, no wood fireplaces, possible gas-powered fireplaces.

Area Coating - Adjusted to 150 g/L VOC in accordance with BAAQMD, Regulation 8, Rule 3.

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	6.55	0.06	5.12	0.00		0.00	0.03		0.00	0.03	0.00	8.33	8.33	0.01	0.00	8.50
Energy	0.04	0.34	0.15	0.00		0.00	0.03		0.00	0.03	0.00	734.33	734.33	0.04	0.02	741.19
Mobile	2.83	4.57	23.85	0.05	4.89	0.22	5.11	0.08	0.21	0.29	0.00	3,898.28	3,898.28	0.18	0.00	3,902.02
Waste						0.00	0.00		0.00	0.00	63.40	0.00	63.40	3.75	0.00	142.09
Water						0.00	0.00		0.00	0.00	0.00	47.37	47.37	1.35	0.04	86.73
Total	**9.42**	**4.97**	**29.12**	**0.05**	**4.89**	**0.22**	**5.17**	**0.08**	**0.21**	**0.35**	**63.40**	**4,688.31**	**4,751.71**	**5.33**	**0.06**	**4,880.53**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	6.55	0.06	5.12	0.00		0.00	0.03		0.00	0.03	0.00	8.33	8.33	0.01	0.00	8.50
Energy	0.03	0.30	0.13	0.00		0.00	0.02		0.00	0.02	0.00	661.60	661.60	0.04	0.02	667.84
Mobile	2.83	4.57	23.85	0.05	4.89	0.22	5.11	0.08	0.21	0.29	0.00	3,898.28	3,898.28	0.18	0.00	3,902.02
Waste						0.00	0.00		0.00	0.00	63.40	0.00	63.40	3.75	0.00	142.09
Water						0.00	0.00		0.00	0.00	0.00	42.64	42.64	1.22	0.03	78.06
Total	**9.41**	**4.93**	**29.10**	**0.05**	**4.89**	**0.22**	**5.16**	**0.08**	**0.21**	**0.34**	**63.40**	**4,610.85**	**4,674.25**	**5.20**	**0.05**	**4,798.51**

4.0 Mobile Detail

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Mitigated	2.83	4.57	23.85	0.05	4.89	0.22	5.11	0.08	0.21	0.29	0.00	3,898.28	3,898.28	0.18	0.00	3,902.02
Unmitigated	2.83	4.57	23.85	0.05	4.89	0.22	5.11	0.08	0.21	0.29	0.00	3,898.28	3,898.28	0.18	0.00	3,902.02
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	4,440.66	4,861.64	4121.53	9,945,660	9,945,660
Parking Structure	0.00	0.00	0.00		
Total	4,440.66	4,861.64	4,121.53	9,945,660	9,945,660

4.3 Trip Type Information

	Miles			Trip %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW
Apartments Mid Rise	12.40	4.30	5.40	26.10	29.10	44.80
Parking Structure	9.50	7.30	7.30	0.00	0.00	0.00

5.0 Energy Detail

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Electricity Mitigated						0.00	0.00		0.00	0.00	0.00	315.24	315.24	0.03	0.01	319.37
Electricity Unmitigated						0.00	0.00		0.00	0.00	0.00	339.52	339.52	0.03	0.01	343.97
NaturalGas Mitigated	0.03	0.30	0.13	0.00		0.00	0.02		0.00	0.02	0.00	346.36	346.36	0.01	0.01	348.47
NaturalGas Unmitigated	0.04	0.34	0.15	0.00		0.00	0.03		0.00	0.03	0.00	394.81	394.81	0.01	0.01	397.22
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	tons/yr										MT/yr					
Apartments Mid Rise	7.39851e+006	0.04	0.34	0.15	0.00		0.00	0.03		0.00	0.03	0.00	394.81	394.81	0.01	0.01	397.22
Parking Structure	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		**0.04**	**0.34**	**0.15**	**0.00**		**0.00**	**0.03**		**0.00**	**0.03**	**0.00**	**394.81**	**394.81**	**0.01**	**0.01**	**397.22**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU	tons/yr										MT/yr					
Apartments Mid Rise	6.49056e+006	0.03	0.30	0.13	0.00		0.00	0.02		0.00	0.02	0.00	346.36	346.36	0.01	0.01	348.47
Parking Structure	0	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		**0.03**	**0.30**	**0.13**	**0.00**		**0.00**	**0.02**		**0.00**	**0.02**	**0.00**	**346.36**	**346.36**	**0.01**	**0.01**	**348.47**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e

Land Use	kWh	tons/yr				MT/yr			
Apartments Mid Rise	2.4407e+006					339.52	0.03	0.01	343.97
Parking Structure	0					0.00	0.00	0.00	0.00
Total						**339.52**	**0.03**	**0.01**	**343.97**

Mitigated

	Electricity Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	kWh	tons/yr				MT/yr			
Apartments Mid Rise	2.26614e+006					315.24	0.03	0.01	319.37
Parking Structure	0					0.00	0.00	0.00	0.00
Total						**315.24**	**0.03**	**0.01**	**319.37**

6.0 Area Detail

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	6.55	0.06	5.12	0.00		0.00	0.03		0.00	0.03	0.00	8.33	8.33	0.01	0.00	8.50
Unmitigated	6.55	0.06	5.12	0.00		0.00	0.03		0.00	0.03	0.00	8.33	8.33	0.01	0.00	8.50
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.24					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Consumer Products	5.16					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.16	0.06	5.12	0.00		0.00	0.03		0.00	0.03	0.00	8.33	8.33	0.01	0.00	8.50
Total	**6.56**	**0.06**	**5.12**	**0.00**		**0.00**	**0.03**		**0.00**	**0.03**	**0.00**	**8.33**	**8.33**	**0.01**	**0.00**	**8.50**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	1.24					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	5.16					0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.16	0.06	5.12	0.00		0.00	0.03		0.00	0.03	0.00	8.33	8.33	0.01	0.00	8.50
Total	**6.56**	**0.06**	**5.12**	**0.00**		**0.00**	**0.03**		**0.00**	**0.03**	**0.00**	**8.33**	**8.33**	**0.01**	**0.00**	**8.50**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

Use Water Efficient Irrigation System

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr				MT/yr			
Mitigated					42.64	1.22	0.03	78.06

Unmitigated					47.37	1.35	0.04	86.73
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
Apartments Mid Rise	44.2396 / 27.8902					47.37	1.35	0.04	86.73
Parking Structure	0 / 0					0.00	0.00	0.00	0.00
Total						**47.37**	**1.35**	**0.04**	**86.73**

Mitigated

	Indoor/Outdoor Use	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	tons/yr				MT/yr			
Apartments Mid Rise	39.8156 / 25.1012					42.64	1.22	0.03	78.06
Parking Structure	0 / 0					0.00	0.00	0.00	0.00
Total						**42.64**	**1.22**	**0.03**	**78.06**

8.0 Waste Detail

Category/Year

	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
	tons/yr				MT/yr			
Mitigated					63.40	3.75	0.00	142.09

Unmitigated					63.40	3.75	0.00	142.09
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
Apartments Mid Rise	312.34					63.40	3.75	0.00	142.09
Parking Structure	0					0.00	0.00	0.00	0.00
Total						**63.40**	**3.75**	**0.00**	**142.09**

Mitigated

	Waste Disposed	ROG	NOx	CO	SO2	Total CO2	CH4	N2O	CO2e
Land Use	tons	tons/yr				MT/yr			
Apartments Mid Rise	312.34					63.40	3.75	0.00	142.09
Parking Structure	0					0.00	0.00	0.00	0.00
Total						**63.40**	**3.75**	**0.00**	**142.09**

9.0 Vegetation

Highway 101 - 2016 Hourly DPM Emissions and Diesel Vehicle Traffic Volumes

2016 Hourly Diesel Traffic Volumes Per Direction and DPM Emissions - EB-Hwy 101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	3.46%	57	0.1029	9	6.19%	101	0.0990	17	6.07%	99	0.0931
2	2.08%	34	0.0870	10	7.07%	116	0.1016	18	3.83%	63	0.0719
3	2.21%	36	0.0784	11	6.24%	102	0.1002	19	2.47%	40	0.0784
4	3.26%	53	0.1126	12	6.72%	110	0.1010	20	1.32%	22	0.0658
5	1.95%	32	0.1021	13	6.12%	100	0.1017	21	3.28%	54	0.0905
6	3.28%	54	0.1154	14	6.02%	99	0.1004	22	4.26%	70	0.0986
7	6.31%	103	0.1068	15	5.20%	85	0.1003	23	2.64%	43	0.0847
8	5.37%	88	0.0914	16	3.92%	64	0.0945	24	0.75%	12	0.1012
								Total		1,637	

2016 Hourly Diesel Traffic Volumes Per Direction and DPM Emissions - WB-Hwy 101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	3.46%	57	0.1029	9	6.19%	101	0.0812	17	6.07%	99	0.0931
2	2.08%	34	0.0870	10	7.07%	116	0.1016	18	3.83%	63	0.0719
3	2.21%	36	0.0784	11	6.24%	102	0.1002	19	2.47%	40	0.0784
4	3.26%	53	0.1126	12	6.72%	110	0.1010	20	1.32%	22	0.0658
5	1.95%	32	0.1021	13	6.12%	100	0.1017	21	3.28%	54	0.0905
6	3.28%	54	0.1154	14	6.02%	99	0.1004	22	4.26%	70	0.0986
7	6.31%	103	0.1068	15	5.20%	85	0.1003	23	2.64%	43	0.0847
8	5.37%	88	0.0761	16	3.92%	64	0.0945	24	0.75%	12	0.1012
								Total		1,637	

Highway 101 - 2020 Hourly DPM Emissions and Diesel Vehicle Traffic Volumes

2020 Hourly Diesel Traffic Volumes Per Direction and DPM Emissions - EB-Hwy 101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	3.47%	59	0.0714	9	6.64%	113	0.0651	17	5.86%	100	0.0660
2	2.05%	35	0.0601	10	6.54%	112	0.0752	18	3.54%	60	0.0513
3	2.19%	37	0.0545	11	6.63%	113	0.0659	19	2.88%	49	0.0496
4	3.21%	55	0.0778	12	7.14%	122	0.0667	20	1.67%	28	0.0374
5	1.95%	33	0.0710	13	6.47%	110	0.0670	21	2.70%	46	0.0726
6	3.22%	55	0.0797	14	6.43%	110	0.0662	22	3.80%	65	0.0758
7	5.75%	98	0.0793	15	5.53%	94	0.0654	23	2.07%	35	0.0710
8	5.18%	88	0.0644	16	4.34%	74	0.0610	24	0.73%	13	0.0695
								Total		1,706	

2020 Hourly Diesel Traffic Volumes Per Direction and DPM Emissions - WB-Hwy 101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	3.47%	59	0.0714	9	6.64%	113	0.0585	17	5.86%	100	0.0660
2	2.05%	35	0.0601	10	6.54%	112	0.0752	18	3.54%	60	0.0513
3	2.19%	37	0.0545	11	6.63%	113	0.0659	19	2.88%	49	0.0496
4	3.21%	55	0.0778	12	7.14%	122	0.0667	20	1.67%	28	0.0374
5	1.95%	33	0.0710	13	6.47%	110	0.0670	21	2.70%	46	0.0726
6	3.22%	55	0.0797	14	6.43%	110	0.0662	22	3.80%	65	0.0758
7	5.75%	98	0.0793	15	5.53%	94	0.0654	23	2.07%	35	0.0710
8	5.18%	88	0.0576	16	4.34%	74	0.0610	24	0.73%	13	0.0695
								Total		1,706	

Highway 101 - 2025 Hourly DPM Emissions and Diesel Vehicle Traffic Volumes

2025 Hourly Diesel Traffic Volumes Per Direction and DPM Emissions - EB-Hwy 101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	3.44%	62	0.0614	9	6.49%	117	0.0569	17	5.83%	105	0.0577
2	2.07%	37	0.0514	10	7.05%	127	0.0615	18	3.37%	61	0.0449
3	2.14%	38	0.0461	11	6.09%	110	0.0607	19	2.72%	49	0.0428
4	3.07%	55	0.0669	12	7.00%	126	0.0581	20	1.11%	20	0.0411
5	1.89%	34	0.0611	13	6.49%	117	0.0584	21	3.10%	56	0.0553
6	3.19%	57	0.0687	14	6.39%	115	0.0577	22	4.13%	74	0.0599
7	6.04%	109	0.0645	15	5.47%	98	0.0574	23	2.61%	47	0.0528
8	4.95%	89	0.0564	16	4.19%	75	0.0532	24	1.15%	21	0.0404
								Total		1,797	

2025 Hourly Diesel Traffic Volumes Per Direction and DPM Emissions - WB-Hwy 101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	3.44%	62	0.0614	9	6.49%	117	0.0524	17	5.83%	105	0.0577
2	2.07%	37	0.0514	10	7.05%	127	0.0615	18	3.37%	61	0.0449
3	2.14%	38	0.0461	11	6.09%	110	0.0607	19	2.72%	49	0.0428
4	3.07%	55	0.0669	12	7.00%	126	0.0581	20	1.11%	20	0.0411
5	1.89%	34	0.0611	13	6.49%	117	0.0584	21	3.10%	56	0.0553
6	3.19%	57	0.0687	14	6.39%	115	0.0577	22	4.13%	74	0.0599
7	6.04%	109	0.0645	15	5.47%	98	0.0574	23	2.61%	47	0.0528
8	4.95%	89	0.0516	16	4.19%	75	0.0532	24	1.15%	21	0.0404
								Total		1,797	

Highway 101 - 2016 Hourly PM2.5 Emissions and Vehicle Traffic Volumes

2016 Hourly Traffic Volumes Per Direction and PM2.5 Emissions - EB-Hwy 101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	1.11%	894	0.0261	9	7.08%	5724	0.0218	17	7.38%	5965	0.0210
2	0.37%	302	0.0288	10	4.30%	3473	0.0238	18	8.26%	6676	0.0203
3	0.32%	256	0.0306	11	4.61%	3729	0.0225	19	5.78%	4672	0.0204
4	0.21%	170	0.0554	12	5.86%	4734	0.0224	20	4.34%	3511	0.0202
5	0.46%	374	0.0281	13	6.17%	4988	0.0216	21	3.28%	2653	0.0213
6	0.85%	684	0.0304	14	6.03%	4879	0.0218	22	3.31%	2677	0.0220
7	3.78%	3058	0.0231	15	7.07%	5715	0.0212	23	2.47%	1995	0.0212
8	7.88%	6371	0.0205	16	7.20%	5824	0.0207	24	1.89%	1526	0.0203
								Total		80,850	

2016 Hourly Traffic Volumes Per Direction and PM2.5 Emissions - WB-Hwy 101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	1.11%	894	0.0261	9	7.08%	5724	0.0220	17	7.38%	5965	0.0210
2	0.37%	302	0.0288	10	4.30%	3473	0.0238	18	8.26%	6676	0.0203
3	0.32%	256	0.0306	11	4.61%	3729	0.0225	19	5.78%	4672	0.0204
4	0.21%	170	0.0554	12	5.86%	4734	0.0224	20	4.34%	3511	0.0202
5	0.46%	374	0.0281	13	6.17%	4988	0.0216	21	3.28%	2653	0.0213
6	0.85%	684	0.0304	14	6.03%	4879	0.0218	22	3.31%	2677	0.0220
7	3.78%	3058	0.0231	15	7.07%	5715	0.0212	23	2.47%	1995	0.0212
8	7.88%	6371	0.0210	16	7.20%	5824	0.0207	24	1.89%	1526	0.0203
								Total		80,850	

Highway 101 - 2020 Hourly PM2.5 Emissions and Vehicle Traffic Volumes

2020 Hourly Traffic Volumes Per Direction and PM2.5 Emissions - EB-Hwy 101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	1.10%	927	0.0244	9	7.08%	5944	0.0211	17	7.38%	6193	0.0204
2	0.37%	314	0.0265	10	4.30%	3606	0.0226	18	8.26%	6933	0.0199
3	0.31%	262	0.0275	11	4.61%	3871	0.0217	19	5.78%	4849	0.0201
4	0.21%	176	0.0457	12	5.86%	4916	0.0215	20	4.35%	3648	0.0199
5	0.46%	387	0.0258	13	6.17%	5180	0.0210	21	3.28%	2754	0.0207
6	0.84%	708	0.0274	14	6.03%	5063	0.0211	22	3.31%	2777	0.0212
7	3.78%	3176	0.0221	15	7.07%	5932	0.0206	23	2.47%	2071	0.0207
8	7.88%	6614	0.0201	16	7.20%	6046	0.0203	24	1.89%	1583	0.0200
								Total		83,930	

2020 Hourly Traffic Volumes Per Direction and PM2.5 Emissions - WB-Hwy 101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	1.10%	927	0.0244	9	7.08%	5944	0.0215	17	7.38%	6193	0.0204
2	0.37%	314	0.0265	10	4.30%	3606	0.0226	18	8.26%	6933	0.0199
3	0.31%	262	0.0275	11	4.61%	3871	0.0217	19	5.78%	4849	0.0201
4	0.21%	176	0.0457	12	5.86%	4916	0.0215	20	4.35%	3648	0.0199
5	0.46%	387	0.0258	13	6.17%	5180	0.0210	21	3.28%	2754	0.0207
6	0.84%	708	0.0274	14	6.03%	5063	0.0211	22	3.31%	2777	0.0212
7	3.78%	3176	0.0221	15	7.07%	5932	0.0206	23	2.47%	2071	0.0207
8	7.88%	6614	0.0206	16	7.20%	6046	0.0203	24	1.89%	1583	0.0200
								Total		83,930	

Highway 101 - 2025 Hourly PM2.5 Emissions and Vehicle Traffic Volumes

2025 Hourly Traffic Volumes Per Direction and PM2.5 Emissions - EB-Hwy 101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	1.10%	969	0.0238	9	7.08%	6218	0.0209	17	7.38%	6480	0.0203
2	0.38%	330	0.0259	10	4.30%	3772	0.0224	18	8.26%	7251	0.0199
3	0.31%	276	0.0265	11	4.61%	4049	0.0215	19	5.77%	5068	0.0200
4	0.21%	182	0.0423	12	5.86%	5140	0.0214	20	4.35%	3815	0.0199
5	0.46%	404	0.0251	13	6.17%	5416	0.0209	21	3.28%	2879	0.0206
6	0.85%	742	0.0266	14	6.04%	5298	0.0210	22	3.31%	2905	0.0211
7	3.78%	3318	0.0218	15	7.07%	6204	0.0206	23	2.47%	2169	0.0207
8	7.88%	6916	0.0200	16	7.20%	6324	0.0203	24	1.89%	1655	0.0199
								Total		87,780	

2025 Hourly Traffic Volumes Per Direction and PM2.5 Emissions - WB-Hwy 101

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	1.10%	969	0.0238	9	7.08%	6218	0.0215	17	7.38%	6480	0.0203
2	0.38%	330	0.0259	10	4.30%	3772	0.0224	18	8.26%	7251	0.0199
3	0.31%	276	0.0265	11	4.61%	4049	0.0215	19	5.77%	5068	0.0200
4	0.21%	182	0.0423	12	5.86%	5140	0.0214	20	4.35%	3815	0.0199
5	0.46%	404	0.0251	13	6.17%	5416	0.0209	21	3.28%	2879	0.0206
6	0.85%	742	0.0266	14	6.04%	5298	0.0210	22	3.31%	2905	0.0211
7	3.78%	3318	0.0218	15	7.07%	6204	0.0206	23	2.47%	2169	0.0207
8	7.88%	6916	0.0206	16	7.20%	6324	0.0203	24	1.89%	1655	0.0199
								Total		87,780	

Off-Ramp to Fair Oaks - 2016 Hourly DPM Emissions and Diesel Vehicle Traffic Volumes

2016 Hourly Diesel Traffic Volumes Per Direction and DPM Emissions - Fair Oaks Exit

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	3.46%	7	0.0698	9	6.19%	12	0.0674	17	6.07%	12	0.0639
2	2.08%	4	0.0612	10	7.07%	14	0.0688	18	3.83%	7	0.0520
3	2.21%	4	0.0565	11	6.24%	12	0.0680	19	2.47%	5	0.0557
4	3.26%	6	0.0751	12	6.72%	13	0.0685	20	1.32%	3	0.0481
5	1.95%	4	0.0694	13	6.12%	12	0.0689	21	3.28%	6	0.0625
6	3.28%	6	0.0766	14	6.02%	12	0.0681	22	4.26%	8	0.0670
7	6.31%	12	0.0716	15	5.20%	10	0.0681	23	2.64%	5	0.0592
8	5.37%	10	0.0629	16	3.92%	8	0.0648	24	0.75%	1	0.0689
								Total		195	

Off-Ramp to Fair Oaks - 2020 Hourly DPM Emissions and Diesel Vehicle Traffic Volumes

2020 Hourly Diesel Traffic Volumes Per Direction and DPM Emissions - Fair Oaks Exit

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	3.47%	7	0.0566	9	6.64%	14	0.0516	17	5.86%	12	0.0522
2	2.05%	4	0.0489	10	6.54%	13	0.0590	18	3.54%	7	0.0417
3	2.19%	4	0.0452	11	6.63%	13	0.0520	19	2.88%	6	0.0401
4	3.21%	7	0.0608	12	7.14%	15	0.0527	20	1.67%	3	0.0306
5	1.95%	4	0.0563	13	6.47%	13	0.0528	21	2.70%	6	0.0573
6	3.22%	7	0.0621	14	6.43%	13	0.0523	22	3.80%	8	0.0595
7	5.75%	12	0.0619	15	5.53%	11	0.0516	23	2.07%	4	0.0562
8	5.18%	11	0.0510	16	4.34%	9	0.0483	24	0.73%	1	0.0552
								Total		203	

Off-Ramp to Fair Oaks - 2025 Hourly DPM Emissions and Diesel Vehicle Traffic Volumes

2025 Hourly Diesel Traffic Volumes Per Direction and DPM Emissions - Fair Oaks Exit

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	3.44%	7	0.0525	9	6.49%	14	0.0484	17	5.83%	12	0.0490
2	2.07%	4	0.0448	10	7.05%	15	0.0523	18	3.37%	7	0.0386
3	2.14%	5	0.0407	11	6.09%	13	0.0516	19	2.72%	6	0.0365
4	3.07%	7	0.0568	12	7.00%	15	0.0493	20	1.11%	2	0.0348
5	1.89%	4	0.0523	13	6.49%	14	0.0495	21	3.10%	7	0.0471
6	3.19%	7	0.0581	14	6.39%	14	0.0489	22	4.13%	9	0.0508
7	6.04%	13	0.0545	15	5.47%	12	0.0486	23	2.61%	6	0.0450
8	4.95%	11	0.0479	16	4.19%	9	0.0451	24	1.15%	2	0.0343
								Total		214	

Off-Ramp to Fair Oaks - 2016 Hourly PM2.5 Emissions and Diesel Vehicle Traffic Volumes

2016 Hourly Traffic Volumes Per Direction and PM2.5 Emissions - Fair Oaks Exit

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	1.11%	107	0.0242	9	7.08%	683	0.0211	17	7.38%	712	0.0205
2	0.37%	36	0.0263	10	4.30%	414	0.0225	18	8.26%	796	0.0200
3	0.32%	31	0.0276	11	4.61%	445	0.0215	19	5.78%	557	0.0199
4	0.21%	20	0.0465	12	5.86%	565	0.0214	20	4.34%	419	0.0198
5	0.46%	45	0.0258	13	6.17%	595	0.0209	21	3.28%	317	0.0206
6	0.85%	82	0.0275	14	6.03%	582	0.0210	22	3.31%	319	0.0211
7	3.78%	365	0.0220	15	7.07%	682	0.0205	23	2.47%	238	0.0206
8	7.88%	760	0.0201	16	7.20%	695	0.0202	24	1.89%	182	0.0198
								Total		9,646	

Off-Ramp to Fair Oaks - 2020 Hourly PM2.5 Emissions and Diesel Vehicle Traffic Volumes

2020 Hourly Traffic Volumes Per Direction and PM2.5 Emissions - Fair Oaks Exit

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	1.10%	111	0.0235	9	7.08%	709	0.0207	17	7.38%	739	0.0202
2	0.37%	37	0.0254	10	4.30%	430	0.0219	18	8.26%	827	0.0198
3	0.31%	31	0.0262	11	4.61%	462	0.0211	19	5.78%	578	0.0197
4	0.21%	21	0.0421	12	5.86%	586	0.0210	20	4.35%	435	0.0196
5	0.46%	46	0.0247	13	6.17%	618	0.0205	21	3.28%	328	0.0202
6	0.84%	84	0.0261	14	6.03%	604	0.0206	22	3.31%	331	0.0208
7	3.78%	379	0.0215	15	7.07%	708	0.0202	23	2.47%	247	0.0202
8	7.88%	789	0.0199	16	7.20%	721	0.0199	24	1.89%	189	0.0196
								Total		10,010	

Off-Ramp to Fair Oaks - 2025 Hourly PM2.5 Emissions and Diesel Vehicle Traffic Volumes

2025 Hourly Traffic Volumes Per Direction and PM2.5 Emissions - Fair Oaks Exit

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	1.10%	116	0.0232	9	7.08%	741	0.0207	17	7.38%	772	0.0202
2	0.38%	39	0.0251	10	4.30%	450	0.0219	18	8.26%	864	0.0198
3	0.31%	33	0.0257	11	4.61%	483	0.0210	19	5.77%	604	0.0197
4	0.21%	22	0.0403	12	5.86%	613	0.0210	20	4.35%	455	0.0196
5	0.46%	48	0.0244	13	6.17%	646	0.0205	21	3.28%	343	0.0202
6	0.85%	88	0.0258	14	6.04%	632	0.0206	22	3.31%	346	0.0207
7	3.78%	396	0.0214	15	7.07%	740	0.0202	23	2.47%	259	0.0203
8	7.88%	825	0.0199	16	7.20%	754	0.0199	24	1.89%	197	0.0196
								Total		10,465	

On-Ramp to 101 From Fair Oaks - 2016 Hourly DPM Emissions and Diesel Vehicle Traffic Volumes

2016 Hourly Diesel Traffic Volumes Per Direction and DPM Emissions - Hwy 101 Entrance

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	3.46%	5	0.0698	9	6.19%	9	0.0674	17	6.07%	9	0.0639
2	2.08%	3	0.0612	10	7.07%	10	0.0688	18	3.83%	6	0.0520
3	2.21%	3	0.0565	11	6.24%	9	0.0680	19	2.47%	4	0.0557
4	3.26%	5	0.0751	12	6.72%	10	0.0685	20	1.32%	2	0.0481
5	1.95%	3	0.0694	13	6.12%	9	0.0689	21	3.28%	5	0.0625
6	3.28%	5	0.0766	14	6.02%	9	0.0681	22	4.26%	6	0.0670
7	6.31%	9	0.0716	15	5.20%	7	0.0681	23	2.64%	4	0.0592
8	5.37%	8	0.0629	16	3.92%	6	0.0648	24	0.75%	1	0.0689
								Total		144	

On-Ramp to 101 From Fair Oaks - 2020 Hourly DPM Emissions and Diesel Vehicle Traffic Volumes

2020 Hourly Diesel Traffic Volumes Per Direction and DPM Emissions - Hwy 101 Entrance

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	3.47%	5	0.0566	9	6.64%	10	0.0516	17	5.86%	9	0.0522
2	2.05%	3	0.0489	10	6.54%	10	0.0590	18	3.54%	5	0.0417
3	2.19%	3	0.0452	11	6.63%	10	0.0520	19	2.88%	4	0.0401
4	3.21%	5	0.0608	12	7.14%	11	0.0527	20	1.67%	3	0.0306
5	1.95%	3	0.0563	13	6.47%	10	0.0528	21	2.70%	4	0.0573
6	3.22%	5	0.0621	14	6.43%	10	0.0523	22	3.80%	6	0.0595
7	5.75%	9	0.0619	15	5.53%	8	0.0516	23	2.07%	3	0.0562
8	5.18%	8	0.0510	16	4.34%	7	0.0483	24	0.73%	1	0.0552
								Total		150	

On-Ramp to 101 From Fair Oaks - 2025 Hourly DPM Emissions and Diesel Vehicle Traffic Volumes

2025 Hourly Diesel Traffic Volumes Per Direction and DPM Emissions - Hwy 101 Entrance

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	3.44%	5	0.0525	9	6.49%	10	0.0484	17	5.83%	9	0.0490
2	2.07%	3	0.0448	10	7.05%	11	0.0523	18	3.37%	5	0.0386
3	2.14%	3	0.0407	11	6.09%	10	0.0516	19	2.72%	4	0.0365
4	3.07%	5	0.0568	12	7.00%	11	0.0493	20	1.11%	2	0.0348
5	1.89%	3	0.0523	13	6.49%	10	0.0495	21	3.10%	5	0.0471
6	3.19%	5	0.0581	14	6.39%	10	0.0489	22	4.13%	7	0.0508
7	6.04%	10	0.0545	15	5.47%	9	0.0486	23	2.61%	4	0.0450
8	4.95%	8	0.0479	16	4.19%	7	0.0451	24	1.15%	2	0.0343
								Total		158	

On-Ramp to 101 From Fair Oaks - 2016 Hourly PM2.5 Emissions and Diesel Vehicle Traffic Volumes

2016 Hourly Traffic Volumes Per Direction and PM2.5 Emissions - Hwy 101 Entrance

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	1.11%	79	0.0242	9	7.08%	503	0.0211	17	7.38%	524	0.0205
2	0.37%	26	0.0263	10	4.30%	305	0.0225	18	8.26%	586	0.0200
3	0.32%	22	0.0276	11	4.61%	328	0.0215	19	5.78%	410	0.0199
4	0.21%	15	0.0465	12	5.86%	416	0.0214	20	4.34%	308	0.0198
5	0.46%	33	0.0258	13	6.17%	438	0.0209	21	3.28%	233	0.0206
6	0.85%	60	0.0275	14	6.03%	429	0.0210	22	3.31%	235	0.0211
7	3.78%	269	0.0220	15	7.07%	502	0.0205	23	2.47%	175	0.0206
8	7.88%	560	0.0201	16	7.20%	512	0.0202	24	1.89%	134	0.0198
								Total		7,102	

On-Ramp to 101 From Fair Oaks - 2020 Hourly PM2.5 Emissions and Diesel Vehicle Traffic Volumes

2020 Hourly Traffic Volumes Per Direction and PM2.5 Emissions - Hwy 101 Entrance

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	1.10%	81	0.0235	9	7.08%	522	0.0207	17	7.38%	544	0.0202
2	0.37%	28	0.0254	10	4.30%	317	0.0219	18	8.26%	609	0.0198
3	0.31%	23	0.0262	11	4.61%	340	0.0211	19	5.78%	426	0.0197
4	0.21%	15	0.0421	12	5.86%	432	0.0210	20	4.35%	320	0.0196
5	0.46%	34	0.0247	13	6.17%	455	0.0205	21	3.28%	242	0.0202
6	0.84%	62	0.0261	14	6.03%	445	0.0206	22	3.31%	244	0.0208
7	3.78%	279	0.0215	15	7.07%	521	0.0202	23	2.47%	182	0.0202
8	7.88%	581	0.0199	16	7.20%	531	0.0199	24	1.89%	139	0.0196
								Total		7,370	

On-Ramp to 101 From Fair Oaks - 2025 Hourly PM2.5 Emissions and Diesel Vehicle Traffic Volumes

2025 Hourly Traffic Volumes Per Direction and PM2.5 Emissions - Hwy 101 Entrance

Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile	Hour	% Per Hour	VPH	g/mile
1	1.10%	85	0.0232	9	7.08%	546	0.0207	17	7.38%	569	0.0202
2	0.38%	29	0.0251	10	4.30%	331	0.0219	18	8.26%	636	0.0198
3	0.31%	24	0.0257	11	4.61%	355	0.0210	19	5.77%	445	0.0197
4	0.21%	16	0.0403	12	5.86%	451	0.0210	20	4.35%	335	0.0196
5	0.46%	35	0.0244	13	6.17%	475	0.0205	21	3.28%	253	0.0202
6	0.85%	65	0.0258	14	6.04%	465	0.0206	22	3.31%	255	0.0207
7	3.78%	291	0.0214	15	7.07%	545	0.0202	23	2.47%	190	0.0203
8	7.88%	607	0.0199	16	7.20%	555	0.0199	24	1.89%	145	0.0196
								Total		7,705	

Highway 101 – 2016 Vehicle Emission Factor Calculations at 65, 60 mph and 30 mph

630 E Weddell Drive, Sunnyvale, CA

Highway 101 Traffic Traffic Data and PM2.5 & TOG Emission Factors - 64 mph

Analysis Year = ***2016***

Vehicle Type	2011 Caltrans Number Vehicles (veh/day)	2016 Number Vehicles (veh/day)	2016 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	103,844	109,036	0.33%	362	65	0.0193	0.0193	0.0015	0.0368	0.059
LDT	43,642	45,824	0.07%	32	65	0.0310	0.0197	0.0019	0.0589	0.128
MDT	3,685	3,869	6.47%	250	65	0.0236	0.0221	0.0031	0.0687	0.168
HDT	2,829	2,971	88.54%	2,630	60	0.1156	0.1416	0.0987	0.1489	0.650
Total	154,000	161,700	-	3,275	63.75	-	-		-	-
Mix Avg Emission Factor						**0.09712**	**0.02171**	**0.00347**	**0.04414**	**0.08294**
Increase From 2011		1.05								
Vehicles/Direction		80,850		1,637						
Avg Vehicles/Hour/Direction		**3,369**		**68**						

Traffic Data Year = ***2011***

Caltrans 2011 AADT Data		Total	Truck by Axle			
Caltrans 2010 Truck AADT Data	Total	Truck	2	3	4	5
SR 101 at Fair Oaks Ave, Sunnyvale	154,000	6,514	3,685	710	355	1,764
SR 101 B Lawrence Expressway			56.57%	10.90%	5.45%	27.08%
Percent of Total Vehicles		4.23%	2.39%	0.46%	0.23%	1.15%

Traffic Increase per Year (%) = ***1.00%***

Highway 101 Traffic Traffic Data and PM2.5 & TOG Emission Factors - 60 mph

Analysis Year = ***2016***

Vehicle Type	2011 Caltrans Number Vehicles (veh/day)	2016 Number Vehicles (veh/day)	2016 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	103,844	109,036	0.33%	362	60	0.0187	0.0191	0.0014	0.0326	0.059
LDT	43,642	45,824	0.07%	32	60	0.0306	0.0195	0.0017	0.0526	0.128
MDT	3,685	3,869	6.47%	250	60	0.0236	0.0221	0.0031	0.0687	0.168
HDT	2,829	2,971	88.54%	2,630	60	0.1156	0.1416	0.0987	0.1489	0.650
Total	154,000	161,700	-	3,275	60	-	-		-	-
Mix Avg Emission Factor						**0.09704**	**0.02154**	**0.00330**	**0.03942**	**0.08294**

Highway 101 Traffic Traffic Data and PM2.5 & TOG Emission Factors - 30 mph

Analysis Year = ***2016***

Vehicle Type	2011 Caltrans Number Vehicles (veh/day)	2016 Number Vehicles (veh/day)	2016 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	103,844	109,036	0.33%	362	30	0.0288	0.0197	0.0020	0.0442	0.059
LDT	43,642	45,824	0.07%	32	30	0.0494	0.0203	0.0025	0.0735	0.128
MDT	3,685	3,869	6.47%	250	30	0.0385	0.0224	0.0034	0.1073	0.168
HDT	2,829	2,971	88.54%	2,630	30	0.0913	0.1231	0.0801	0.6056	0.650
Total	154,000	161,700	-	3,275	30	-	-	-	-	-
Mix Avg Emission Factor						**0.07993**	**0.02183**	**0.00359**	**0.05534**	**0.08294**

Highway 101 – 2020 Vehicle Emission Factor Calculations at 65, 60 mph and 30 mph

Highway 101 Traffic Traffic Data and PM2.5 & TOG Emission Factors - 64 mph

Analysis Year = ***2020***

Vehicle Type	2011 Caltrans Number Vehicles (veh/day)	2020 Number Vehicles (veh/day)	2020 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	103,844	113,190	0.33%	376	65	0.0121	0.0192	0.0015	0.0202	0.044
LDT	43,642	47,570	0.07%	34	65	0.0188	0.0195	0.0017	0.0333	0.103
MDT	3,685	4,017	6.48%	260	65	0.0191	0.0217	0.0027	0.0498	0.161
HDT	2,829	3,084	88.92%	2,742	60	0.0797	0.1107	0.0682	0.0864	0.422
Total	154,000	167,860	-	3,412	63.75	-	-		-	-
Mix Avg Emission Factor						**0.06707**	**0.02102**	**0.00279**	**0.02478**	**0.06442**
Increase From 2011		1.09								
Vehicles/Direction		83,930		1,706						
Avg Vehicles/Hour/Direction		**3,497**		**71**						

Traffic Data Year = ***2011***

Caltrans 2011 AADT Data		Total	Truck by Axle			
Caltrans 2010 Truck AADT Data	Total	Truck	2	3	4	5
SR 101 at Fair Oaks Ave, Sunnyvale	154,000	6,514	3,685	710	355	1,764
SR 101 B Lawrence Expressway			56.57%	10.90%	5.45%	27.08%
Percent of Total Vehicles		4.23%	2.39%	0.46%	0.23%	1.15%

Traffic Increase per Year (%) = ***1.00%***

Highway 101 Traffic Traffic Data and PM2.5 & TOG Emission Factors - 60 mph

Analysis Year = ***2020***

Vehicle Type	2011 Caltrans Number Vehicles (veh/day)	2020 Number Vehicles (veh/day)	2020 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	103,844	113,190	0.33%	376	60	0.0111	0.0190	0.0013	0.0179	0.044
LDT	43,642	47,570	0.07%	34	60	0.0180	0.0193	0.0015	0.0298	0.103
MDT	3,685	4,017	6.48%	260	60	0.0191	0.0217	0.0027	0.0498	0.161
HDT	2,829	3,084	88.92%	2,742	60	0.0797	0.1107	0.0682	0.0864	0.422
Total	154,000	167,860	-	3,412	60	-	-		-	-
Mix Avg Emission Factor						**0.06696**	**0.02086**	**0.00262**	**0.02221**	**0.06442**

Highway 101 Traffic Traffic Data and PM2.5 & TOG Emission Factors - 30 mph

Analysis Year = ***2020***

Vehicle Type	2011 Caltrans Number Vehicles (veh/day)	2020 Number Vehicles (veh/day)	2020 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	103,844	113,190	0.33%	376	30	0.0152	0.0196	0.0019	0.0259	0.044
LDT	43,642	47,570	0.07%	34	30	0.0270	0.0200	0.0022	0.0440	0.103
MDT	3,685	4,017	6.48%	260	30	0.0311	0.0220	0.0030	0.0783	0.161
HDT	2,829	3,084	88.92%	2,742	30	0.0692	0.1035	0.0610	0.4439	0.422
Total	154,000	167,860	-	3,412	30	-	-	-	-	-
Mix Avg Emission Factor						**0.05996**	**0.02132**	**0.00309**	**0.03315**	**0.06442**

Highway 101 – 2025 Vehicle Emission Factor Calculations at 65, 60 mph and 30 mph

Highway 101 Traffic Traffic Data and PM2.5 & TOG Emission Factors - 64 mph

Analysis Year = ***2025***

Vehicle Type	2011 Caltrans Number Vehicles (veh/day)	2025 Number Vehicles (veh/day)	2025 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	103,939	118,491	0.33%	388	65	0.0080	0.0193	0.0016	0.0162	0.037
LDT	43,547	49,643	0.07%	35	65	0.0132	0.0194	0.0017	0.0245	0.086
MDT	3,685	4,201	6.54%	275	65	0.0149	0.0213	0.0023	0.0329	0.145
HDT	2,829	3,225	89.77%	2,895	60	0.0687	0.1016	0.0593	0.0402	0.257
Total	154,000	175,560	-	3,593	63.75	-	-		-	-
Mix Avg Emission Factor						**0.05746**	**0.02091**	**0.00268**	**0.01900**	**0.05394**
Increase From 2011		1.14								
Vehicles/Direction		87,780		1,797						
Avg Vehicles/Hour/Direction		**3,658**		**75**						

Traffic Data Year = ***2011***

Caltrans 2011 AADT Data		Total	Truck by Axle			
Caltrans 2010 Truck AADT Data	Total	Truck	2	3	4	5
SR 101 at Fair Oaks Ave, Sunnyvale	154,000	6,514	3,685	710	355	1,764
SR 101 B Lawrence Expressway			56.57%	10.90%	5.45%	27.08%
Percent of Total Vehicles		4.23%	2.39%	0.46%	0.23%	1.15%

Traffic Increase per Year (%) = ***1.00%***

Highway 101 Traffic Traffic Data and PM2.5 & TOG Emission Factors - 60 mph

Analysis Year = ***2025***

Vehicle Type	2011 Caltrans Number Vehicles (veh/day)	2025 Number Vehicles (veh/day)	2025 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	103,939	118,491	0.33%	388	60	0.0068	0.0191	0.0014	0.0143	0.037
LDT	43,547	49,643	0.07%	35	60	0.0121	0.0192	0.0015	0.0219	0.086
MDT	3,685	4,201	6.54%	275	60	0.0149	0.0213	0.0023	0.0329	0.145
HDT	2,829	3,225	89.77%	2,895	60	0.0687	0.1016	0.0593	0.0402	0.257
Total	154,000	175,560	-	3,593	60	-	-		-	-
Mix Avg Emission Factor						**0.05732**	**0.02073**	**0.00250**	**0.01698**	**0.05394**

Highway 101 Traffic Traffic Data and PM2.5 & TOG Emission Factors - 60 mph

Analysis Year = ***2025***

Vehicle Type	2011 Caltrans Number Vehicles (veh/day)	2025 Number Vehicles (veh/day)	2025 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	103,939	118,491	0.33%	388	60	0.0068	0.0191	0.0014	0.0143	0.037
LDT	43,547	49,643	0.07%	35	60	0.0121	0.0192	0.0015	0.0219	0.086
MDT	3,685	4,201	6.54%	275	60	0.0149	0.0213	0.0023	0.0329	0.145
HDT	2,829	3,225	89.77%	2,895	60	0.0687	0.1016	0.0593	0.0402	0.257
Total	154,000	175,560	-	3,593	60	-	-		-	-
Mix Avg Emission Factor						**0.05732**	**0.02073**	**0.00250**	**0.01698**	**0.05394**

Off-Ramp to Fair Oaks Ave – Vehicle Emission Factor Calculations at 45 mph

Raintree & Sares Regis, Sunnyvale, CA
Fair Oaks Exit From Highway 101 Traffic Traffic Data and PM2.5 & TOG Emission Factors - 45 mph

Analysis Year = ***2016***

Vehicle Type	2010 Caltrans Number Vehicles (veh/day)	2016 Number Vehicles (veh/day)	2016 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	6,136	6,504	0.33%	22	45	0.0205	0.0191	0.0013	0.0303	0.059
LDT	2,579	2,734	0.07%	2	45	0.0348	0.0194	0.0017	0.0501	0.128
MDT	218	231	6.47%	15	45	0.0267	0.0211	0.0021	0.0709	0.168
HDT	167	177	88.54%	157	45	0.0767	0.1120	0.0690	0.2250	0.650
Total	9,100	9,646	-	195	45	-	-		-	-
Mix Avg Emission Factor						**0.06628**	**0.02092**	**0.00267**	**0.03741**	**0.08294**
Increase From 2010		1.06								
Vehicles/Direction		4,823		98						
Avg Vehicles/Hour/Direction		**201**		**4**						

Traffic Data Year = ***2010***

Caltrans 2010 Ramp AADT Data		Total	Truck by Axle			
Caltrans 2010 Truck AADT Data	Total	Truck	2	3	4	5
WB SR 101 Off to Fair Oaks Ave	9,100	385	218	42	21	104
SR 101 B Lawrence Expressway			56.57%	10.90%	5.45%	27.08%
Percent of Total Vehicles		4.23%	2.39%	0.46%	0.23%	1.15%

Traffic Increase per Year (%) = ***1.00%***

Analysis Year = ***2020***

Vehicle Type	2010 Caltrans Number Vehicles (veh/day)	2020 Number Vehicles (veh/day)	2020 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	6,136	6,750	0.33%	22	45	0.0112	0.0190	0.0012	0.0171	0.044
LDT	2,579	2,837	0.07%	2	45	0.0194	0.0192	0.0015	0.0291	0.103
MDT	218	240	6.48%	16	45	0.0215	0.0209	0.0019	0.0517	0.161
HDT	167	184	88.92%	164	45	0.0621	0.0986	0.0561	0.1393	0.422
Total	9,100	10,010	-	203	45	-	-		-	-
Mix Avg Emission Factor						**0.05300**	**0.02056**	**0.00233**	**0.02161**	**0.06442**

Analysis Year = ***2025***

Vehicle Type	2010 Caltrans Number Vehicles (veh/day)	2025 Number Vehicles (veh/day)	2025 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	6,142	7,063	0.33%	23	45	0.0058	0.0191	0.0013	0.0137	0.037
LDT	2,573	2,959	0.07%	2	45	0.0120	0.0192	0.0014	0.0213	0.086
MDT	218	250	6.54%	16	45	0.0166	0.0207	0.0017	0.0346	0.145
HDT	167	192	89.77%	173	45	0.0581	0.0952	0.0529	0.0748	0.257
Total	9,100	10,465	-	214	45	-	-		-	-
Mix Avg Emission Factor						**0.04883**	**0.02054**	**0.00231**	**0.01651**	**0.05394**

On-Ramp to Hwy 101 From Fair Oaks Ave – Vehicle Emission Factor Calculations at 45 mph

Raintree & Sares Regis, Sunnyvale, CA

Fair Oaks Entrance to Highway 101 Traffic Traffic Data and PM2.5 & TOG Emission Factors - 45 mph

Analysis Year = ***2016***

Vehicle Type	2010 Caltrans Number Vehicles (veh/day)	2016 Number Vehicles (veh/day)	2016 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	4,518	4,789	0.33%	16	45	0.0205	0.0191	0.0013	0.0303	0.059
LDT	1,899	2,013	0.07%	1	45	0.0348	0.0194	0.0017	0.0501	0.128
MDT	160	170	6.47%	11	45	0.0267	0.0211	0.0021	0.0709	0.168
HDT	123	130	88.54%	116	45	0.0767	0.1120	0.0690	0.2250	0.650
Total	6,700	7,102	-	144	45	-	-		-	-
Mix Avg Emission Factor						**0.06628**	**0.02092**	**0.00267**	**0.03741**	**0.08294**
Increase From 2010		1.06								
Vehicles/Direction		3,551		72						
Avg Vehicles/Hour/Direction		**148**		**3**						

Traffic Data Year = ***2010***

Caltrans 2010 Ramp AADT Data		Total	Truck by Axle			
Caltrans 2010 Truck AADT Data	Total	Truck	2	3	4	5
WB SR 101 Off to Fair Oaks Ave	6,700	283	160	31	15	77
SR 101 B Lawrence Expressway			56.57%	10.90%	5.45%	27.08%
Percent of Total Vehicles		4.23%	2.39%	0.46%	0.23%	1.15%

Traffic Increase per Year (%) = ***1.00%***

Analysis Year = ***2020***

Vehicle Type	2010 Caltrans Number Vehicles (veh/day)	2020 Number Vehicles (veh/day)	2020 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	4,518	4,970	0.33%	16	45	0.0112	0.0190	0.0012	0.0171	0.044
LDT	1,899	2,089	0.07%	1	45	0.0194	0.0192	0.0015	0.0291	0.103
MDT	160	176	6.48%	11	45	0.0215	0.0209	0.0019	0.0517	0.161
HDT	123	135	88.92%	120	45	0.0621	0.0986	0.0561	0.1393	0.422
Total	6,700	7,370	-	150	45	-	-		-	-
Mix Avg Emission Factor						**0.05300**	**0.02056**	**0.00233**	**0.02161**	**0.06442**

Analysis Year = ***2025***

Vehicle Type	2010 Caltrans Number Vehicles (veh/day)	2025 Number Vehicles (veh/day)	2025 Percent Diesel	Number Diesel Vehicles (veh/day)	Vehicle Speed (mph)	Emission Factors: Diesel Vehicles DPM (g/VMT)	All Vehicles: Total PM2.5 (g/VMT)	All Vehicles: Exhaust PM2.5 (g/VMT)	Gas Vehicles: Exhaust TOG (g/VMT)	Gas Vehicles: Running TOG (g/VMT)
LDA	4,522	5,200	0.33%	17	45	0.0058	0.0191	0.0013	0.0137	0.037
LDT	1,895	2,179	0.07%	2	45	0.0120	0.0192	0.0014	0.0213	0.086
MDT	160	184	6.54%	12	45	0.0166	0.0207	0.0017	0.0346	0.145
HDT	123	142	89.77%	127	45	0.0581	0.0952	0.0529	0.0748	0.257
Total	6,700	7,705	-	158	45	-	-		-	-
Mix Avg Emission Factor						**0.04883**	**0.02054**	**0.00231**	**0.01651**	**0.05394**

Highway 101, Fair Oaks Off-Ramp & On-Ramp - Cancer Risk Calculations at Proposed Sares Regis Site

CAL3QHCR Risk Modeling Parameters and Maximum Cancer Risk in Project Area
Sares Regis Developmente - DPM & TOG TACs

Receptor Information

Number of Receptors	155
Receptor Height =	1.8 m
Receptor distances =	10 m

Meteorological Conditions

San Jose Airport Hourly Met Data	1991 - 1995
Land Use Classification	urban
Wind speed =	variable
Wind direction =	variable

Cancer Risk Calculation Method

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Inhalation Dose Factors

Exposure Type	Value[1] DBR (L/kg BW-day)	A (-)	Exposure (hr/day)	Exposure (days/week)	Exposure (week/year)	EF (days/yr)	ED (Years)	AT (days)
Residential (70-Year)	302	1	24	7	50	350	70	25,550

[1] Default values recommended by OEHHA& Bay Area Air Quality Management District

Cancer Risk (per million) = Inhalation Dose x CRAF x CPF x 10^6
= URF x Cair

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
CRAF = Cancer Risk Adjustment Factor [adjustment factors are dependent on emissions period and duration of exposure]
URF =Unit risk factor (cancer risk per $\mu g/m^3$)

Unit Risk Factors (risk per million per $\mu g/m^3$) for DPM and Organic TACs from Vehicle TOG Exhaust & Evaporative Emissions

Exposure Type	CPF $(mg/kg\text{-}day)^{-1}$	CRAF (-)	*DPM*	Exhaust TOG TACs	Evaporative TOG TACs
Residential (70-Yr Exposure)	1.10E+00	1	318.5	1.8	0.107

MEI Cancer Risk Calculations - Receptor Height = 1.8 m

Meteorological Data Year	Maximum DPM Concentration ($\mu g/m^3$) 2016	2020	2025	Maximum Exhaust TOG Concentration $\mu g/m^3$) 2016	2020	2025	Maximum Evaporative TOG Concentration ($\mu g/m^3$) 2016	2020	2025	Maximum PM2.5 Concentration ($\mu g/m^3$) 2016	2020	2025
1991	0.0593	0.0430	0.0389	1.1190	0.6534	0.5202	2.0805	1.6717	1.4589	0.5432	0.5445	0.5655
1992	0.0628	0.0455	0.0412	1.1959	0.6985	0.5562	2.2235	1.7870	1.5597	0.5806	0.5821	0.6046
1993	0.0718	0.0520	0.0471	1.3656	0.7971	0.6345	2.5390	2.0392	1.7795	0.6629	0.6642	0.6897
1994	0.0699	0.0507	0.0458	1.3164	0.7687	0.6120	2.4474	1.9665	1.7162	0.6390	0.6406	0.6652
1995	0.0684	0.0496	0.0449	1.2876	0.7513	0.5981	2.3939	1.9221	1.6772	0.6250	0.6261	0.6501
Average	0.0664	0.0482	0.0436	1.2569	0.7338	0.5842	2.3369	1.8773	1.6383	0.610	0.611	0.635
Unadjusted Cancer Risk[a]	21.16	15.34	13.88	2.27	1.33	1.06	0.25	0.20	0.18			
Age Sensitivity Weighting Factor	0.396	0.214	1.079	0.396	0.214	1.079	0.396	0.214	1.079			
Contribution to Total Cancer Risk	8.39	3.29	14.97	0.90	0.3	1.1	0.10	0.0	0.2			
70-yr Cumulative Risk[b]	26.65			2.33			0.33			**Average PM2.5 =**		**0.62**

Total Risk From All TACs = 29.3 per million

Notes:
Receptor Heights = 1.8 m
Maximum DPM & PM2.5 concentrations occur at receptor closest to Highway 101
a Cancer risk (per million) calculated assuming constant 70-year exposure to concentration for year of analysis - without age sensitivity adjustments.
b Cumulative cancer risk (per million) calculated assuming variable exposure over a 70-year period due to decreased concentrations over time and incorporating age adjustment factors.

Highway 101, Fair Oaks Off-Ramp & On-Ramp - Cancer Risk Calculations at Proposed Raintree Site

CAL3QHCR Risk Modeling Parameters and Maximum Cancer Risk in Project Area
Raintree Development - DPM & TOG TACs

Receptor Information

Number of Receptors	514
Receptor Height =	1.8 m
Receptor distances =	10 m

Meteorological Conditions

San Jose Airport Hourly Met Data	1991 - 1995
Land Use Classification	urban
Wind speed =	variable
Wind direction =	variable

Cancer Risk Calculation Method

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air (µg/m^3)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Inhalation Dose Factors

Exposure Type	Value[1] DBR (L/kg BW-day)	A (-)	Exposure (hr/day)	Exposure (days/week)	Exposure (week/year)	EF (days/yr)	ED (Years)	AT (days)
Residential (70-Year)	302	1	24	7	50	350	70	25,550

[1] Default values recommended by OEHHA& Bay Area Air Quality Management District

Cancer Risk (per million) = Inhalation Dose x CRAF x CPF x 10^6
= URF x Cair

Where: CPF = Cancer potency factor (mg/kg-day)$^{-1}$
CRAF = Cancer Risk Adjustment Factor [adjustment factors are dependent on emissions period and duration of exposure]
URF =Unit risk factor (cancer risk per µg/m^3)

Unit Risk Factors (risk per million per µg/m^3) for DPM and Organic TACs from Vehicle TOG Exhaust & Evaporative Emissions

Exposure Type	CPF (mg/kg-day)$^{-1}$	CRAF (-)	*DPM*	Exhaust TOG TACs	Evaporative TOG TACs
Residential (70-Yr Exposure)	1.10E+00	1	318.5	1.8	0.107

MEI Cancer Risk Calculations - Receptor Height = 1.8 m

Meteorological Data Year	Maximum DPM Concentration (µg/m^3) 2016	2020	2025	Maximum Exhaust TOG Concentration µg/m^3) 2016	2020	2025	Maximum Evaporative TOG Concentration (µg/m^3) 2016	2020	2025
1991	0.0709	0.0511	0.0461	1.3066	0.7616	0.6060	2.4293	1.9483	1.6995
1992	0.0755	0.0544	0.0491	1.4072	0.8204	0.6529	2.6163	2.0989	1.8311
1993	0.0861	0.0620	0.0559	1.6096	0.9385	0.7470	2.9926	2.4010	2.0947
1994	0.0840	0.0606	0.0546	1.5522	0.9048	0.7200	2.8859	2.3148	2.0193
1995	0.0822	0.0592	0.0534	1.5230	0.8879	0.7066	2.8317	2.2714	1.9815
Average	0.0797	0.0575	0.0518	1.4797	0.8626	0.6865	2.7512	2.2069	1.9252
Unadjusted Cancer Risk[a]	25.39	18.31	16.50	2.68	1.56	1.24	0.29	0.24	0.21
Age Sensitivity Weighting Factor	0.396	0.214	1.079	0.396	0.214	1.079	0.396	0.214	1.079
Contribution to Total Cancer Risk	10.07	3.9	17.8	1.06	0.3	1.3	0.12	0.1	0.2
70-yr Cumulative Risk[b]	31.79			2.74			0.39		

Maximum PM2.5 Concentration (µg/m^3) 2016	2020	2025
0.6343	0.6346	0.6587
0.6831	0.6837	0.7097
0.7814	0.7821	0.8119
0.7535	0.7540	0.7827
0.7393	0.7399	0.7680
0.718	0.719	0.746
Average PM2.5 =		**0.73**

Total Risk From All TACs = 34.9 per million

Notes:
Receptor Heights = 1.8 m
Maximum DPM & PM2.5 concentrations occur at receptor closest to Highway 101
a Cancer risk (per million) calculated assuming constant 70-year exposure to concentration for year of analysis - without age sensitivity adjustments.
b Cumulative cancer risk (per million) calculated assuming variable exposure over a 70-year period due to decreased concentrations over time and incorporating age adjustment factors.

DPM Cancer Risk From Diesel Emergency Generators
Switch and Data CA Eleven LLC

DPM Emission Rates			
	Annual	DPM Emissions	
	Operation	Daily*	Annual
Source Type	(hr)	(lb/day)	(lb/yr)
Data Center Generators (4)	-	0.0794	29.0

* Total emissions from 4 generators From BAAQMD for P# 18976

Modeling Information	
Model:	ISCST3
Source	Generator
Source Type	Point
Meteorological Data	San Jose Airport 1991-1995
Point Source Stack Parameters	
Generator engine size (hp)	unknown (assumed 2,000 kW)
Stack Height** (ft)	15
Stack Diameter** (ft)	1.50
Stack Exit Velocity** (ft/sec)	141
Exhaust Temperature** (F)	750
Hourly Emission Rate (lb/hr)***	0.0033
Building Downwash Information	
Water Co. Building	
Building Height (ft)	25
Building Length (ft)	145
Building Width (ft)	100

** Based on 2,000 kW Caterpillar 3516C diesel generator

*** Hourly emission rate based on annual emissions and 8,760 hours per year.

Cancer Risk Calculation Method

Inhalation Dose = C_{air} x DBR x A x HD x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air (µg/m^3)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
HD = daily exposure (hours/day/24)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Inhalation Dose Factors

	Value[1]							
Exposure Type	DBR (L/kg BW-day)	A (-)	Exposure (hr/day)	Exposure (days/week)	Exposure (week/year)	EF (days/yr)	ED (Years)	AT (days)
Residential (70-Year)	302	1	24	7	50	350	70	25,550

[1] Default values recommended by OEHHA& Bay Area Air Quality Management District

Cancer Risk (per million) = Inhalation Dose x CRAF x CPF x 10^6
= URF x Cair

Where: CPF = Cancer potency factor (mg/kg-day)$^{-1}$
CRAF = Cancer Risk Adjustment Factor
URF =Unit risk factor (cancer risk per µg/m^3)

Unit Risk Factor for DPM

Exposure Type	CPF (mg/kg-day)$^{-1}$	CRAF (-)	URF *DPM*
Residential (70-Yr Exposure)	1.10E+00	1.7	**541.5**

Model Results and Cancer Risks

Exposure Type	Distance to Maximum		DPM/PM2.5 Annual Ave (µg/m^3)	DPM Cancer Risk (per million)
Residential (70-Yr Exposure)	256 feet	78 meters	0.01564	**8.5**

BAY AREA AIR QUALITY MANAGEMENT DISTRICT Printed: MAY 7, 2013
DETAIL POLLUTANTS - ABATED
MOST RECENT P/O APPROVED (2012)
Switch and Data CA Eleven LLC (P# 18976)

S# SOURCE NAME
MATERIAL SOURCE CODE
THROUGHPUT DATE POLLUTANT CODE LBS/DAY

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1 Emergency Standby Diesel Generator Set
C22BG098
Benzene 41 5.11E-04
Formaldehyde 124 4.23E-05
Organics (part not spec el 990 2.47E-02
Arsenic (all) 1030 4.45E-07
Beryllium (all) pollutant 1040 2.61E-07
Cadmium 1070 1.11E-06
Chromium (hexavalent) 1095 2.30E-08
Lead (all) pollutant 1140 9.44E-07
Manganese 1160 1.48E-06
Nickel pollutant 1180 1.80E-05
Mercury (all) pollutant 1190 3.15E-07
Diesel Engine Exhaust Part 1350 2.57E-02
PAH's (non-speciated) 1840 2.35E-06
Nitrous Oxide (N2O) 2030 1.37E-04
Nitrogen Oxides (part not 2990 3.60E-01
Sulfur Dioxide (SO2) 3990 1.67E-04
Carbon Monoxide (CO) pollu 4990 7.82E-02
Carbon Dioxide, non-biogen 6960 1.71E+01
Methane (CH4) 6970 6.84E-04

2 Emergency Standby Diesel Generator Set
C22BG098
Benzene 41 5.11E-04
Formaldehyde 124 4.23E-05
Organics (part not spec el 990 2.47E-02
Arsenic (all) 1030 4.45E-07
Beryllium (all) pollutant 1040 2.61E-07
Cadmium 1070 1.11E-06
Chromium (hexavalent) 1095 2.30E-08
Lead (all) pollutant 1140 9.44E-07
Manganese 1160 1.48E-06
Nickel pollutant 1180 1.80E-05
Mercury (all) pollutant 1190 3.15E-07
Diesel Engine Exhaust Part 1350 2.57E-02
PAH's (non-speciated) 1840 2.35E-06
Nitrous Oxide (N2O) 2030 1.37E-04
Nitrogen Oxides (part not 2990 3.60E-01
Sulfur Dioxide (SO2) 3990 1.67E-04
Carbon Monoxide (CO) pollu 4990 7.82E-02
Carbon Dioxide, non-biogen 6960 1.71E+01
Methane (CH4) 6970 6.84E-04

3 Emergency Standby Diesel Generator Set
C22BG098
Benzene 41 5.11E-04
Formaldehyde 124 4.23E-05
Organics (part not spec el 990 2.47E-02
Arsenic (all) 1030 4.45E-07
Beryllium (all) pollutant 1040 2.61E-07
Cadmium 1070 1.11E-06
Chromium (hexavalent) 1095 2.30E-08
Lead (all) pollutant 1140 9.44E-07
Manganese 1160 1.48E-06
Nickel pollutant 1180 1.80E-05
Mercury (all) pollutant 1190 3.15E-07
Diesel Engine Exhaust Part 1350 2.57E-02
PAH's (non-speciated) 1840 2.35E-06
Nitrous Oxide (N2O) 2030 1.37E-04
Nitrogen Oxides (part not 2990 3.60E-01
Sulfur Dioxide (SO2) 3990 1.67E-04
Carbon Monoxide (CO) pollu 4990 7.82E-02
Carbon Dioxide, non-biogen 6960 1.71E+01
Methane (CH4) 6970 6.84E-04

4 Emergency Standby Diesel Generator Set
C22BG098
Benzene 41 5.29E-04
Formaldehyde 124 4.38E-05
Organics (part not spec el 990 6.24E-03
Arsenic (all) 1030 4.61E-07
Beryllium (all) pollutant 1040 2.70E-07
Cadmium 1070 1.15E-06
Chromium (hexavalent) 1095 2.38E-08
Lead (all) pollutant 1140 9.77E-07
Manganese 1160 1.53E-06
Nickel pollutant 1180 1.86E-05
Mercury (all) pollutant 1190 3.26E-07
Diesel Engine Exhaust Part 1350 2.27E-03
PAH's (non-speciated) 1840 2.43E-06
Nitrous Oxide (N2O) 2030 1.42E-04
Nitrogen Oxides (part not 2990 1.29E-01
Sulfur Dioxide (SO2) 3990 1.73E-04
Carbon Monoxide (CO) pollu 4990 1.26E-02
Carbon Dioxide, non-biogen 6960 1.77E+01
Methane (CH4) 6970 7.09E-04

PLANT TOTAL:

lbs/day	Pollutant
1.80E-06	Arsenic (all) (1030)
2.06E-03	Benzene (41)
1.05E-06	Beryllium (all) pollutant (1040)
4.49E-06	Cadmium (1070)
6.91E+01	Carbon Dioxide, non-biogenic CO2 (6960)
2.47E-01	Carbon Monoxide (CO) pollutant (4990)
9.29E-08	Chromium (hexavalent) (1095)
7.94E-02	Diesel Engi -1350
1.71E-04	Formaldehyde (124)
3.81E-06	Lead (all) pollutant (1140)
5.98E-06	Manganese (1160)
1.27E-06	Mercury (all) pollutant (1190)
2.76E-03	Methane (CH4) (6970)
7.26E-05	Nickel pollutant (1180)
1.21E+00	Nitrogen O) (2990)
5.52E-04	Nitrous Oxide (N2O) (2030)
8.03E-02	Organics (p cluding Methane (990)
9.47E-06	PAH's (non-speciated) (1840)
6.73E-04	Sulfur Dioxide (SO2) (3990)

Off-Road Construction Equipment & On-Site Vehicle Exhaust Emissions
Sares Regis Site - 2014 -2015 Construction Emissions with Tier 2 Equipment

Analysis Period = 2014 - 2015 **462 = Annual Days of Construction**

Off-Road Equipment												Emission Factor (g/hp-hr)							Average Daily Emissions (lb/day)							Annual Emissions (lb/period)						
Equipment Type	No. Units	Engine Age (years)	Engine Model Year	Daily Hours In Use	Days Per Year	Unit Annual Hours Use	Use Factor	Load Factor	Cumulative Hours Operation Per Unit	Engine (hp)	Fuel Type	NOx	CO	ROG	PM10	PM2.5	SO2	CO2	NOx	CO	ROG	PM10	PM2.5	SO2	CO2	NOx	CO	ROG	PM10	PM2.5	SO2	CO2
Construction Activities																															
Demolition (1/15/2014 - 3/1/2014)																															
Excavators	2	8	2006	7	30	210	1.00	0.38	4,368	157	ULSD	4.48	3.01	0.27	0.17	0.16	0.005	559.8	0.5	0.4	0.0	0.02	0.02	0.001	67	247.3	166.4	15.0	9.35	8.78	0.28	30923
Rubber Tired Dozers	1	8	2006	7	30	210	1.00	0.40	6,136	358	ULSD	2.51	1.03	0.25	0.12	0.11	0.005	559.8	0.4	0.1	0.0	0.02	0.02	0.001	80	166.2	68.4	16.8	7.64	7.17	0.33	37112
Rubber Tired Loaders	2	8	2006	6	30	180	1.00	0.36	7,144	246	ULSD	4.58	1.09	0.29	0.12	0.11	0.005	559.8	0.7	0.2	0.0	0.02	0.02	0.001	85	322.0	76.9	20.5	8.51	8.02	0.35	39345
Debris Shredder	1	8	2006	6	20	120	1.00	0.34	3,432	540	ULSD	2.43	0.98	0.19	0.10	0.10	0.005	559.8	0.3	0.1	0.0	0.01	0.01	0.001	59	117.8	47.7	9.0	5.01	4.67	0.24	27190
Crushing/Proc. Equipment	1	8	2006	7	20	140	1.00	0.78	7,640	540	ULSD	2.55	1.06	0.29	0.12	0.11	0.005	559.8	0.7	0.3	0.1	0.03	0.03	0.001	158	331.9	137.7	37.8	15.85	14.93	0.65	72772
Grading/Excavation (3/1/2014 -5/1/2014)																															
Excavators	2	8	2006	7	20	140	1.00	0.38	4,368	157	ULSD	4.48	3.01	0.27	0.17	0.16	0.005	559.8	0.4	0.2	0.0	0.01	0.01	0.000	45	164.9	110.9	10.0	6.23	5.86	0.18	20615
Graders	1	8	2006	7	35	245	1.00	0.41	4,880	162	ULSD	4.51	3.05	0.29	0.17	0.16	0.005	559.8	0.4	0.2	0.0	0.01	0.01	0.000	43	161.7	109.4	10.2	6.24	5.88	0.18	20082
Rubber Tired Dozers	1	8	2006	7	35	245	1.00	0.40	6,136	358	ULSD	2.51	1.03	0.25	0.12	0.11	0.005	559.8	0.4	0.2	0.0	0.02	0.02	0.001	94	194.0	79.8	19.6	8.91	8.37	0.39	43297
Scrapers	2	8	2006	5	35	175	1.00	0.48	3,624	356	ULSD	2.43	0.99	0.19	0.10	0.10	0.005	559.8	0.7	0.3	0.1	0.03	0.03	0.001	160	320.7	130.0	25.1	13.72	12.80	0.66	73809
Tractors/Loaders/Backhoes	2	8	2006	5	40	200	1.00	0.37	4,096	75	ULSD	5.04	3.43	0.30	0.25	0.23	0.005	559.8	0.3	0.2	0.0	0.01	0.01	0.000	30	123.3	83.8	7.4	6.11	5.73	0.12	13699
Trenching/Site Prep (5/1/2014 - 7/15/2014)																															
Rubber Tired Dozers	2	8	2006	7	100	700	1.00	0.40	6,136	358	ULSD	2.51	1.03	0.25	0.12	0.11	0.005	559.8	2.4	1.0	0.2	0.11	0.10	0.005	536	1108.3	456.0	112.0	50.94	47.82	2.21	247412
Tractors/Loaders/Backhoes	2	8	2006	7	100	700	1.00	0.37	4,096	75	ULSD	5.04	3.43	0.30	0.25	0.23	0.005	559.8	0.9	0.6	0.1	0.05	0.04	0.001	104	431.6	293.5	25.8	21.38	20.07	0.43	47945
Excavators	1	8	2006	7	70	490	1.00	0.38	4,368	157	ULSD	4.48	3.01	0.27	0.17	0.16	0.005	559.8	0.6	0.4	0.0	0.02	0.02	0.001	78	288.5	194.1	17.5	10.91	10.25	0.32	36077
Building Exterior (7/15/2014 -67/15/2015)																															
Cranes	1	8	2006	6	31	186	1.00	0.29	3,552	208	ULSD	4.37	1.01	0.21	0.10	0.10	0.005	559.8	0.2	0.1	0.0	0.01	0.01	0.000	30	108.0	24.9	5.1	2.58	2.41	0.12	13846
Forklifts	2	8	2006	4	160	640	1.00	0.20	5,520	149	ULSD	4.55	3.09	0.30	0.18	0.17	0.005	559.8	0.8	0.6	0.1	0.03	0.03	0.001	102	382.4	260.2	25.4	15.15	14.28	0.42	47074
Tractors/Loaders/Backhoes	1	8	2006	4	200	800	1.00	0.37	4,096	75	ULSD	5.04	3.43	0.30	0.25	0.23	0.005	559.8	0.5	0.4	0.0	0.03	0.02	0.001	59	246.6	167.7	14.7	12.22	11.47	0.24	27397
Welders	2	8	2006	5	160	800	1.00	0.30	5,144	46	ULSD	5.11	4.35	0.52	0.39	0.37	0.006	559.8	0.5	0.5	0.1	0.04	0.04	0.001	59	248.5	211.8	25.3	19.08	17.99	0.27	27249
Building Interior/Architectural Coating (6/15/2015 - 10/15/2015)																															
Compressors	4	8	2006	7	110	770	1.00	0.32	6,520	60	ULSD	5.21	3.63	0.37	0.28	0.27	0.005	559.8	1.5	1.0	0.1	0.08	0.08	0.001	158	679.2	472.6	47.8	37.00	35.00	0.65	72980
Paving (8/15/2015 - 10/15/2015)																															
Pavers	1	8	2006	7	10	70	1.00	0.42	2,592	89	ULSD	4.93	3.30	0.26	0.23	0.21	0.005	559.8	0.1	0.0	0.0	0.00	0.00	0.000	7	28.5	19.1	1.5	1.32	1.23	0.03	3229
Paving Equipment	1	8	2006	7	10	70	1.00	0.36	3,200	82	ULSD	4.98	3.35	0.28	0.24	0.22	0.005	559.8	0.0	0.0	0.0	0.00	0.00	0.000	6	22.7	15.3	1.3	1.08	1.01	0.02	2550
Rollers	1	8	2006	5	10	50	1.00	0.38	2,392	84	ULSD	4.92	3.29	0.25	0.23	0.21	0.005	559.8	0.0	0.0	0.0	0.00	0.00	0.000	4	17.3	11.6	0.9	0.79	0.74	0.02	1970
Subtotal																			***12.36***	***6.79***	***0.97***	***0.56***	***0.53***	***0.02***	***1962***	***5711.3***	***3137.7***	***448.9***	***260.0***	***244.5***	***8.1***	***906,573***

On-Site On-Road Vehicles												Emission Factors (g/mi)																			
												NOx	CO	ROG	PM10	PM2.5	SO2	CO2	NOx	CO	ROG	PM10	PM2.5	SO2	CO2	NOx	CO	ROG	PM10	PM2.5	SO2	CO2
HHDT Diesel Emission Factors - Running												16.640	4.323	2.061	0.245	0.225	0.017	3238.4													
HHDT Diesel Emission Factors - Idle												66.24	34.36	6.389	0.305	0.281	0.067	6854.4													
	No. Trucks		Onsite Travel (ft) per Truck	Daily Hours In Use	Days Per Year	Annual Hours per Truck	Idle Minutes per Truck	Annual Miles per Truck																							
Demolition (1/15/2014 - 3/1/2014)																															
Water Truck	1	-	-	4	30	120	-	1200		-	ULSD								0.10	0.02	0.01	0.00	0.00	0.00	19	44.0	11.4	5.5	0.6	0.60	0.0	8,567
Haul Trucks	406		1200	-	-	-	10	0.23		-	ULSD								0.03	0.01	0.00	0.00	0.00	0.00	4	13.3	6.0	1.4	0.10	0.09	0.0	1,681
Grading/Excavation (3/1/2014 -5/1/2014)																															
Water Truck	1	-	-	4	35	140	-	1400		-	ULSD								0.11	0.03	0.01	0.00	0.00	0.00	22	51.4	13.3	6.4	0.8	0.70	0.1	9,995
Haul Trucks	237		1200	-	-	-	10	0.23		-	ULSD								0.02	0.01	0.00	0.00	0.00	0.00	2	7.7	3.5	0.8	0.06	0.05	0.0	981
Building Exterior (7/15/2014 -67/15/2015)																															
Cement Trucks	925		1200	-	-	-	60	0.23		-	ULSD								0.31	0.16	0.03	0.00	0.00	0.00	34	142.8	72.1	14.0	0.74	0.68	0.1	15,479
Vendor Trucks	2662		1200	-	-	-	10	0.23		-	ULSD								0.19	0.09	0.02	0.00	0.00	0.00	24	87.0	39.4	9.0	0.62	0.57	0.1	11,024
Subtotal																			***0.75***	***0.32***	***0.08***	***0.01***	***0.01***	***0.00***	***103***	***346.2***	***145.7***	***37.0***	***2.9***	***2.7***	***0.3***	***47,729***
TOTAL OFF-ROAD EQUIPMENT & ON-SITE ON-ROAD VEHICLE EMISSIONS												**-**	**-**	**-**	**-**				**13.1**	**7.1**	**1.1**	**0.6**	**0.53**	**0.02**	**2,066**	**6,058**	**3,283**	**486**	**263**	**247**	**8**	**954,302**
																								Total tons -->		**3.0**	**1.6**	**0.2**	**0.1**	**0.12**	**0.00**	**477**

Notes: Cumulative hours operation based on statewide averages
On-Road vehicle emission factors for 2015 from EMFAC2011 for Santa Clara Co for heavy-heavy duty diesel trucks. Onsite truck travel 10 mph
Vendor trips assume 100% HHDT trucks

Emission Factors - Off-Road Compression Ignited Engines

	NOx			CO			ROG			PM10			PM2.5			CO2			SO2
EF ID	ZH EF (g/hp-hr)	DR (g/hp-hr^2)	Fuel CF	ZH EF (g/hp-hr)	DR (g/hp-hr^2)	Fuel CF	ZH EF (g/hp-hr)	DR (g/hp-hr^2)	Fuel CF	ZH EF (g/hp-hr)	DR (g/hp-hr^2)	Fuel CF	ZH EF (g/hp-hr)	DR (g/hp-hr^2)	Fuel CF	ZH EF (g/hp-hr)	DR (g/hp-hr^2)	Fuel LCF-CF	(g/hp-hr)
Demolition (1/15/2014 - 3/1/2014)																			
ULSD1752006	4.44	6.46E-05	0.95	2.70	7.14E-05	1.00	0.16	2.57E-05	1.00	0.16	1.18E-05	0.80	0.15	1.18E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD5002006	2.45	3.18E-05	0.95	0.92	1.82E-05	1.00	0.10	2.50E-05	1.00	0.11	5.55E-06	0.80	0.10	5.55E-06	0.80	568.30	0.00E+00	0.99	0.005
ULSD2502006	4.38	6.33E-05	0.95	0.92	2.43E-05	1.00	0.12	2.40E-05	1.00	0.11	5.79E-06	0.80	0.10	5.79E-06	0.80	568.30	0.00E+00	0.99	0.005
ULSD7502006	2.45	3.18E-05	0.95	0.92	1.82E-05	1.00	0.10	2.50E-05	1.00	0.11	5.55E-06	0.80	0.10	5.55E-06	0.80	568.30	0.00E+00	0.99	0.005
ULSD7502006	2.45	3.18E-05	0.95	0.92	1.82E-05	1.00	0.10	2.50E-05	1.00	0.11	5.55E-06	0.80	0.10	5.55E-06	0.80	568.30	0.00E+00	0.99	0.005
Grading/Excavation (3/1/2014 -5/1/2014)																			
ULSD1752006	4.44	6.46E-05	0.95	2.70	7.14E-05	1.00	0.16	2.57E-05	1.00	0.16	1.18E-05	0.80	0.15	1.18E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD1752006	4.44	6.46E-05	0.95	2.70	7.14E-05	1.00	0.16	2.57E-05	1.00	0.16	1.18E-05	0.80	0.15	1.18E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD5002006	2.45	3.18E-05	0.95	0.92	1.82E-05	1.00	0.10	2.50E-05	1.00	0.11	5.55E-06	0.80	0.10	5.55E-06	0.80	568.30	0.00E+00	0.99	0.005
ULSD5002006	2.45	3.18E-05	0.95	0.92	1.82E-05	1.00	0.10	2.50E-05	1.00	0.11	5.55E-06	0.80	0.10	5.55E-06	0.80	568.30	0.00E+00	0.99	0.005
ULSD1202006	5.01	7.45E-05	0.95	3.09	8.21E-05	1.00	0.19	2.71E-05	1.00	0.24	1.76E-05	0.80	0.22	1.76E-05	0.80	568.30	0.00E+00	0.99	0.005
Trenching/Site Prep (5/1/2014 - 7/15/2014)																			
ULSD5002006	2.45	3.18E-05	0.95	0.92	1.82E-05	1.00	0.10	2.50E-05	1.00	0.11	5.55E-06	0.80	0.10	5.55E-06	0.80	568.30	0.00E+00	0.99	0.005
ULSD1202006	5.01	7.45E-05	0.95	3.09	8.21E-05	1.00	0.19	2.71E-05	1.00	0.24	1.76E-05	0.80	0.22	1.76E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD1752006	4.44	6.46E-05	0.95	2.70	7.14E-05	1.00	0.16	2.57E-05	1.00	0.16	1.18E-05	0.80	0.15	1.18E-05	0.80	568.30	0.00E+00	0.99	0.005
Building Exterior (7/15/2014 -67/15/2015)																			
ULSD2502006	4.38	6.33E-05	0.95	0.92	2.43E-05	1.00	0.12	2.40E-05	1.00	0.11	5.79E-06	0.80	0.10	5.79E-06	0.80	568.30	0.00E+00	0.99	0.005
ULSD1752006	4.44	6.46E-05	0.95	2.70	7.14E-05	1.00	0.16	2.57E-05	1.00	0.16	1.18E-05	0.80	0.15	1.18E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD1202006	5.01	7.45E-05	0.95	3.09	8.21E-05	1.00	0.19	2.71E-05	1.00	0.24	1.76E-05	0.80	0.22	1.76E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD502006	4.88	9.83E-05	0.95	2.86	2.90E-04	1.00	0.24	5.45E-05	1.00	0.35	2.72E-05	0.80	0.32	2.72E-05	0.80	568.30	0.00E+00	0.99	0.006
Building Interior/Architectural Coating (6/15/2015 - 10/15/2015)																			
ULSD1202006	5.01	7.45E-05	0.95	3.09	8.21E-05	1.00	0.19	2.71E-05	1.00	0.24	1.76E-05	0.80	0.22	1.76E-05	0.80	568.30	0.00E+00	0.99	0.005
Paving (8/15/2015 - 10/15/2015)																			
ULSD1202006	5.01	7.45E-05	0.95	3.09	8.21E-05	1.00	0.19	2.71E-05	1.00	0.24	1.76E-05	0.80	0.22	1.76E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD1202006	5.01	7.45E-05	0.95	3.09	8.21E-05	1.00	0.19	2.71E-05	1.00	0.24	1.76E-05	0.80	0.22	1.76E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD1202006	5.01	7.45E-05	0.95	3.09	8.21E-05	1.00	0.19	2.71E-05	1.00	0.24	1.76E-05	0.80	0.22	1.76E-05	0.80	568.30	0.00E+00	0.99	0.005

Notes ZH EF = Zero hour emission factor
DR = Deterioration rate
ULSD = Ultra low sulfur diesel (15 ppmw sulfur, 0.0015% sulfur)

Refs: CARB OFFFROAD2007 model (http://www.arb.ca.gov/msei/offroad/offroad.htm), December, 2006.
Stationary/Off-road engines ARB, "California's Emissions Inventory for Off-Road Large Compression-Ignited (CI) Engines (> 25 HP)" MAC#99-32

Sares Regis - Construction Worker Vehicle Trip Emissions

Air Pollutant and GHG Emissions

Average Daily Emissions

Trip Type	Ave Daily Trips	Vehicle Emissions per Day (pounds/day)				
		ROG	NOx	PM10	PM2.5	CO2
Worker Trips	86	0.28	0.33	0.23	0.07	494
Total	**86**	**0.3**	**0.3**	**0.2**	**0.1**	**494**

Total Emissions

Trip Type	Trips	Annual Vehicle Emissions (tons)					CO2 MT CO2
		ROG	NOx	PM10	PM2.5	CO2	
Worker Trips	39,699	0.06	0.08	0.05	0.02	114	
Total	**39,699**	**0.06**	**0.08**	**0.05**	**0.02**	**114**	**103**
Number of days for project construction =		462					

Vehicle & Trip Information

Description	Trip Length*	% LDA	%LDT	%MDT	%HDT	%HHDT
Worker Vehicles	**7.3**	50%	50%			

* Trip length is one way distance in miles based on CalEEMod.

Composite Running Emission Factors, gm/mi

Description	Vehicle Exhaust Emission Factors					Entrained Dust	
	ROG	NOx	PM10	PM2.5	CO2	PM10	PM2.5
Employee Vehicles	0.158	0.199	0.047	0.020	346.68	0.116	0.029

Emission factors for vehicle exhaust from EMFAC2011

Trip Emissions, gm/trip

Description	ROG	NOx	PM10	PM2.5	CO2
Employee Vehicles	0.310	0.291	0.003	0.003	77.97

Emission factors based on EMFAC2011

Entrained Roadway Dust (gm/mi)

Vehicle	PM10	PM2.5
All	0.116	0.029

EPA AP-42 Section 13.2.1

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where:

k (PM2.5) =	0.25	
k (PM10) =	1.00	
sL =	0.035	g/m^2 for major & collector roads
W =	2.4	tons

Off-Road Construction Equipment & On-Site Vehicle Exhaust Emissions
Raintree - 2014 -2016 Construction Emissions with Tier 2 Equipment

Analysis Period = 2014 - 2016 **528 = Annual Days of Construction**

Off-Road Equipment Equipment Type	No. Units	Engine Age (years)	Engine Model Year	Daily Hours In Use	Days Per Year	Unit Annual Hours Use	Use Factor	Load Factor	Cumulative Hours Operation Per Unit	Engine (hp)	Fuel Type	Emission Factor (g/hp-hr) NOx	CO	ROG	PM10	PM2.5	SO2	CO2	Average Daily Emissions (lb/day) NOx	CO	ROG	PM10	PM2.5	SO2	CO2	Annual Emissions (lb/period) NOx	CO	ROG	PM10	PM2.5	SO2	CO2
Construction Activities																																
Demolition (9/15/2014 - 11/15/2014)																																
Concrete/Industrial Saws	1	8	2006	6	10	60	1.00	0.49	4,644	81	ULSD	5.08	3.47	0.32	0.26	0.24	0.005	559.8	0.1	0.0	0.0	0.00	0.00	0.000	6	26.7	18.2	1.7	1.35	1.27	0.03	2939
Excavators	3	8	2006	6	40	240	1.00	0.38	4,368	157	ULSD	4.48	3.01	0.27	0.17	0.16	0.005	559.8	0.8	0.5	0.0	0.03	0.03	0.001	100	423.9	285.2	25.8	16.03	15.06	0.47	53011
Rubber Tired Dozers	2	8	2006	6	40	240	1.00	0.40	6,136	358	ULSD	2.51	1.03	0.25	0.12	0.11	0.005	559.8	0.7	0.3	0.1	0.03	0.03	0.001	161	380.0	156.3	38.4	17.46	16.40	0.76	84827
Skid Steer Loaders	2	8	2006	6	40	240	1.00	0.37	2,376	45	ULSD	4.85	3.55	0.37	0.33	0.31	0.006	559.8	0.2	0.1	0.0	0.01	0.01	0.000	19	85.4	62.5	6.5	5.84	5.45	0.10	9863
Crushing/Proc. Equipment	1	8	2006	6	25	150	1.00	0.78	7,640	230	ULSD	4.61	1.11	0.30	0.12	0.12	0.005	559.8	0.5	0.1	0.0	0.01	0.01	0.001	63	273.5	65.6	18.0	7.32	6.90	0.30	33210
Sweepers/Scrubbers	1	8	2006	8	44	352	1.00	0.46	5,248	200	ULSD	4.47	1.05	0.25	0.11	0.11	0.005	559.8	0.6	0.1	0.0	0.02	0.01	0.001	76	318.9	74.8	17.6	8.02	7.52	0.36	39965
Grading/Excavation (11/15/2014 -12/15/2014)																																
Excavators	2	8	2006	6	22	132	1.00	0.38	4,368	157	ULSD	4.48	3.01	0.27	0.17	0.16	0.005	559.8	0.3	0.2	0.0	0.01	0.01	0.000	37	155.4	104.6	9.5	5.88	5.52	0.17	19437
Graders	1	8	2006	6	18	108	1.00	0.41	4,880	162	ULSD	4.51	3.05	0.29	0.17	0.16	0.005	559.8	0.1	0.1	0.0	0.01	0.00	0.000	17	71.3	48.2	4.5	2.75	2.59	0.08	8853
Rubber Tired Dozers	1	8	2006	6	18	108	1.00	0.40	6,136	358	ULSD	2.51	1.03	0.25	0.12	0.11	0.005	559.8	0.2	0.1	0.0	0.01	0.01	0.000	36	85.5	35.2	8.6	3.93	3.69	0.17	19086
Scrapers	2	8	2006	6	18	108	1.00	0.48	3,624	356	ULSD	2.43	0.99	0.19	0.10	0.10	0.005	559.8	0.4	0.2	0.0	0.02	0.01	0.001	86	197.9	80.2	15.5	8.47	7.90	0.41	45551
Tractors/Loaders/Backhoes	2	8	2006	6	22	132	1.00	0.37	4,096	75	ULSD	5.04	3.43	0.30	0.25	0.23	0.005	559.8	0.2	0.1	0.0	0.01	0.01	0.000	17	81.4	55.3	4.9	4.03	3.78	0.08	9041
Skid Steer Loaders	2	8	2006	6	20	120	1.00	0.37	2,376	45	ULSD	4.85	3.55	0.37	0.33	0.31	0.006	559.8	0.1	0.1	0.0	0.01	0.01	0.000	9	42.7	31.3	3.3	2.92	2.72	0.05	4931
Trenching/Site Prep (12/15/2014 - 2/15/2015)																																
Rubber Tired Dozers	3	8	2006	6	38	228	1.00	0.40	6,136	358	ULSD	2.51	1.03	0.25	0.12	0.11	0.005	559.8	1.0	0.4	0.1	0.05	0.04	0.002	229	541.5	222.8	54.7	24.89	23.37	1.08	120879
Tractors/Loaders/Backhoes	3	8	2006	6	38	228	1.00	0.37	4,096	75	ULSD	5.04	3.43	0.30	0.25	0.23	0.005	559.8	0.4	0.3	0.0	0.02	0.02	0.000	44	210.9	143.4	12.6	10.45	9.81	0.21	23424
Trenchers	1	8	2006	6	20	120	1.00	0.50	2,384	70	ULSD	4.92	3.29	0.25	0.23	0.21	0.005	559.8	0.1	0.1	0.0	0.00	0.00	0.000	10	45.5	30.4	2.4	2.09	1.95	0.05	5183
Excavators	1	8	2006	6	18	108	1.00	0.32	4,368	30	ULSD	5.03	4.13	0.48	0.38	0.35	0.006	559.8	0.0	0.0	0.0	0.00	0.00	0.000	2	11.5	9.4	1.1	0.86	0.81	0.01	1280
Building Exterior (1/15/2015 - 7/15/2016)																																
Cranes	1	8	2006	6	199	1194	1.00	0.29	3,552	208	ULSD	4.37	1.01	0.21	0.10	0.10	0.005	559.8	1.3	0.3	0.1	0.03	0.03	0.002	168	693.1	159.8	32.6	16.59	15.47	0.79	88882
Forklifts	5	8	2006	6	396	2376	1.00	0.20	5,520	149	ULSD	4.55	3.09	0.30	0.18	0.17	0.005	559.8	6.7	4.6	0.4	0.27	0.25	0.007	827	3549.0	2414.9	235.6	140.57	132.58	3.90	436901
Generator Sets	1	8	2006	6	396	2376	1.00	0.49	6,520	84	ULSD	5.21	3.63	0.37	0.28	0.27	0.005	559.8	2.1	1.5	0.1	0.12	0.11	0.002	229	1123.3	781.6	79.1	61.19	57.88	1.08	120690
Tractors/Loaders/Backhoes	3	8	2006	6	300	1800	1.00	0.37	4,096	75	ULSD	5.04	3.43	0.30	0.25	0.23	0.005	559.8	3.2	2.1	0.2	0.16	0.15	0.003	350	1664.6	1131.9	99.4	82.48	77.41	1.65	184930
Welders	1	8	2006	6	45	270	1.00	0.30	5,144	46	ULSD	5.11	4.35	0.52	0.39	0.37	0.006	559.8	0.1	0.1	0.0	0.01	0.01	0.000	9	41.9	35.7	4.3	3.22	3.04	0.05	4598
Aerial Lifts	1	8	2006	8	186	1488	1.00	0.31	2,128	120	ULSD	4.90	3.26	0.25	0.22	0.21	0.005	559.8	1.1	0.8	0.1	0.05	0.05	0.001	129	597.9	398.4	30.2	27.09	25.21	0.61	68312
Concrete Pumps	2	8	2006	6	176	1056	1.00	0.34	3,432	130	ULSD	4.42	2.95	0.25	0.16	0.15	0.005	559.8	1.7	1.1	0.1	0.06	0.06	0.002	218	909.5	606.1	51.1	33.01	30.90	1.03	115204
Stucco Pump	1	8	2006	5	190	950	1.00	0.30	3,432	40	ULSD	4.95	3.86	0.43	0.35	0.33	0.006	559.8	0.2	0.2	0.0	0.02	0.02	0.000	27	124.3	96.9	10.7	8.91	8.35	0.14	14069
Compressors	6	8	2006	6	250	1500	1.00	0.32	6,520	30	ULSD	5.23	4.75	0.60	0.42	0.40	0.006	559.8	1.9	1.7	0.2	0.15	0.14	0.002	202	996.9	904.9	113.4	80.36	76.09	1.06	106626
Aerial Lifts	2	8	2006	6	250	1500	1.00	0.31	2,128	75	ULSD	4.90	3.26	0.25	0.22	0.21	0.005	559.8	1.4	1.0	0.1	0.06	0.06	0.001	163	753.5	502.0	38.1	34.13	31.77	0.77	86078
Skid Steer Loaders	2	8	2006	6	250	1500	1.00	0.37	3,432	45	ULSD	4.95	3.86	0.43	0.35	0.33	0.006	559.8	1.0	0.8	0.1	0.07	0.07	0.001	117	544.7	424.5	47.0	39.06	36.59	0.61	61643
Building Interior/Architectural Coating (8/15/2015 - 9/15/2016)																																
Compressors	5	8	2006	6	264	1584	1.00	0.32	6,520	30	ULSD	5.23	4.75	0.60	0.42	0.40	0.006	559.8	1.7	1.5	0.2	0.13	0.13	0.002	178	877.3	796.3	99.8	70.72	66.96	0.93	93831
Texture Spray Rig	1	8	2006	6	264	1584	1.00	0.32	6,520	30	ULSD	5.23	4.75	0.60	0.42	0.40	0.006	559.8	0.3	0.3	0.0	0.03	0.03	0.000	36	175.5	159.3	20.0	14.14	13.39	0.19	18766
Paint Spray Rig	1	8	2006	6	264	1584	1.00	0.32	6,520	30	ULSD	5.23	4.75	0.60	0.42	0.40	0.006	559.8	0.3	0.3	0.0	0.03	0.03	0.000	36	175.5	159.3	20.0	14.14	13.39	0.19	18766
Paving (8/15/2016 - 9/15/2016)																																
Pavers	2	8	2006	6	10	60	1.00	0.42	2,592	89	ULSD	4.93	3.30	0.26	0.23	0.21	0.005	559.8	0.1	0.1	0.0	0.00	0.00	0.000	10	48.8	32.7	2.6	2.26	2.11	0.05	5536
Paving Equipment	2	8	2006	6	10	60	1.00	0.36	3,200	82	ULSD	4.98	3.35	0.28	0.24	0.22	0.005	559.8	0.1	0.0	0.0	0.00	0.00	0.000	8	38.9	26.2	2.2	1.85	1.73	0.04	4372
Rollers	2	8	2006	6	10	60	1.00	0.38	2,392	84	ULSD	4.92	3.29	0.25	0.23	0.21	0.005	559.8	0.1	0.1	0.0	0.00	0.00	0.000	9	41.5	27.8	2.2	1.91	1.78	0.04	4727
Vaccum Truck	1	8	2006	8	12	96	1.00	0.46	5,248	200	ULSD	4.47	1.05	0.25	0.11	0.11	0.005	559.8	0.2	0.0	0.0	0.00	0.00	0.000	21	87.0	20.4	4.8	2.19	2.05	0.10	10900
Subtotal																			***29.16***	***19.13***	***2.12***	***1.43***	***1.35***	***0.03***	***3648***	***15395.3***	***10102.3***	***1117.8***	***756.1***	***711.4***	***17.5***	***1,926,312***

On-Site On-Road Vehicles	No. Trucks		Onsite Travel (ft) per Truck	Daily Hours In Use	Days Per Year	Annual Hours per Truck	Idle Minutes per Truck	Annual Miles per Truck				Emission Factors (g/mi) NOx	CO	ROG	PM10	PM2.5	SO2	CO2	NOx	CO	ROG	PM10	PM2.5	SO2	CO2	NOx	CO	ROG	PM10	PM2.5	SO2	CO2
HHDT Diesel Emission Factors - Running												16.640	4.323	2.061	0.245	0.225	0.017	3238.4														
HHDT Diesel Emission Factors - Idle												66.24	34.36	6.389	0.305	0.281	0.067	6854.4														
Demolition (9/15/2014 - 11/15/2014)																																
Water Truck	2	-	-	8	44	352	-	3520		-	ULSD								0.49	0.13	0.06	0.01	0.01	0.00	95	258.3	67.1	32.0	3.8	3.50	0.3	50,263
Haul Trucks	600		1850	-	-	-	10	0.35		-	ULSD								0.04	0.02	0.00	0.00	0.00	0.00	6	22.3	9.6	2.4	0.18	0.17	0.0	3,012
Grading/Excavation (11/15/2014 -12/15/2014)																																
Water Truck	2	-	-	8	22	176	-	1760		-	ULSD								0.24	0.06	0.03	0.00	0.00	0.00	48	129.1	33.5	16.0	1.9	1.75	0.1	25,131
Building Exterior (1/15/2015 - 7/15/2016)																																
Cement Trucks	1667		1850	-	-	-	60	0.35		-	ULSD								0.50	0.25	0.05	0.00	0.00	0.00	56	264.9	131.8	26.1	1.44	1.32	0.3	29,361
Vendor Trucks	9900		1850	-	-	-	10	0.35		-	ULSD								0.70	0.30	0.07	0.01	0.01	0.00	94	368.2	158.0	39.0	2.98	2.74	0.4	49,699
Subtotal																			***1.98***	***0.76***	***0.22***	***0.02***	***0.02***	***0.00***	***298***	***1042.8***	***400.1***	***115.5***	***10.3***	***9.5***	***1.1***	***157,466***
TOTAL OFF-ROAD EQUIPMENT & ON-SITE ON-ROAD VEHICLE EMISSIONS												**-**	**-**	**-**	**-**				**31.1**	**19.9**	**2.3**	**1.5**	**1.37**	**0.04**	**3,947**	**16,438**	**10,502**	**1,233**	**766**	**721**	**19**	**2,083,778**
																								Total tons -->		**8.2**	**5.3**	**0.6**	**0.4**	**0.36**	**0.01**	**1,042**

Notes: Cumulative hours operation based on statewide averages
On-Road vehicle emission factors for 2015 from EMFAC2011 for Santa Clara Co for heavy-heavy duty diesel trucks. Onsite truck travel s¡10 mph
Vendor trips assume 100% HHDT trucks

Raintree - Construction Worker Vehicle Trip Emissions

Air Pollutant and GHG Emissions

Average Daily Emissions

Trip Type	Ave Daily Trips	Vehicle Emissions per Day (pounds/day)				
		ROG	NOx	PM10	PM2.5	CO2
Worker Trips	291	0.94	1.12	0.76	0.23	1672
Total	**291**	**0.9**	**1.1**	**0.8**	**0.2**	**1,672**

Total Emissions

Trip Type	Trips	Annual Vehicle Emissions (tons)					CO2 MT CO2
		ROG	NOx	PM10	PM2.5	CO2	
Worker Trips	153,648	0.25	0.29	0.20	0.06	441	
Total	**153,648**	**0.25**	**0.29**	**0.20**	**0.06**	**441**	**400**
Number of days for project construction =		528					

Vehicle & Trip Information

Description	Trip Length*	% LDA	%LDT	%MDT	%HDT	%HHDT
Worker Vehicles	**7.3**	50%	50%			

* Trip length is one way distance in miles based on CalEEMod.

Composite Running Emission Factors, gm/mi

Description	Vehicle Exhaust Emission Factors					Entrained Dust	
	ROG	NOx	PM10	PM2.5	CO2	PM10	PM2.5
Employee Vehicles	0.158	0.199	0.047	0.020	346.68	0.116	0.029

Emission factors for vehicle exhaust from EMFAC2011

Trip Emissions, gm/trip

Description	ROG	NOx	PM10	PM2.5	CO2
Employee Vehicles	0.310	0.291	0.003	0.003	77.97

Emission factors based on EMFAC2011

Entrained Roadway Dust (gm/mi)

Vehicle	PM10	PM2.5
All	0.116	0.029

EPA AP-42 Section 13.2.1

$E = k(sL)^{0.91} \times (W)^{1.02}$

Where:

k (PM2.5) =	0.25	
k (PM10) =	1.00	
sL =	0.035	g/m^2 for major & collector roads
W =	2.4	tons

Emission Factors - Off-Road Compression Ignited Engines

	NOx			CO			ROG			PM10			PM2.5			CO2			SO2
EF ID	ZH EF (g/hp-hr)	DR (g/hp-hr^2)	Fuel CF	ZH EF (g/hp-hr)	DR (g/hp-hr^2)	Fuel CF	ZH EF (g/hp-hr)	DR (g/hp-hr^2)	Fuel CF	ZH EF (g/hp-hr)	DR (g/hp-hr^2)	Fuel CF	ZH EF (g/hp-hr)	DR (g/hp-hr^2)	Fuel CF	ZH EF (g/hp-hr)	DR (g/hp-hr^2)	Fuel LCF-CF	(g/hp-hr)
Demolition (9/15/2014 - 11/15/2014)																			
ULSD1202006	5.01	7.45E-05	0.95	3.09	8.21E-05	1.00	0.19	2.71E-05	1.00	0.24	1.76E-05	0.80	0.22	1.76E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD1752006	4.44	6.46E-05	0.95	2.70	7.14E-05	1.00	0.16	2.57E-05	1.00	0.16	1.18E-05	0.80	0.15	1.18E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD5002006	2.45	3.18E-05	0.95	0.92	1.82E-05	1.00	0.10	2.50E-05	1.00	0.11	5.55E-06	0.80	0.10	5.55E-06	0.80	568.30	0.00E+00	0.99	0.005
ULSD502006	4.88	9.83E-05	0.95	2.86	2.90E-04	1.00	0.24	5.45E-05	1.00	0.35	2.72E-05	0.80	0.32	2.72E-05	0.80	568.30	0.00E+00	0.99	0.006
ULSD2502006	4.38	6.33E-05	0.95	0.92	2.43E-05	1.00	0.12	2.40E-05	1.00	0.11	5.79E-06	0.80	0.10	5.79E-06	0.80	568.30	0.00E+00	0.99	0.005
ULSD2502006	4.38	6.33E-05	0.95	0.92	2.43E-05	1.00	0.12	2.40E-05	1.00	0.11	5.79E-06	0.80	0.10	5.79E-06	0.80	568.30	0.00E+00	0.99	0.005
Grading/Excavation (11/15/2014 -12/15/2014)																			
ULSD1752006	4.44	6.46E-05	0.95	2.70	7.14E-05	1.00	0.16	2.57E-05	1.00	0.16	1.18E-05	0.80	0.15	1.18E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD1752006	4.44	6.46E-05	0.95	2.70	7.14E-05	1.00	0.16	2.57E-05	1.00	0.16	1.18E-05	0.80	0.15	1.18E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD5002006	2.45	3.18E-05	0.95	0.92	1.82E-05	1.00	0.10	2.50E-05	1.00	0.11	5.55E-06	0.80	0.10	5.55E-06	0.80	568.30	0.00E+00	0.99	0.005
ULSD5002006	2.45	3.18E-05	0.95	0.92	1.82E-05	1.00	0.10	2.50E-05	1.00	0.11	5.55E-06	0.80	0.10	5.55E-06	0.80	568.30	0.00E+00	0.99	0.005
ULSD1202006	5.01	7.45E-05	0.95	3.09	8.21E-05	1.00	0.19	2.71E-05	1.00	0.24	1.76E-05	0.80	0.22	1.76E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD502006	4.88	9.83E-05	0.95	2.86	2.90E-04	1.00	0.24	5.45E-05	1.00	0.35	2.72E-05	0.80	0.32	2.72E-05	0.80	568.30	0.00E+00	0.99	0.006
Trenching/Site Prep (12/15/2014 - 2/15/2015)																			
ULSD5002006	2.45	3.18E-05	0.95	0.92	1.82E-05	1.00	0.10	2.50E-05	1.00	0.11	5.55E-06	0.80	0.10	5.55E-06	0.80	568.30	0.00E+00	0.99	0.005
ULSD1202006	5.01	7.45E-05	0.95	3.09	8.21E-05	1.00	0.19	2.71E-05	1.00	0.24	1.76E-05	0.80	0.22	1.76E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD1202006	5.01	7.45E-05	0.95	3.09	8.21E-05	1.00	0.19	2.71E-05	1.00	0.24	1.76E-05	0.80	0.22	1.76E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD502006	4.88	9.83E-05	0.95	2.86	2.90E-04	1.00	0.24	5.45E-05	1.00	0.35	2.72E-05	0.80	0.32	2.72E-05	0.80	568.30	0.00E+00	0.99	0.006
Building Exterior (1/15/2015 - 7/15/2016)																			
ULSD2502006	4.38	6.33E-05	0.95	0.92	2.43E-05	1.00	0.12	2.40E-05	1.00	0.11	5.79E-06	0.80	0.10	5.79E-06	0.80	568.30	0.00E+00	0.99	0.005
ULSD1752006	4.44	6.46E-05	0.95	2.70	7.14E-05	1.00	0.16	2.57E-05	1.00	0.16	1.18E-05	0.80	0.15	1.18E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD1202006	5.01	7.45E-05	0.95	3.09	8.21E-05	1.00	0.19	2.71E-05	1.00	0.24	1.76E-05	0.80	0.22	1.76E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD1202006	5.01	7.45E-05	0.95	3.09	8.21E-05	1.00	0.19	2.71E-05	1.00	0.24	1.76E-05	0.80	0.22	1.76E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD502006	4.88	9.83E-05	0.95	2.86	2.90E-04	1.00	0.24	5.45E-05	1.00	0.35	2.72E-05	0.80	0.32	2.72E-05	0.80	568.30	0.00E+00	0.99	0.006
ULSD1202006	5.01	7.45E-05	0.95	3.09	8.21E-05	1.00	0.19	2.71E-05	1.00	0.24	1.76E-05	0.80	0.22	1.76E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD1752006	4.44	6.46E-05	0.95	2.70	7.14E-05	1.00	0.16	2.57E-05	1.00	0.16	1.18E-05	0.80	0.15	1.18E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD502006	4.88	9.83E-05	0.95	2.86	2.90E-04	1.00	0.24	5.45E-05	1.00	0.35	2.72E-05	0.80	0.32	2.72E-05	0.80	568.30	0.00E+00	0.99	0.006
ULSD502006	4.88	9.83E-05	0.95	2.86	2.90E-04	1.00	0.24	5.45E-05	1.00	0.35	2.72E-05	0.80	0.32	2.72E-05	0.80	568.30	0.00E+00	0.99	0.006
ULSD1202006	5.01	7.45E-05	0.95	3.09	8.21E-05	1.00	0.19	2.71E-05	1.00	0.24	1.76E-05	0.80	0.22	1.76E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD502006	4.88	9.83E-05	0.95	2.86	2.90E-04	1.00	0.24	5.45E-05	1.00	0.35	2.72E-05	0.80	0.32	2.72E-05	0.80	568.30	0.00E+00	0.99	0.006
Building Interior/Architectural Coating (8/15/2015 - 9/15/2016)																			
ULSD502006	4.88	9.83E-05	0.95	2.86	2.90E-04	1.00	0.24	5.45E-05	1.00	0.35	2.72E-05	0.80	0.32	2.72E-05	0.80	568.30	0.00E+00	0.99	0.006
ULSD502006	4.88	9.83E-05	0.95	2.86	2.90E-04	1.00	0.24	5.45E-05	1.00	0.35	2.72E-05	0.80	0.32	2.72E-05	0.80	568.30	0.00E+00	0.99	0.006
ULSD502006	4.88	9.83E-05	0.95	2.86	2.90E-04	1.00	0.24	5.45E-05	1.00	0.35	2.72E-05	0.80	0.32	2.72E-05	0.80	568.30	0.00E+00	0.99	0.006
Paving (8/15/2016 - 9/15/2016)																			
ULSD1202006	5.01	7.45E-05	0.95	3.09	8.21E-05	1.00	0.19	2.71E-05	1.00	0.24	1.76E-05	0.80	0.22	1.76E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD1202006	5.01	7.45E-05	0.95	3.09	8.21E-05	1.00	0.19	2.71E-05	1.00	0.24	1.76E-05	0.80	0.22	1.76E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD1202006	5.01	7.45E-05	0.95	3.09	8.21E-05	1.00	0.19	2.71E-05	1.00	0.24	1.76E-05	0.80	0.22	1.76E-05	0.80	568.30	0.00E+00	0.99	0.005
ULSD2502006	4.38	6.33E-05	0.95	0.92	2.43E-05	1.00	0.12	2.40E-05	1.00	0.11	5.79E-06	0.80	0.10	5.79E-06	0.80	568.30	0.00E+00	0.99	0.005

Notes: ZH EF = Zero hour emission factor
DR = Deterioration rate
ULSD = Ultra low sulfur diesel (15 ppmw sulfur, 0.0015% sulfur)

Refs: CARB OFFFROAD2007 model (http://www.arb.ca.gov/msei/offroad/offroad.htm), December, 2006.
Stationary/Off-road engines ARB, "California's Emissions Inventory for Off-Road Large Compression-Ignited (CI) Engines (> 25 HP)" MAC#99-32

Raintree and Sates Regis Construction Sites Offsite Truck Emissions: 2014 - 2016

Truck Route/Location	Line Source Name	Vehicle Type[1]	Annual Trips[2] 2014-2015	Annual Trips[2] 2015-2016	Travel Speed (mph)	PM2.5 Emission Factors[3] (g/mi) 2014	PM2.5 Emission Factors[3] (g/mi) 2015	Construction[4] Schedule (hrs/day)	Trip Travel Distance (feet)	Trip Travel Distance (miles)	Annual DPM Emissions (lb/year) 2014-2015	Annual DPM Emissions (lb/year) 2015-2016	Annualized Average Hourly Emissions (lb/hr) 2014-2015	Annualized Average Hourly Emissions (lb/hr) 2015-2016
Raintree Site														
North Fair Oaks	FAIROAK	HHDT	4534	9900	25	0.1497	0.1004	9	940	0.18	0.27	0.39	8.11E-05	1.19E-04
		MHDT	0	9900	25	0.1420	0.0965	9	940	0.18	0.00	0.38	0.0E+00	1.14E-04
		Total	***4,534***	***19,800***							***0.27***	***0.77***	***8.11E-05***	***2.33E-04***
East Weddell Drive	R_WEDDEL	HHDT	4,534	9,900	25	0.1497	0.1004	9	450	0.09	0.13	0.19	3.88E-05	5.69E-05
		MHDT	0	9,900	25	0.1420	0.0965	9	450	0.09	0.00	0.18	0.0E+00	5.47E-05
		Total	***4,534***	***19,800***							***0.13***	***0.37***	***3.88E-05***	***1.12E-04***
North Fair Oaks	FAIROAK	HHDT	5798	0	25	0.1497	0.1004	9	940	0.18	0.34	0.00	1.04E-04	0.00E+00
		MHDT	2662	0	25	0.1420	0.0965	9	940	0.18	0.15	0.00	4.5E-05	0.00E+00
		Total	***8460***	***0***							***0.49***	***0.00***	***1.49E-04***	***0.00E+00***
East Weddell Drive	S_WEDDEL	HHDT	5798	0	25	0.1497	0.1004	9	600	0.11	0.22	0.00	6.62E-05	0.00E+00
		MHDT	2662	0	25	0.1420	0.0965	9	600	0.11	0.09	0.00	2.9E-05	0.00E+00
		Total	***8460***	***0***							***0.31***	***0.00***	***9.50E-05***	***0.00E+00***

[1] HHDT = heavy heavy duty truck & MHDT = medium heavy duty truck

[2] Annual trips - see calculations below. Assumes 1/2 trips arrive/depart via westbound Monroe St & 1/2 arrive/depart via eastbound Monroe St.

[3] Emission factors from EMFAC2011 for Santa Clara Co. and assumes all trucks are diesel.

[4] Construction hours from 7 am to 6 pm

Raintree Site	Annual Trips		
Heavy Duty Truck Trips	**2014-2015**	**2015-2016**	**Total**
Demolition - HHDT	1200	0	1,200
Grading/Excavation - HHDT	0	0	0
Cement Trucks - HHDT	3334	0	3,334
Vendor Trips During Constru	**2014-2015**	**2015-2016**	
HHDT	0	9900	9,900
MHDT	0	9900	9,900
Total Trips	**2014-2015**	**2015-2016**	
HHDT	4534	9900	14,434
MHDT	0	9900	9,900
All	4,534	19,800	24,334

* Assumes vendor trucks are 50% HHDT and 50% MHDT

Sares Regis Site	Annual Trips		
Heavy Duty Truck Trips	**2014-2015**	**2015-2016**	**Total**
Demolition - HHDT	812	0	812
Grading/Excavation - HHDT	474	0	474
Cement Trucks - HHDT	1850	0	1,850
Vendor Trips During Constru	**2014-2015**	**2015-2016**	
HHDT	2662	0	2,662
MHDT	2662	0	2,662
Total Trips	**2014-2015**	**2015-2016**	
HHDT	5798	0	5,798
MHDT	2662	0	2,662
All	8,460	0	8,460

Sares Regis Site
DPM Construction Emissions for Modeling

Construction Year	Area Source	DPM Emissions (tons)	(lbs)	(lb/hr)	(g/s)	Modeled Area (m^2)	DPM Emission Rate $g/s/m^2$
2014 - 2016	ConArea	0.12	247	0.07519	9.47E-03	15,934	5.95E-07

Notes:
Emissions assumed to be evenly distributed over each construction areas

hr/day =	9	(7am - 4pm)
days/yr =	365	
hours/year =	3285	

Raintree Site
DPM Construction Emissions for Modeling

Construction Year	Area Source	DPM Emissions (tons)	(lbs)	(lb/hr)	(g/s)	Modeled Area (m^2)	DPM Emission Rate $g/s/m^2$
2014 - 2016	ConArea	0.36	721	0.21948	2.77E-02	52,148	5.30E-07

Notes:
Emissions assumed to be evenly distributed over each construction areas

hr/day =	9	(7am - 4pm)
days/yr =	365	
hours/year =	3285	

Sares Regis Site
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Year	Exposure Exposure Duration (years)	Child - Exposure Information DPM Conc (ug/m3) Year	Child - Exposure Information DPM Conc (ug/m3) Annual	Child - Exposure Information Exposure Adjust Factor	Child Cancer Risk (per million)	Adult - Exposure Information Modeled DPM Conc (ug/m3) Year	Adult - Exposure Information Modeled DPM Conc (ug/m3) Annual	Adult - Exposure Information Exposure Adjust Factor	Adult Cancer Risk (per million)
1	1	2014	0.1299	10	11.37	2014	0.1299	1	0.59
2	1		0.0000	10	0.00		0.0000	1	0.00
3	1		0.0000	4.75	0.00		0.0000	1	0.00
4	1		0.0000	3	0.00		0.0000	1	0.000
5	1		0.0000	3	0.00		0.0000	1	0.00
6	1		0.0000	3	0.00		0.0000	1	0.00
7	1		0.0000	3	0.00		0.0000	1	0.00
8	1		0.0000	3	0.00		0.0000	1	0.00
9	1		0.0000	3	0.00		0.0000	1	0.00
10	1		0.0000	3	0.00		0.0000	1	0.00
11	1		0.0000	3	0.00		0.0000	1	0.00
12	1		0.0000	3	0.00		0.0000	1	0.00
13	1		0.0000	3	0.00		0.0000	1	0.00
14	1		0.0000	3	0.00		0.0000	1	0.00
15	1		0.0000	3	0.00		0.0000	1	0.00
16	1		0.0000	3	0.00		0.0000	1	0.00
17	1		0.0000	1.5	0.00		0.0000	1	0.00
18	1		0.0000	1	0.00		0.0000	1	0.00
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65	1		0.0000	1	0.00		0.0000	1	0.00
66	1		0.0000	1	0.00		0.0000	1	0.00
67	1		0.0000	1	0.00		0.0000	1	0.00
68	1		0.0000	1	0.00		0.0000	1	0.00
69	1		0.0000	1	0.00		0.0000	1	0.00
70	1		0.0000	1	0.00		0.0000	1	0.00
Total Increased Cancer Risk					**11.4**				**0.6**

Raintree Site
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

	Exposure	Child - Exposure Information			Child	Adult - Exposure Information			Adult
	Exposure			Exposure	Cancer	Modeled		Exposure	Cancer
	Duration	DPM Conc (ug/m3)		Adjust	Risk	DPM Conc (ug/m3)		Adjust	Risk
Year	(years)	Year	Annual	Factor	(per million)	Year	Annual	Factor	(per million)
1	1	2014	0.2170	10	19.00	2014	0.2170	1	0.99
2	1		0.0000	10	0.00		0.0000	1	0.00
3	1		0.0000	4.75	0.00		0.0000	1	0.00
4	1		0.0000	3	0.00		0.0000	1	0.000
5	1		0.0000	3	0.00		0.0000	1	0.00
6	1		0.0000	3	0.00		0.0000	1	0.00
7	1		0.0000	3	0.00		0.0000	1	0.00
8	1		0.0000	3	0.00		0.0000	1	0.00
9	1		0.0000	3	0.00		0.0000	1	0.00
10	1		0.0000	3	0.00		0.0000	1	0.00
11	1		0.0000	3	0.00		0.0000	1	0.00
12	1		0.0000	3	0.00		0.0000	1	0.00
13	1		0.0000	3	0.00		0.0000	1	0.00
14	1		0.0000	3	0.00		0.0000	1	0.00
15	1		0.0000	3	0.00		0.0000	1	0.00
16	1		0.0000	3	0.00		0.0000	1	0.00
17	1		0.0000	1.5	0.00		0.0000	1	0.00
18	1		0.0000	1	0.00		0.0000	1	0.00
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65	1		0.0000	1	0.00		0.0000	1	0.00
66	1		0.0000	1	0.00		0.0000	1	0.00
67	1		0.0000	1	0.00		0.0000	1	0.00
68	1		0.0000	1	0.00		0.0000	1	0.00
69	1		0.0000	1	0.00		0.0000	1	0.00
70	1		0.0000	1	0.00		0.0000	1	0.00
Total Increased Cancer Risk					**19.0**				**1.0**

Raintree& Sares Regis Sites
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

	Exposure	Child - Exposure Information			Child	Adult - Exposure Information			Adult
	Exposure			Exposure	Cancer	Modeled		Exposure	Cancer
	Duration	DPM Conc (ug/m3)		Adjust	Risk	DPM Conc (ug/m3)		Adjust	Risk
Year	(years)	Year	Annual	Factor	(per million)	Year	Annual	Factor	(per million)
1	1	2013	0.2251	10	19.71	2014	0.2251	1	1.02
2	1		0.0000	10	0.00		0.0000	1	0.00
3	1		0.0000	4.75	0.00		0.0000	1	0.00
4	1		0.0000	3	0.00		0.0000	1	0.000
5	1		0.0000	3	0.00		0.0000	1	0.00
6	1		0.0000	3	0.00		0.0000	1	0.00
7	1		0.0000	3	0.00		0.0000	1	0.00
8	1		0.0000	3	0.00		0.0000	1	0.00
9	1		0.0000	3	0.00		0.0000	1	0.00
10	1		0.0000	3	0.00		0.0000	1	0.00
11	1		0.0000	3	0.00		0.0000	1	0.00
12	1		0.0000	3	0.00		0.0000	1	0.00
13	1		0.0000	3	0.00		0.0000	1	0.00
14	1		0.0000	3	0.00		0.0000	1	0.00
15	1		0.0000	3	0.00		0.0000	1	0.00
16	1		0.0000	3	0.00		0.0000	1	0.00
17	1		0.0000	1.5	0.00		0.0000	1	0.00
18	1		0.0000	1	0.00		0.0000	1	0.00
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65	1		0.0000	1	0.00		0.0000	1	0.00
66	1		0.0000	1	0.00		0.0000	1	0.00
67	1		0.0000	1	0.00		0.0000	1	0.00
68	1		0.0000	1	0.00		0.0000	1	0.00
69	1		0.0000	1	0.00		0.0000	1	0.00
70	1		0.0000	1	0.00		0.0000	1	0.00
Total Increased Cancer Risk					**19.7**				**1.0**

APPENDIX E
WATER SUPPLY REPORT

Date: July 10, 2013

Project Addresses: 520-592 E. Weddell Drive & 610-630 E. Weddell Drive

Project Numbers: 2013-7132 & 2013-7081

Prepared by: Ryan Kuchenig, City of Sunnyvale, Associate Planner
Mansour Nasser, City of Sunnyvale, Water & Sewer Systems Division Manager

Re: Water Supply Report

Background

An Environmental Impact Report (EIR) is being prepared by Amy Skewes-Cox for the City of Sunnyvale for a proposed multi-family development under the requirements of the California Environmental Quality Act (CEQA). The project that is evaluated in the EIR consists of two separate development projects proposed by two separate developers. These two multi-family development projects are combined because of their proximity to each other and for the assessment of cumulative impacts.

The environmental analysis includes providing an assessment of water supply adequacy for the proposed projects. Senate Bill 610 (SB 610) also requires an assessment of whether available water supply is sufficient to serve the demand generated by the projects. This report provides information with regard to an assessment of the available water supply to serve the proposed project. This assessment also builds on the City's 2010 Urban Water Management Plan.

Project Description

The proposed project is located at 520-592 E. Weddell Drive and 610-630 E. Weddell Drive, just north of Highway 101 along N. Fair Oaks Avenue. Both sites are currently developed with industrial buildings. The 12.04-acre site at 520-592 E. Weddell ("Raintree") is partially occupied by several industrial and research and development (R&D) businesses. The Raintree buildings total approximately 183,020 square feet. The 4.04-acre site at 610 E. Weddell Drive ("Sares Regis") has been vacant for several years and was previously occupied

by an industrial/R&D business. The Sares Regis building totals approximately 62,442 square feet.

The applicant for the Raintree project proposes to construct 465 residential apartment units within eight buildings. A mixture of studios, one-bedroom and two-bedroom units is planned, with an average unit size of approximately 1,000 square feet. The gross building square footage would be 901,870 square feet (including garages). The project also includes landscaping.

The applicant for the Sares Regis project proposes to construct 205 residential apartment units within one building. Apartments would range in size from 575 square feet to 1,400 square feet and would include one-, two-, and three-bedroom units. The gross building square footage would be square footage of the residential building would be approximately 280,000 square feet and the gross square footage of the garage would be 135,000 square feet. The project also includes landscaping.

The EIR analysis combines the two projects proposed by the applicant, which is referred to as the "Applicant Proposed Scenario" in the EIR. The Applicant Proposed Scenario totals 670 residential apartment units.

At the request of the applicants, the Sunnyvale City Council has initiated a General Plan study to examine a higher density. Therefore, the EIR also evaluates a second development scenario, referred to as the "Full Buildout Scenario". The Full Buildout Scenario includes 679 units for the Raintree site and 259 units for the Sares Regis site, for a total of 938 residential apartment units.

Project's Proposed Water Demand & Historical Use

The applicants provided estimates for proposed water demand for the Applicant Proposed Scenario and Full Build-out Scenario. Water demand estimated for the Applicant Proposed Scenario is 195.5 acre-feet per year (AFY), and 264 AFY for the Full Build-out Scenario.

Staff reviewed water usage records when both sites were occupied to determine historical water demand. Based on water usage records within a 12-month period, a total of 186 acre-feet per year was used. The Applicant Proposed Scenario would result in an additional 9.5 AFY and the Full Buildout Scenario would result in an additional 78 AFY.

Sunnyvale's Sources of Supply

The City has three sources of potable water supply: purchased surface water from San Francisco Public Utilities Commission (SFPUC), purchased treated

surface water from the Santa Clara Valley Water District (SCVWD), and groundwater from seven, City-owned and operated wells. One additional well is on stand-by for emergencies. An additional source of non-potable water comes from the City's Water Pollution Control Plant in the form of recycled water.

Figure **1** represents the percentage of water supply from each source for Calendar Year 2010 and

Table 1 depicts the current and planned water supplies for the City.

Figure 1: City of Sunnyvale Sources of Water Supply

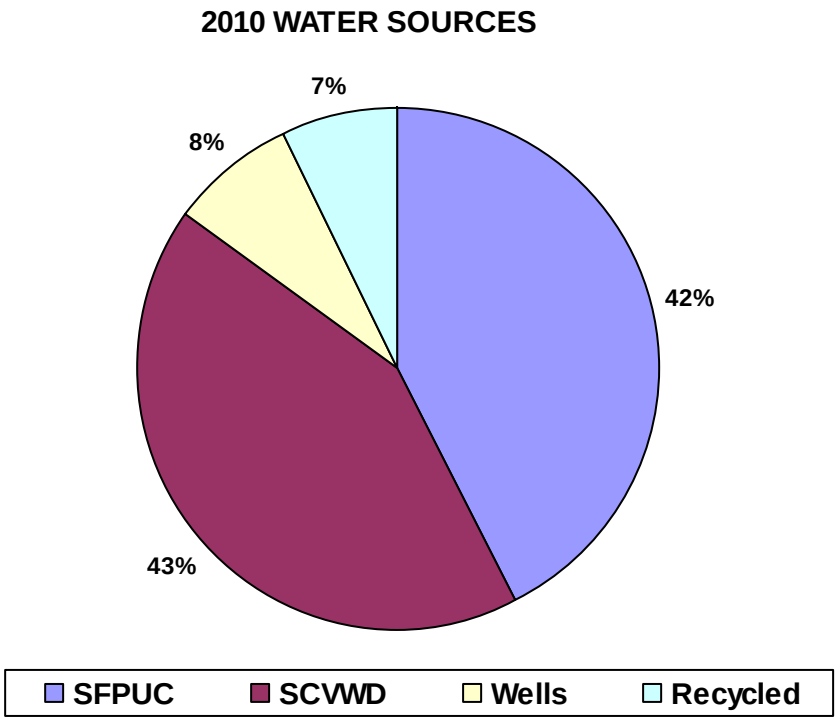

Table 1: Water Supplies – Current and Projected in a Normal Year (AFY)

Water Supply Sources	2010	2015	2020	2025	2030
SFPUC	8,982	10,003	10,003	10,003	10,003
SCVWD	9,331	9,570	9,999	11,023	12,728
Groundwater	1,629	1,000	1,000	1,000	1,000
Recycled Water	1,523	1,400	1,525	1,765	1,775
Total Supply	**21,465**	**21,973**	**22,527**	**23,791**	**25,506**

SFPUC – Wholesaler (Treated Surface Water)

The City receives water from the City and County of San Francisco's Regional Water System (RWS), operated by SFPUC. This supply is predominantly from the Sierra Nevada, delivered through the Hetch Hetchy aqueducts, but also includes treated water produced by the SFPUC from its local watersheds and facilities in Alameda and San Mateo Counties.

The business relationship between the SFPUC and Sunnyvale is largely defined by the "Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County" (WSA) entered into in July 2009 (WSA). The WSA is supplemented by an individual Water Supply Contract between SFPUC and each individual retailer, also entered into in July 2009. These contracts also expire in 25 years. The City of Sunnyvale has an Individual Supply Guarantee (ISG) of 12.58 MGD (or approximately 14,100 acre feet per year). Although the WSA and accompanying Water Supply Contract expire in 2034, the ISG (which quantifies San Francisco's obligation to supply water to its individual wholesale customers) survives their expiration and continues indefinitely. The Sunnyvale contract also includes an Individual Supply Allocation of 9.44 MGD (10,575 AFY) thru 2018, and a minimum purchase amount of 8.93 MGD (10,003 AFY), which Sunnyvale agrees to buy, regardless of whether sales drop below this level.

SCVWD – Wholesaler (Treated Surface Water)

SCVWD supplies the City of Sunnyvale with treated surface water through an entitlement of imported Central Valley Project (CVP) water and the State Water Project (SWP), as well as surface water from local reservoirs. The current contractual agreement between the City and SCVWD sunsets in 2051. It was effective in 1976 with a 75 year term.

SCVWD's imported water is conveyed through the Sacramento-San Joaquin Delta then pumped and delivered to the county through three main pipelines:

the South Bay Aqueduct, which carries water from the SWP, and the Santa Clara Conduit and Pacheco Conduit, which bring water from the federal CVP.

Table 2 represents the existing and planned wholesale treated water supply as determined by the City.

Table 2: Wholesale Supplies – Historical and Planned Treated Water Sources (AFY)

Wholesale Sources	2010	2015	2020	2025	2030	2035
SFPUC	10,003	10,003	10,003	10,003	10,003	10,003
SCVWD	10,409	9,570	9,999	11,023	12,728	12,728
Total	**20,412**	**19,573**	**20,002**	**21,026**	**22,731**	**22,731**

It should be noted that based on current demand projections Sunnyvale plans to use 10,003 AFY from SFPUC by 2035, however its Individual Supply Guarantee is 14,100 AFY.

Groundwater

The City of Sunnyvale has seven operating wells and one well on stand-by for emergencies. The seven wells are used by the City as a supplemental source to the imported SFPUC and SCVWD water supplies. Historically the wells produced more than 8,000 acre-feet annually. Water demand has been reduced due to conservation, building code changes and manufacturing operations moving out of state and overseas. As a result the City now utilizes treated water first to meet its take-or-pay contract provisions before using groundwater. Groundwater production is estimated at 1000 acre-feet annually in the long term. Groundwater will also be used to meet customer demands in the event SFPUC or SCVWD supplies are disrupted.

WATER DEMANDS AND DEMAND PROJECTIONS

The City of Sunnyvale categorizes its water accounts into five broad customer categories: single-family, multi-family, commercial (incorporating industrial and institutional), irrigation, and fire services. The commercial sector includes all non-residential accounts that are not classified as irrigation.

Past, current, and projected water use in the City are summarized by classification of the water delivered to all customers in **Table 3**. Population is a primary factor affecting urban water demand. Since 2005, the number of service connections has increased by more than 1,500 for residential and commercial accounts. Single-family residential connections increased by 446, nearly a 20% increase; multi-family residential connections increased by 278, over a 17% increase; and commercial/institutional connections increased by 941, nearly a 50% increase. Landscape irrigation connections have decreased from 786 to 588 connections while recycled water landscape irrigation connections increased by 31 to 112. "Other" connections, historically fire-lines, have decreased from 862 to 108 connections. The present and projected water demands for the City are shown in **Table 3**. The decrease in demand from 2005 to 2010 can be attributed to economic downturn.

Table 3: Past, Current, and Projected Water Use by Customer Type (AFY)

Customer Type	2005	2010	2015	2020	2025	2030	2035
Single family residential	8,264	7,023	6,555	6,393	6,341	6,378	6,378
Multi-family residential	6,047	8,309	7,755	7,563	7,502	7,545	7,545
Commercial	9,035	4,261	4,507	5,334	6,485	8,100	8,100
Irrigation	642	970	905	883	876	881	881
Other (Firelines)	946	911	850	829	823	827	827
Total Potable	**24,934**	**21,474**	**20,573**	**21,002**	**22,026**	**23,731**	**23,731**

Conclusions

At full build-out the project will result in water demand increase of 78 acre feet annually, from what was historically used on the site. The City of Sunnyvale has contracts in place and adequate supplies from SFPUC, SCVWD and groundwater to meet the proposed project's water demand.

APPENDIX F
MEMO ON SB 18 CONSULTATION

LSA

LSA ASSOCIATES, INC.
157 PARK PLACE
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BERKELEY
CARLSBAD
FORT COLLINS

FRESNO
IRVINE
PALM SPRINGS

RIVERSIDE
ROCKLIN
SAN LUIS OBISPO

August 29, 2013

Ryan Kuchenig
City of Sunnyvale
Department of Community Development
456 West Olive Avenue
Sunnyvale, CA 94086

Subject: SB 18 Consultation

Dear Mr. Kuchenig:

At the request of Amy Skewes-Cox, AICP, and the City of Sunnyvale (City), LSA Associates, Inc. (LSA) initiated Native American consultation for the Sares Regis and Raintree Project (project) pursuant to California Government Code §§65352.3 and 65352.4. These sections of the California Government Code were adopted pursuant to Senate Bill 18 (SB 18) and require local governments to contact, refer plans to, and consult with tribal organizations prior to making a decision to adopt or amend a general or specific plan. The purpose of SB 18 is to obtain Native American tribal input during the planning process to avoid, or mitigate the effects to, cultural places in local government jurisdiction. The project would require a City General Plan amendment to allow for residential development on both sites and is, therefore, subject to the requirements of SB 18.

Native American consultation conducted for the project was completed in accordance with the Governor's Office of Planning and Research *Tribal Consultation Guidelines* (April 15, 2005). Pursuant to these guidelines, LSA contacted the Native American Heritage Commission (NAHC) for a list of tribes eligible to consult for the proposed project. The NAHC provided LSA with a list of five individuals eligible to consult with the City, each of whom was contacted on May 23, 2013, by LSA via letter sent by U.S. Postal Service Certified Mail to inform them of their opportunity to consult for the project and address possible impacts to cultural places. Copies of this correspondence are attached.

No responses to the letters have been received within the required 90-day consultation request period (California Government Code §65352.3(a)(2)), and the City's obligations under California Government Code §65352.3 are considered complete.

Sincerely,

LSA ASSOCIATES, INC.

E. Timothy Jones

E. Timothy Jones
Cultural Resources Manager

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd, Suite 100
WEST SACRAMENTO, CA 955691
(916) 373-3710
Fax (916) 373-5471

May 16, 2013

E. Timothy Jones
159 Park Place
Pt. Richmond, CA 94801

Sent Via Fax: 510-236-3480
# of Pages: 2

RE: SB 18 Tribal Consultation: Santa Clara County

Government Code §65352.3 requires local governments to consult with California Native American tribes identified by the Native American Heritage Commission (NAHC) for the purpose of protecting, and/or mitigating impacts to cultural places. Attached is a consultation list of tribes with traditional lands or cultural places located within the requested General Plan boundaries.

As a part of consultation, the NAHC recommends that local governments conduct record searches through the NAHC and California Historic Resources Information System (CHRIS) to determine if any cultural places are located within the area(s) affected by the proposed action. NAHC Sacred Lands File requests must be made in writing. All requests must include: county, USGS quad map name, township, range and section. Local governments should be aware, however, that records maintained by the NAHC and CHRIS are not exhaustive, and a negative response to these searches does not preclude the existence of a cultural place. A tribe may be the only source of information regarding the existence of a cultural place.

If you receive notification of change of addresses and phone numbers from Tribes, please notify me. With your assistance we are able to assure that our consultation list contains current information.

If you have any questions, please contact me at (916) 653-4038.

Sincerely,

Debbie Pilas-Treadway
Enviromental Specialist III

Native American Tribal Consultation List
City of Sunnyvale
May 8, 2013

Amah MutsunTribal Band
Valentin Lopez, Chairperson
PO Box 5272 Ohlone/Costanoan
Galt , CA 95632
vlopez@amahmutsun.org
916-743-5833

Amah/MutsunTribal Band
Irene Zwierlein, Chairperson
789 Canada Road Ohlone/Costanoan
Woodside , CA 94062
(650) 851-7747 - Home
650-400-4806 cell preferred

Indian Canyon Mutsun Band of Costanoan
Ann Marie Sayers, Chairperson
P.O. Box 28 Ohlone/Costanoan
Hollister , CA 95024
ams@indiancanyon.org
831-637-4238

Muwekma Ohlone Indian Tribe of the SF Bay Area
Rosemary Cambra, Chairperson
PO Box 360791 Ohlone / Costanoan
Milpitas , CA 95036
muwekma@muwekma.org
408-205-9714

The Ohlone Indian Tribe
Andrew Galvan
PO Box 3152 Ohlone/Costanoan
Fremont , CA 94539 Bay Miwok
chochenyo@AOL.com Plains Miwok
(510) 882-0527 - Cell Patwin

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable only for consultation with Native American tribes under Government Code Section 65352.3.

LSA

LSA ASSOCIATES, INC.
157 PARK PLACE
PT. RICHMOND, CALIFORNIA 94801

510.236.6810 TEL
510.236.3480 FAX

BERKELEY
CARLSBAD
FORT COLLINS

FRESNO
IRVINE
PALM SPRINGS

RIVERSIDE
ROCKLIN
SAN LUIS OBISPO

May 23, 2013

Rosemary Cambra, Chairperson
Muwekma Ohlone Indian Tribe
P.O. Box 360791
Milpitas, CA 95036

Subject: Sares Regis Raintree General Plan Amendment, Sunnyvale, Santa Clara County; LSA Project #AWC1301

Dear Chairperson Cambra:

A project is proposed in Sunnyvale, Santa Clara County that would permit medium- and high-density residential development on two areas: the 4.04-acre Sares Regis project site at 610 and 630 E. Weddell Drive; and the 12.04-acre Raintree project site at 520 E. Weddell Drive (see attached maps). Both of the project sites are currently developed with industrial, manufacturing, and office buildings.

A cultural resources records search conducted at the Northwest Information Center at Sonoma State University on March 25, 2013, did not identify recorded Native American resources in or immediately adjacent to the project site.

As the lead agency for this project, the City of Sunnyvale (City) must amend its General Plan for the project to occur. California Government Code §65352.3 requires local governments, prior to making a decision to adopt or amend a general or specific plan, to consult with California Native American tribes identified by the Native American Heritage Commission (NAHC) for the purposes of protecting, or mitigating impacts to, cultural places. The NAHC identified your tribal organization as having traditional lands in the jurisdiction of the City.

In accordance with the requirements of California Government Code §65352.3, LSA is contacting your organization on behalf of the City to notify you (or another tribal representative authorized to speak on the tribe's behalf) of the opportunity to consult about the proposed project and possible impacts to cultural places. **You must request consultation within 90 days of your receipt of this notification.** If you choose to request consultation, please contact me via letter, telephone, or email to arrange for consultation. My contact information is provided below.

E. Timothy Jones
LSA Associates, Inc.
157 Park Place
Point Richmond, CA 94801
(510) 236-6810
tim.jones@lsa-assoc.com

Please contact me should you have any questions about this letter. Thank you.

Sincerely,

LSA ASSOCIATES, INC.

E. Timothy Jones
Cultural Resources Manager

LSA

LSA ASSOCIATES, INC.
157 PARK PLACE
PT. RICHMOND, CALIFORNIA 94801

510.236.6810 TEL
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May 23, 2013

Andrew Galvan
The Ohlone Indian Tribe
P.O. Box 3152
Fremont, CA 94539

Subject: Sares Regis Raintree General Plan Amendment, Sunnyvale, Santa Clara County; LSA Project #AWC1301

Dear Mr. Galvan:

A project is proposed in Sunnyvale, Santa Clara County that would permit medium- and high-density residential development on two areas: the 4.04-acre Sares Regis project site at 610 and 630 E. Weddell Drive; and the 12.04-acre Raintree project site at 520 E. Weddell Drive (see attached maps). Both of the project sites are currently developed with industrial, manufacturing, and office buildings.

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157 Park Place
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tim.jones@lsa-assoc.com

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Sincerely,

LSA ASSOCIATES, INC.

E. Timothy Jones
Cultural Resources Manager

LSA

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May 23, 2013

Valentin Lopez, Chairperson
Amah/Mutsun Tribal Band
P.O. Box 5272
Galt, CA 95632

Subject: Sares Regis Raintree General Plan Amendment, Sunnyvale, Santa Clara County; LSA Project #AWC1301

Dear Chairperson Lopez:

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LSA Associates, Inc.
157 Park Place
Point Richmond, CA 94801
(510) 236-6810
tim.jones@lsa-assoc.com

Please contact me should you have any questions about this letter. Thank you.

Sincerely,

LSA ASSOCIATES, INC.

E. Timothy Jones
Cultural Resources Manager

LSA

LSA ASSOCIATES, INC.
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May 23, 2013

Ann Marie Sayers, Chairperson
Indian Canyon Mutsun Band of Costanoan
P.O. Box 28
Hollister, CA 95024

Subject: Sares Regis Raintree General Plan Amendment, Sunnyvale, Santa Clara County; LSA Project #AWC1301

Dear Chairperson Sayers:

A project is proposed in Sunnyvale, Santa Clara County that would permit medium- and high-density residential development on two areas: the 4.04-acre Sares Regis project site at 610 and 630 E. Weddell Drive; and the 12.04-acre Raintree project site at 520 E. Weddell Drive (see attached maps). Both of the project sites are currently developed with industrial, manufacturing, and office buildings.

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E. Timothy Jones
LSA Associates, Inc.
157 Park Place
Point Richmond, CA 94801
(510) 236-6810
tim.jones@lsa-assoc.com

Please contact me should you have any questions about this letter. Thank you.

Sincerely,

LSA ASSOCIATES, INC.

E. Timothy Jones
Cultural Resources Manager

LSA

LSA ASSOCIATES, INC.
157 PARK PLACE
PT. RICHMOND, CALIFORNIA 94801

510.236.6810 TEL
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RIVERSIDE
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SAN LUIS OBISPO

May 23, 2013

Irene Zwierlein, Chairperson
Amah/Mutsun Tribal Band
789 Canada Road
Woodside, CA 94062

Subject: Sares Regis Raintree General Plan Amendment, Sunnyvale, Santa Clara County; LSA Project #AWC1301

Dear Chairperson Zwierlein:

A project is proposed in Sunnyvale, Santa Clara County that would permit medium- and high-density residential development on two areas: the 4.04-acre Sares Regis project site at 610 and 630 E. Weddell Drive; and the 12.04-acre Raintree project site at 520 E. Weddell Drive (see attached maps). Both of the project sites are currently developed with industrial, manufacturing, and office buildings.

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E. Timothy Jones
LSA Associates, Inc.
157 Park Place
Point Richmond, CA 94801
(510) 236-6810
tim.jones@lsa-assoc.com

Please contact me should you have any questions about this letter. Thank you.

Sincerely,

LSA ASSOCIATES, INC.

E. Timothy Jones
Cultural Resources Manager

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Roemary Cambra
Muwekma Ohlone Indian Tirbe
P.O. Box 360791
Milpitas, CA 95036

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Norma Sandez ☐ Agent ☐ Addressee

B. Received by (Printed Name) Norma Sandez | C. Date of Delivery 5/29/13

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
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☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

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1. Article Addressed to:

Ire - Zwierlein
Amah/Mutsun Tribal Band
789 Canada Road
Woodside, CA 94062

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X ☐ Agent ☐ Addressee

B. Received by (Printed Name) | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service 7009 1680 0002 3482 2659

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• Sender: Please print your name, address, and ZIP+4 in this box •

LSA Associates, Inc.
Tim Jone
157 Park Place
Point Richmond, CA 94801

RECEIVED
MAY 30 2013
LSA ASSOCIATES INC.
PT RICHMOND OFFICE

UNITED STATES POSTAL SERVICE

First-Class Mail
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USPS
Permit No. G-10

• Sender: Please print your name, address, and ZIP+4 in this box •

LSA Associates, Inc.
Tim Jones
157 Park Place
Point Richmond, CA 94801

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MAY 29 2013
LSA ASSOCIATES INC.
PT RICHMOND OFFICE

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- Print your name and address on the reverse so that we can return the card to you.
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1. Article Addressed to:

Ann Marie Sayers
Indian Canyon Mutsun Band
of Costanoan
P.O. Box 28
Hollister, CA 95024

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☐ Addressee

B. Received by (Printed Name) Kanyon Sayers-Roods
C. Date of Delivery 5/28/13

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

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- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Valentin Lopez
Amah/Mutsun Tribal Band
P.O. Box 5272
Galt, CA 95632

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☒ Addressee

B. Received by (Printed Name) Valentin Lopez
C. Date of Delivery 05-29-13

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☒ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7009 1680 0002 3482 2666

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LSA Associates, Inc.
Tim Jones
157 Park Place
Point Richmond, CA 94801

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LSA Associates, Inc.
Tim Jones
157 Park Place
Point Richmond, CA 94801

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MAY 31 2013
LSA ASSOCIATES INC.
PT RICHMOND OFFICE

ENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
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. Article Addressed to:

Andrew Galvan
The Ohlone Indian Tribe
P.O. Box 3152
Fremont, CA 94539

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☒ Addressee

B. Received by (*Printed Name*) GALVAN
C. Date of Delivery 24 D 2013

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☒ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

. Article Number
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'S Form 3811, February 2004 Domestic Return Receipt 102595-

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LSA Associates, Inc.
Tim Jones
157 Park Place
Point Richmond, CA 94801

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2 8 2013
INC.
OFFICE