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MEMO

Date: April 30, 2015

To: **Tanya Carothers**, *David J. Powers Associates*
Via Email: TCarothers@davidjpowers.com

From: James A. Reyff

Subject: **45 N. San Pedro Mixed Use Project – Greenhouse Gas Emissions Modeling**
I&R Project: 14-200

This memo reports modeled greenhouse gas (GHG) emissions for the 45 N. San Pedro Project in San Jose, CA. Based on the project plans, the project would construct 201 new apartments, 11,969 square feet (sf) of commercial use and 273 parking spaces[1]. Construction air quality impacts were evaluated separately; however, those modeling results were used to provide construction period GHG emissions.

GHG Significance Thresholds

In 2010, BAAQMD adopted its updated CEQA Guidelines that contain methodology and thresholds of significance for evaluating greenhouse gas (GHG) emissions from land use type projects. The BAAQMD thresholds were developed specifically for the Bay Area after considering the latest Bay Area GHG inventory and the effects of AB 32 scoping plan measures that would reduce regional emissions. BAAQMD intends to achieve GHG reductions from new land use developments to close the gap between projected regional emissions with AB 32 scoping plan measures and the AB 32 targets. The BAAQMD applies GHG efficiency thresholds to land use projects with annual emissions of 1,100 MT of CO_2e or greater. Projects that have emissions below 1,100 MT of CO_2e per year are considered to have less than significant GHG emissions. For land use projects, the GHG efficiency threshold is 4.6 MT of CO_2e annually per capita, where capita is the sum of project residents and workers.

CalEEMod Modeling

GHG emissions were computed for construction and operation of the project. Both construction and operational emissions were computed using the CalEEMod model, but as two separate modeling analyses.

[1] Modera Mixed Use Building Plans dated 4/17/2015,

The construction emissions reported in this memo are based on the modeling performed for the construction air quality analysis that used project-specific construction information provided by the applicant[2]. Specifically, construction emissions were computed for the approximate 2-year construction period with operational emissions predicted for 2018. Land use inputs to the CalEEMod model included the following:

- 201 Dwelling Unit "Apartments High- Rise" with area of 178,278 sf of floor surface area on a 1-acre site
- 11,969-square foot "Strip mall"
- 273 space "Parking Structure"

Construction Emissions

An approximate 2-year construction schedule, beginning in September 2015, was assumed in the modeling. Construction phases included demolition, site grading and trenching, building construction, and paving. Most CO_2 emissions associated with construction would occur in 2016 and 2017. Under this scenario, construction of the project would emit a total of 876 MT of CO_2. These would be temporary emissions. Neither the City of San Jose nor the BAAQMD have quantified thresholds for construction activities.

Operational Emissions

Unless otherwise noted below, the CalEEMod model defaults for the San Francisco Bay Area were used. CalEEMod provides emissions for transportation, areas sources, electricity consumption, natural gas combustion, electricity usage associated with water usage and wastewater discharge, and solid waste land filling and transport.

Model Year

The model uses mobile emission factors from CARB's EMFAC2011 model and adjusts these based on the effect of new regulations to reduce GHG emissions. These regulations include the Pavley Rule that increases fleet efficiency (reducing fuel consumption) and the low carbon fuel standard. This model is sensitive to the year selected, since vehicle emissions have and continue to be reduced due to fuel efficiency standards and low carbon fuels. The Year 2018 was analyzed since it is the first year that the project could conceivably be occupied.

Traffic

CalEEMod allows the user to enter specific trip generation rates. *Hexagon Transportation Consultants* provided trip generation rates for the proposed project by land use type[3]. Adjustments to the total trips generated by residential and non-residential trips were made by *Hexagon Transportation Consultants*. Transit was predicted to reduce residential trips by 9 percent, since the project site is located within 2,000 feet of a major transit facility. A reduction in trip generation due to internalization between the residences and the commercial uses was

[2] See Illingworth & Rodkin, Inc. Air Quality report dated February 6, 2015, Attachment 1
[3] Hexagon Transportation Consultants. 2015. Memo to: Michelle Kimball, City of San Jose, from: Robert Del Rio, T.E., dated April 23, 2015 - Subject: 45 N. San Pedro Traffic Operations Analysis

applied. Internal trip reductions were computed based on 25 percent of the retail trips. The adjustments to the trip generation rates yielded lower trips rates than the CalEEMod default rates. *Hexagon Transportation Consultants* only provides weekday trip generation forecasts. CalEEMod also includes trips rates for weekends. The ratio of Hexagon predicted trips to CalEEMod default trips was used to adjust weekend trip generation rates in the CalEEMod model. The CalEEMod default for passby and diverted trips was used.

Area Sources (including Natural Gas and Electricity Consumption)

Natural gas, electricity usage, and water usage were based on CalEEMod default rates. The proposed project would have to meet 2010 Title 24 standards that are approximately equivalent to LEED Silver certification. Energy efficiency of the project is likely to be greater than assumed in the CalEEMod model defaults; however, no adjustments were made in the CalEEMod model.

Emissions rates associated with electricity consumption were adjusted to account for Pacific Gas & Electric utility's (PG&E) existing CO_2 intensity rate. These rates are based, in part, on the requirement of a renewable energy portfolio standard of 33 percent by the year 2020. CalEEMod uses a default rate of 641.3 pounds of CO_2 per megawatt hour of electricity produced for PG&E. PG&E's most recent certified CO_2 intensity rate is 445 pounds of CO_2 per megawatt hour of energy produced[4].

Solid waste generation was based on CalEEMod default generation rates and emissions rates.

Existing Emissions

Existing emissions from the project site were not computed for this assessment.

Per Capita Rate

The per capita rate is the total annual GHG emissions expressed in metric tons divided by the service population (i.e., number of residences and employees). A future service population of 649 persons was assumed based on 2010 U.S. Census Facts for San Jose (i.e., 3.08 persons per household) and approximately one worker per 400 square feet of retail space.

Computed GHG Emissions

Annual operational GHG emissions from the proposed project are shown in Table 1. Future GHG emissions (and per capita emissions) were compared to the GHG significance thresholds of 1,100 metric tons per year and 4.6 metric tons per year per person established by BAAQMD. The annual emissions would exceed 1,100 metric tons per year. However, the per capita emissions for the proposed project would be 2.56 metric tons CO_2e/year in 2018. These emissions would not exceed the BAAQMD significance threshold. The CalEEMod model output for operational emissions is included as *Attachment 1*.

[4] Climate Registry – see 2012 Pacific Gas and Electric rates for 2012 at http://www.theclimateregistry.org/tools-resources/reporting-protocols/general-reporting-protocol/ accessed April 29, 2015.

Table 1 Project GHG Emissions

Scenario	Annual GHG Emissions Reported as CO_2e in Metric Tons
Area	11
Energy	432
Mobile	1,134
Waste	48
Water	39
Total emissions in metric tons per year	1,664
BAAQMD Thresholds	*1,100*
Exceed?	***Yes***
Per Capita Emissions 2018 project emissions divided by 649 residents and workers	2.56
BAAQMD Thresholds	4.6
Significant?	***No***

Attachment 1

Operational - Modera at San Pedro (45 N. San Pedro)

Santa Clara County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments High Rise	201.00	Dwelling Unit	1.00	178,278.00	621
Enclosed Parking with Elevator	273.00	Space	0.00	124,216.00	0
Strip Mall	11.97	1000sqft	0.00	11,970.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2018
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	445	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Use PG&E current certified rate see:http://www.theclimateregistry.org/tools-resources/reporting-protocols/general-reporting-protocol/

Land Use - Project data with both underground and above ground parking

Construction Phase - Construction no addressed with this model

Off-road Equipment - Construction not addressed

Grading - Construction not addressed

Demolition -

Trips and VMT -

Vehicle Trips - Adjusted trip rate to TIA adjusted for internalization and transit (Res = 5.46 trips/du -83%, Retail = 30.00 trips/ksf -68%)

Table Name	Column Name	Default Value	New Value
tblLandUse	LandUseSquareFeet	201,000.00	178,278.00
tblLandUse	LandUseSquareFeet	109,200.00	124,216.00
tblLandUse	LotAcreage	3.24	1.00
tblLandUse	LotAcreage	2.46	0.00
tblLandUse	LotAcreage	0.27	0.00
tblLandUse	Population	575.00	621.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	641.35	445
tblProjectCharacteristics	OperationalYear	2014	2018
tblVehicleTrips	ST_TR	7.16	5.94
tblVehicleTrips	ST_TR	42.04	28.57
tblVehicleTrips	SU_TR	6.07	5.04
tblVehicleTrips	SU_TR	20.43	13.89
tblVehicleTrips	WD_TR	6.59	5.46
tblVehicleTrips	WD_TR	44.32	30.00

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											3.2835	7.7577	11.0412	8.5100e-003	2.7000e-004	11.3049
Energy											0.0000	429.0819	429.0819	0.0239	6.2200e-003	431.5103
Mobile											0.0000	1,133.3141	1,133.3141	0.0450	0.0000	1,134.2580
Waste											21.3201	0.0000	21.3201	1.2600	0.0000	47.7798
Water											4.4360	21.4885	25.9245	0.4570	0.0111	38.9469
Total											**29.0396**	**1,591.6422**	**1,620.6818**	**1.7943**	**0.0175**	**1,663.7999**

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											3.2835	7.7577	11.0412	8.5100e-003	2.7000e-004	11.3049
Energy											0.0000	429.0819	429.0819	0.0239	6.2200e-003	431.5103
Mobile											0.0000	1,133.3141	1,133.3141	0.0450	0.0000	1,134.2580
Waste											21.3201	0.0000	21.3201	1.2600	0.0000	47.7798
Water											4.4360	21.4885	25.9245	0.4569	0.0110	38.9398
Total											**29.0396**	**1,591.6422**	**1,620.6818**	**1.7943**	**0.0175**	**1,663.7928**

	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	N20	CO2e
Percent Reduction	**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**	**0.11**	**0.00**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	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											0.0000	1,133.3141	1,133.3141	0.0450	0.0000	1,134.2580
Unmitigated											0.0000	1,133.3141	1,133.3141	0.0450	0.0000	1,134.2580

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments High Rise	1,097.46	1,193.94	1013.04	2,453,778	2,453,778
Enclosed Parking with Elevator	0.00	0.00	0.00		
Strip Mall	359.10	341.98	166.26	506,835	506,835
Total	1,456.56	1,535.92	1,179.30	2,960,614	2,960,614

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments High Rise	12.40	4.30	5.40	26.10	29.10	44.80	86	11	3
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.551461	0.058468	0.185554	0.123211	0.029507	0.004440	0.012712	0.023230	0.001775	0.001270	0.006089	0.000516	0.001766

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	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											0.0000	340.3135	340.3135	0.0222	4.5900e-003	342.2016
Electricity Unmitigated											0.0000	340.3135	340.3135	0.0222	4.5900e-003	342.2016
NaturalGas Mitigated											0.0000	88.7684	88.7684	1.7000e-003	1.6300e-003	89.3086
NaturalGas Unmitigated											0.0000	88.7684	88.7684	1.7000e-003	1.6300e-003	89.3086

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/yr	tons/yr										MT/yr					
Apartments High Rise	1.63365e+006											0.0000	87.1779	87.1779	1.6700e-003	1.6000e-003	87.7084
Enclosed Parking with Elevator	0											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Strip Mall	29805.3											0.0000	1.5905	1.5905	3.0000e-005	3.0000e-005	1.6002
Total												**0.0000**	**88.7684**	**88.7684**	**1.7000e-003**	**1.6300e-003**	**89.3086**

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/yr	tons/yr										MT/yr					
Apartments High Rise	1.63365e+006											0.0000	87.1779	87.1779	1.6700e-003	1.6000e-003	87.7084
Enclosed Parking with Elevator	0											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Strip Mall	29805.3											0.0000	1.5905	1.5905	3.0000e-005	3.0000e-005	1.6002
Total												**0.0000**	**88.7684**	**88.7684**	**1.7000e-003**	**1.6300e-003**	**89.3086**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	708839	143.0781	9.3200e-003	1.9300e-003	143.8719
Enclosed Parking with Elevator	837216	168.9909	0.0110	2.2800e-003	169.9285
Strip Mall	139929	28.2445	1.8400e-003	3.8000e-004	28.4012
Total		**340.3135**	**0.0222**	**4.5900e-003**	**342.2016**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	708839	143.0781	9.3200e-003	1.9300e-003	143.8719
Enclosed Parking with Elevator	837216	168.9909	0.0110	2.2800e-003	169.9285
Strip Mall	139929	28.2445	1.8400e-003	3.8000e-004	28.4012
Total		**340.3135**	**0.0222**	**4.5900e-003**	**342.2016**

6.0 Area Detail

6.1 Mitigation Measures Area

	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											3.2835	7.7577	11.0412	8.5100e-003	2.7000e-004	11.3049
Unmitigated											3.2835	7.7577	11.0412	8.5100e-003	2.7000e-004	11.3049

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											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth											3.2835	5.3147	8.5982	6.0800e-003	2.7000e-004	8.8109
Landscaping											0.0000	2.4430	2.4430	2.4300e-003	0.0000	2.4940
Total											**3.2835**	**7.7577**	**11.0412**	**8.5100e-003**	**2.7000e-004**	**11.3049**

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											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products											0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth											3.2835	5.3147	8.5982	6.0800e-003	2.7000e-004	8.8109
Landscaping											0.0000	2.4430	2.4430	2.4300e-003	0.0000	2.4940
Total											**3.2835**	**7.7577**	**11.0412**	**8.5100e-003**	**2.7000e-004**	**11.3049**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	25.9245	0.4569	0.0110	38.9398
Unmitigated	25.9245	0.4570	0.0111	38.9469

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments High Rise	13.096 / 8.25615	24.2909	0.4280	0.0104	36.4876
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Strip Mall	0.886648 / 0.543429	1.6336	0.0290	7.0000e-004	2.4593

Total		**25.9245**	**0.4570**	**0.0111**	**38.9469**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments High Rise	13.096 / 8.25615	24.2909	0.4280	0.0103	36.4810
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Strip Mall	0.886648 / 0.543429	1.6336	0.0290	7.0000e-004	2.4589
Total		**25.9245**	**0.4569**	**0.0110**	**38.9398**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Unmitigated	21.3201	1.2600	0.0000	47.7798
Mitigated	21.3201	1.2600	0.0000	47.7798

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments High Rise	92.46	18.7685	1.1092	0.0000	42.0615
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Strip Mall	12.57	2.5516	0.1508	0.0000	5.7183
Total		**21.3201**	**1.2600**	**0.0000**	**47.7798**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments High Rise	92.46	18.7685	1.1092	0.0000	42.0615

Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Strip Mall	12.57	2.5516	0.1508	0.0000	5.7183
Total		**21.3201**	**1.2600**	**0.0000**	**47.7798**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation