

Appendix F

Supplemental Energy Memo MSA Consulting, 2022

Travertine SPA
Draft EIR
SCH# 201811023
Technical Appendices

October 2023



June 28, 2022

Supplemental Energy Memo for the Travertine Development Project

This Supplemental Energy Memo has been prepared by MSA Consulting, Inc. to provide additional context, calculations, and formulas used within **Section 4.6, Energy Resources**, of this Draft EIR. The calculations provided herein utilized the output figures from the California Emissions Estimator Model (CalEEMod) Version 2016.3.2 Modeling Data, provided by Urban Crossroads, Inc. in their *Greenhouse Gas Analysis (Appendix H)*. CalEEMod is a Statewide land use emissions computer model designed to provide a uniform platform to quantify potential criteria pollutant and greenhouse gas (GHG) emissions associated with both construction and operations from land use projects. CalEEMod was used to determine the energy consumed via, electricity, natural gas, and petroleum during construction and operation of the proposed project using the GHG emission values.

CalEEMod Version 2016.3.2 was utilized in the *Greenhouse Gas Analysis* because it was the most current version of the software at the time the report was written in January 2022. However, in May 2022, the California Air Pollution Control Officers Association (CAPCOA) in conjunction with other California air districts, including the South Coast Air Quality Management District (SCAQMD), released the latest version of the CalEEMod: Version 2022.1. The *Greenhouse Gas Analysis* provided by Urban Crossroads was prepared before the release of the 2022.1 version. Accordingly, the latest version of CalEEMod was used to determine project operational emissions. The findings of the new CalEEMod outputs are included in Urban Crossroad's *Operational Memo (Appendix C.2)*.

The analysis below includes the original CalEEMod Version 2016.3.2 output to analyze project construction energy use, and the updated CalEEMod Version 2022.1 output to analyze project operational energy use.

Construction

Energy resources consumed during construction of the project site includes electricity and petroleum. Natural gas is not anticipated to be required during construction of the project.

During grading and construction of the proposed project, electricity would be consumed to supply and convey water for dust control and, on a limited basis, may be used to power lighting, and electronic equipment. Electricity consumed for onsite construction trailers, which are used by managerial staff during the hours of construction activities and other construction activities necessitating electrical power would be provided by IID.

Electricity consumption during project construction was determined using the following formula:

$$\text{Days Grading} \times \text{Acres (acres disturbed during grading)} \times 3,020 \text{ gallons per acre per day} \times 0.009727 \text{ kWh/gallons} = \text{Electricity Consumed kWh}$$

This is based on the water for dust control, which is calculated from the total days of grading, the acreage disturbed on the project site along with water usage factor per day (based on the Air and Waste Management Association, 1992), and a supply water electricity intensity factor (CalEEMod default for the Salton Sea Air Basin). The electricity consumed was calculated for each site preparation and grading phase of the project. See Table 1 below.

Table 1 Summary of Electricity Use During Construction

Phase	Subphase	Days Grading	Acres Graded (per day)	Total Acres Graded	Electricity Consumed (kWh)*
Phase A Grading Activities					
Grading & Water Tank	Grading	521	5	2605	76,523.3
Well Construction					
Well #1 through 9	Site Preparation	10**	1**	10**	1,469***
Substation Construction					
Substation	Grading	90	1	90	2,643.8
Phase B Grading Activities					
Grading	Grading	522	5	2610	76,670.2
Physical Construction					
Phase 1 (2026-2029)	Site Preparation	50	5	250	7,343.9
	Grading	50	5	250	7,343.9
Phase 2 (2029-2031)	Site Preparation	30	5	150	4,406.3
	Grading	30	5	150	4,406.3
Phase 3 (2031-2033)	Site Preparation	35	5	175	5,140.7
	Grading	35	5	175	5,140.7
Total Electricity Consumed					191,088.1

Note: Electricity Consumed is determined by: Days Grading x Acres (acres disturbed during grading) x 3,020 gallons per acre per day (Air and Waste Management Association, 1992) x 0.009727 kWh/gallons (CalEEMod default for Salton Sea Air Basin).

*Numbers are rounded.

**Timing and grading acreage for each well.

***Each well site would consume 293.8 kWh. Multiplied by 5 (the number of wells proposed) is 1,469 kWh.

For petroleum consumption during construction of the project, the CalEEMod values for carbon dioxide (CO₂) emissions during each construction phase were converted to kilograms/CO₂ per gallon by multiplying the CO₂ emissions by 1,000. Then kilograms/CO₂/gallon was divided by 8.89

kg/CO₂ for gasoline consumption (worker demand), or 10.18 kg/CO₂ for diesel consumption (vendor or equipment demand) to calculate gallons consumed during project construction.

$$(x) \text{ MT CO}_2\text{e/year} \times 1,000 = (y) \text{ kg/CO}_2\text{/gallon}$$

$$(y) \text{ kg/CO}_2\text{/gallon} \div 8.89 \text{ kg/CO}_2 = \text{Construction Worker Gasoline Demand}$$

$$(y) \text{ kg/CO}_2\text{/gallon} \div 10.18 \text{ kg/CO}_2 = \text{Vendor/Equipment Vehicle Diesel Demand}$$

Table 2 Construction Worker Gasoline Demand

Phase	Subphase	Days	Trips	Miles	Kg/CO2/Gallon	Gallons
Phase A Grading Activities						
Grading & Water Tank	Demolition	390	3	11	3,548.7	399.2
	Grading	521	20	11	30,897.8	3,475.6
Well Construction						
Well #1 through 9	Site Preparation	10	23	11	597.2*	67.2**
	Trenching	41	18	11	1,911.1*	215.0**
	Building Const.	15	4	11	155.7*	17.5**
Substation Construction						
Substation	Demolition	15	43	11	1,932.5	217.4
	Grading	90	83	11	22,380.4	2,517.5
	Building Const.	287	21	11	17,729.8	1,994.4
Phase B Grading Activities						
Grading	Demolition	585	3	11	4890.6	550.1
	Grading	522	20	11	28,452.7	3,200.5
Physical Construction						
Phase 1 (2026-2029)	Site Preparation	50	18	11	2,588.5	291.2
	Grading	50	20	11	2,876.1	323.5
	Building Const.	800	271	11	583,751.9	65,663.9
	Arch. Coating	330	54	11	46,681.4	5,251.0
	Paving	55	15	11	2,144.3	241.2
Phase 2 (2029-2031)	Site Preparation	30	18	11	1,365.7	153.6
	Grading	30	20	11	1,517.4	170.7
	Building Const.	450	169	11	189,740.3	21,343.1
	Arch. Coating	175	34	11	14,681.4	1,651.5
	Paving	35	15	11	1,295.4	145.7
Phase 3 (2031-2033)	Site Preparation	35	18	11	1,527.0	171.8
	Grading	35	20	11	1,696.7	190.9
	Building Const.	450	288	11	310,614.0	34,939.7
	Arch. Coating	200	58	11	27,570.1	3,101.2
	Paving	40	15	11	1426.0	160.4
Total Construction Worker Gasoline Consumed						147,652.6***

*Kg/CO2/Gallons were calculated by taking the average of the Kg/CO2/Gallons of each well site as calculated in the GHG Analysis.

**Gallons were calculated by taking the Kg/CO2/Gallon calculated and then divided by 10.18.

***This number does not equal the sum of the numbers in the "Gallons" column. This is because the well sites 1 through 9, occupies one set (site prep., grading, and building construction) of rows. The gallons number in the well site row was multiplied by 5 (the number of well sites that will be developed) to get 1,498.5 gallons. This number was added to the other rows to get a total of 147,652.6 gallons of gasoline consumed during the construction of the project.

Table 3 Construction Vendor Diesel Fuel Demand

Phase	Subphase	Days	Trips	miles	Kg/CO2/Gallon	Gallons
Well Construction						
Well #1 through 9	Building Const.	15	2	5.40	290.4*	28.5**
Substation Construction						
Substation	Building Const.	287	8	5.40	22,670.4	2,226.9
Physical Construction						
Phase 1 (2026-2029)	Building Const.	800	75	5.40	583,566.5	7,324.8
Phase 2 (2029-2031)	Building Const.	450	33	5.40	142,752.6	14,022.9
Phase 3 (2031-2033)	Building Const.	450	74	5.40	319,774.5	31,412.0
Total Construction Vendor Diesel Consumed						55,129.1***

*Kg/CO2/Gallons were calculated by taking the average of the Kg/CO2/Gallons of each well site as calculated in the GHG Analysis.

**Gallons were calculated by taking the Kg/CO2/Gallon calculated and then divided by 10.18. This number will be multiplied by 5 (the number of well sites proposed) to get the sum of the construction vendor diesel demand.

***This number does not equal the sum of the numbers in the "Gallons" column. This is because the well sites 1 through 9, occupies one set (site prep., grading, and building construction) of rows. The gallons number in the well site row was multiplied by 5 (the number of well sites that will be developed) to get 11,134.5 gallons. This number was added to the other rows to get a total of 55,129.1 gallons of diesel consumed during the building construction phase of the project due to vendor trips.

Table 4 Construction Equipment Diesel Fuel Demand

Phase	Subphase	Days	Equipment Units	Kg/CO2/Gallon	Gallons
Phase A Grading Activities					
Grading & Water Tank	Demolition	390	1	484,508.2	47,594.1
	Grading	521	8	1,649,195	162,003.4
Well Construction					
Well #1 through 9	Site Preparation	10	9	48,500.9*	4,764.3**
	Trenching	41	7	284,174.5*	27,915.0**
	Building Const.	15	15	183,524.6*	18,027.9**
Substation Construction					
Substation	Demolition	15	17	131,091.1	12,877.3
	Grading	90	33	1,571,063.0	154,328.4
	Building Const.	287	54	6,466,378.0	635,204.1
Phase B Grading Activities					
Grading	Demolition	585	1	726,719.5	71,387.0
	Grading	522	8	1,651,899	162,269.1
Physical Construction					
Phase 1 (2026-2029)	Site Preparation	50	7	126,065.4	12,383.6
	Grading	50	8	158,227.9	15,547.9
	Building Const.	800	9	11,500,775	1,129,742.0
	Arch. Coating	330	1	56,248.1	5,525.4
	Paving	55	6	55,498	5,451.7
Phase 2 (2029-2031)	Site Preparation	30	7	75,639.2	7,430.2
	Grading	30	8	94,936.7	9,325.8
	Building Const.	450	9	917,289.1	90,107.0
	Arch. Coating	175	1	29,818.1	1,919.1
	Paving	35	6	42,223.5	4,147.7
Phase 3 (2031-2033)	Site Preparation	35	7	105,308.0	10,344.6
	Grading	35	8	132,235.8	12,989.8
	Building Const.	450	9	976,300.4	95,903.8
	Arch. Coating	200	1	34,077.8	3,347.5
	Paving	40	6	48,255.5	4,740.2
Total Construction Worker Gasoline Consumed					2,908,105.7***

*Kg/CO2/Gallons were calculated by taking the average of the Kg/CO2/Gallons of each well site as calculated in the GHG Analysis.

**Gallons were calculated by taking the Kg/CO2/Gallon calculated and then divided by 10.18. This number will be multiplied by 5 (the number of well sites proposed) to get the sum of the construction equipment diesel demand.

***This number does not equal the sum of the numbers in the "Gallons" column. This is because the well sites 1 through 9, occupies one set (site prep., grading, and building construction) of rows. The gallons number in the well site row was multiplied by 5 (the number of well sites that will be developed) to get 253,536 gallons. This number was added to the other rows to get a total of 2,908,105.7 gallons of diesel consumed during the use of construction equipment during development of the project.

Operation

For operation of the proposed project, CalEEMod calculates the electricity and natural gas consumption based on project features including land uses, building square footages, modeling default inputs, and specific user inputs (if any). As stated above, CalEEMod Version 2022.1 was used to determine project-related operational energy use.

Table 5 Project Electricity Demand CalEEMod Version 2022.1

Land Use	Electricity Use kWh/yr
Apartments Low Rise	3,026,281
Hotel	2,882,475
Golf Course	0
Single Family Housing	7,079,147
Other Asphalt Surfaces	0
Total Demand (kWh/yr)	12,987,903

**Table 6 Proposed Project Operational Natural Gas Demand
 CalEEMod Version 2022.1**

Land Use	Natural Gas Use kBTU/yr
Apartments Low Rise	7,500,838
Hotel	9,015,851
Single Family Housing	26,957,750
Golf Course	0
Other Asphalt Surfaces	0
Total Demand (kBTU/yr)	43,474,439

Note: 43,474,439 kBTU/yr is approximately 114,858.3 cf/day per the 1 cf to 1.037 kBTU conversion and 365 days a year.

For operational petroleum use, project-related gasoline and diesel consumption was calculated using the VMTs from the Project-specific VMT Evaluation provided by Urban Crossroads (**Appendix M.2**) and the total mobile source emission value generated by CalEEMod modeling (**Appendix H**).

Similar to the petroleum consumption methodology used for project construction, for operational petroleum consumption the total mobile CO2 emissions was converted to kilograms/CO2 per gallon by multiplying the CO2 emissions by 1,000. This value was then divided

by 8.89 kg/CO₂ for gasoline consumption (approximately 92.5% of VMT burned), or 10.18 kg/CO₂ for diesel consumption (approximately 7.5% of VMT burned). This provides the gallons of gasoline and diesel consumed during project operation.

*Operational Gasoline Demand: (x) MT CO₂e/year × 92.5% = (y) MT/CO₂e/year Gasoline Demand
 (y) MT/CO₂e/year × 1,000 = (z) kg/CO₂/gallon
 (z) kg/CO₂/gallon ÷ 8.89 kg/CO₂ = Construction Worker Gasoline Demand*

*Operational Diesel Demand: (x) MT CO₂e/year × 92.5% = (y) MT/CO₂e/year Diesel Demand
 (y) MT/CO₂e/year × 1,000 = (z) kg/CO₂/gallon
 (z) kg/CO₂/gallon ÷ 10.18 kg/CO₂ = Vendor/Equipment Vehicle Diesel Demand*

Table 7 Proposed Project Operational VMT

Land Use	Annual VMT (Project Buildout)
Residential	17,710,712.5
Employee	1,967,350
Total Annual VMT	19,678,062.5

Note: Project Buildout is the cumulative annual VMT value assuming total project buildout.

Table 8 Proposed Project Operational Annual Petroleum

	Annual VMT	KgCO ₂ e	Kg/CO ₂ /Gallon	Annual Gallons
Gasoline	18,202,207.8	11,270,000	8.89	1,267,716.5
Diesel	1,475,854.7	918,750	10.18	90,250.5
Total Annual Petroleum				1,357,967

Additional Notes

Number of Well Sites analyzed in the GHG Analysis and the Energy Section:

On October 26, 2017, CVWD produced a Preliminary Hydraulic Model for providing domestic water to the project. At that time, the gross project acreage of 878 acres was used to determine that 9 well sites were required for the development. (Section 5.6.1, Well Sites of the CVWD Development Design Manual, requires 1 well site per 100 acres or major portion thereof, major portion being 50 or more acres.)

In 2021, an update to the Hydraulic Model was recommended by CVWD due to the project's revised phasing. In a letter from CVWD, dated February 8, 2021, the project description identified that a portion of the previously analyzed gross acreage included open space and the analysis of

domestic water facilities was based on the net developed acreage of 478 acres. This letter identified that the project would require 5 well sites, 2 of which would be required with Phase I of the project.

Therefore, the project's analysis of energy consumed during construction of the nine well sites is conservative, since the project would be developing five well sites.