

**Appendix C:**  
**Additional Supporting Information**

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**Site Work Construction Assumptions****Construction Schedule**

<i>Construction Activity</i>	<i>Start Date</i>	<i>End Date</i>	<i>Number of Days Per Week</i>	<i>Number of Days</i>
Demolition	1/1/2021	1/28/2021	5	20
Site Preparation	1/29/2021	2/11/2021	5	10
Grading	2/12/2021	3/25/2021	5	30

**Construction Equipment**

<i>Phase Name</i>	<i>Offroad Equipment Type</i>	<i>Amount</i>	<i>Usage Hours</i>	<i>Horse Power</i>	<i>Load Factor</i>
Demolition	Concrete/Industrial Saws	1	8	81	0.73
Demolition	Excavators	3	8	158	0.38
Demolition	Rubber Tired Dozers	2	8	247	0.4
Site Preparation	Rubber Tired Dozers	3	8	247	0.4
Site Preparation	Tractors/Loaders/Backhoes	4	8	97	0.37
Grading	Excavators	2	8	158	0.38
Grading	Graders	1	8	187	0.41
Grading	Rubber Tired Dozers	1	8	247	0.4
Grading	Scrapers	2	8	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8	97	0.37

**Construction Trips**

<i>Phase Name</i>	<i>Offroad Equipment Count</i>	<i>Worker Trip Number</i>	<i>Vendor Trip Number</i>	<i>Hauling Trip Number</i>	<i>Worker Trip Length</i>	<i>Vendor Trip Length</i>	<i>Hauling Trip Length</i>	<i>Worker Vehicle Class</i>	<i>Vendor Vehicle Class</i>	<i>Hauling Vehicle Class</i>
Demolition	6	15	0	258	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18	0	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT
Grading	8	20	0	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT

**Phase 1 Construction Assumptions****Construction Schedule**

<i>Construction Activity</i>	<i>Start Date</i>	<i>End Date</i>	<i>Number of Days Per Week</i>	<i>Number of Days</i>
Demolition	1/1/2021	1/28/2021	5	20
Site Preparation	1/29/2021	2/11/2021	5	10
Grading	2/12/2021	3/25/2021	5	30

**Construction Equipment**

<i>Phase Name</i>	<i>Offroad Equipment Type</i>	<i>Amount</i>	<i>Usage Hours</i>	<i>Horse Power</i>	<i>Load Factor</i>
Building Construction	Cranes	1	7	231	0.29
Building Construction	Forklifts	3	8	89	0.2
Building Construction	Generator Sets	1	8	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7	97	0.37
Building Construction	Welders	1	8	46	0.45
Paving	Pavers	1	8	130	0.42
Paving	Paving Equipment	2	6	132	0.36
Paving	Rollers	2	6	80	0.38
Architectural Coating	Air Compressors	1	6	78	0.48

**Construction Trips**

<i>Phase Name</i>	<i>Offroad Equipment Count</i>	<i>Worker Trip Number</i>	<i>Vendor Trip Number</i>	<i>Hauling Trip Number</i>	<i>Worker Trip Length</i>	<i>Vendor Trip Length</i>	<i>Hauling Trip Length</i>	<i>Worker Vehicle Class</i>	<i>Vendor Vehicle Class</i>	<i>Hauling Vehicle Class</i>
Building Construction	9	67	15	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT
Paving	5	13	0	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	13	0	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT

**Phase 2 Construction Assumptions****Construction Schedule**

<i>Construction Activity</i>	<i>Start Date</i>	<i>End Date</i>	<i>Number of Days Per Week</i>	<i>Number of Days</i>
Demolition	1/1/2021	1/28/2021	5	20
Site Preparation	1/29/2021	2/11/2021	5	10

Grading	2/12/2021	3/25/2021	5	30
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**Construction Equipment**

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Building Construction	Cranes	1	2.4	231	0.29
Building Construction	Forklifts	3	2.8	89	0.2
Building Construction	Generator Sets	1	2.8	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	2.4	97	0.37
Building Construction	Welders	1	2.8	46	0.45
Paving	Pavers	1	7	130	0.42
Paving	Rollers	1	7	80	0.38
Architectural Coating	Air Compressors	1	6	78	0.48

**Construction Trips**

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Building Construction	9	5	2	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT
Paving	2	5	0	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	1	0	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT

**Phase 3 Construction Assumptions**

**Construction Schedule**

Construction Activity	Start Date	End Date	Number of Days Per Week	Number of Days
Demolition	1/1/2021	1/28/2021	5	20
Site Preparation	1/29/2021	2/11/2021	5	10
Grading	2/12/2021	3/25/2021	5	30

**Construction Equipment**

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Building Construction	Cranes	1	2.40	231	0.29
Building Construction	Forklifts	3	2.80	89	0.20
Building Construction	Generator Sets	1	2.80	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	2.40	97	0.37
Building Construction	Welders	1	2.80	46	0.45
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	2	6.00	132	0.36
Paving	Rollers	2	6.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

**Construction Trips**

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Building Construction	9	30	11	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT
Paving	5	13	0	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	6	0	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT

**Phase 4 Construction Assumptions**

**Construction Schedule**

Construction Activity	Start Date	End Date	Number of Days Per Week	Number of Days
Demolition	1/1/2021	1/28/2021	5	20
Site Preparation	1/29/2021	2/11/2021	5	10
Grading	2/12/2021	3/25/2021	5	30

**Construction Equipment**

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Building Construction	Cranes	1	2.4	231	0.29
Building Construction	Forklifts	3	2.8	89	0.2
Building Construction	Generator Sets	1	2.8	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	2.4	97	0.37

Building Construction	Welders	1	2.8	46	0.45
Paving	Pavers	1	6	130	0.42
Paving	Paving Equipment	1	8	132	0.36
Paving	Rollers	1	7	80	0.38
Architectural Coating	Air Compressors	1	6	78	0.48

**Construction Trips**

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Building Construction	9	18	5	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT
Paving	3	8	0	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	4	0	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT

**Phase 5 Construction Assumptions**

**Construction Schedule**

Construction Activity	Start Date	End Date	Number of Days Per Week	Number of Days
Demolition	1/1/2021	1/28/2021	5	20
Site Preparation	1/29/2021	2/11/2021	5	10
Grading	2/12/2021	3/25/2021	5	30

**Construction Equipment**

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Building Construction	Cranes	1	2.4	231	0.29
Building Construction	Forklifts	3	2.8	89	0.2
Building Construction	Generator Sets	1	2.8	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	2.4	97	0.37
Building Construction	Welders	1	2.8	46	0.45
Paving	Pavers	2	8	130	0.42
Paving	Paving Equipment	2	8	132	0.36
Paving	Rollers	2	8	80	0.38
Architectural Coating	Air Compressors	1	6	78	0.48

**Construction Trips**

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Building Construction	9	41	15	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT
Paving	6	15	0	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	8	0	0	10.8	7.3	20	LD_Mix	HDT_Mix	HHDT

Burbank Phases 2-5

Construction Duration

CalEEMod

	Defaults	Revisions	Difference	Ratio of Actual to Default Duration
Building Construction	300	866		
<b>Total Working Days</b>	<b>300</b>	<b>866</b>	<b>566</b>	<b>2.8867</b>

CalEEMod Defaults						Revisions						Cross-Check	
Building Construction						Building Construction						Cross-Check	
Equipment	Amount	Usage Hours	Horsepower	Load Factor	HP Hours	Equipment	Amount	Usage Hours	Horsepower	Load Factor	HP Hours	Goal HP Hours	Difference
Cranes	1	7	231	0.29	140,679	Cranes	1	2.42	231	0.29	140,679	140,679	-
Forklifts	3	8	89	0.20	128,160	Forklifts	3	2.77	89	0.20	128,160	128,160	-
Generator Sets	1	8	84	0.74	149,184	Generator Sets	1	2.77	84	0.74	149,184	149,184	-
Tractors/Loaders/Backhoes	3	7	97	0.37	226,107	Tractors/Loaders/Backhoes	3	2.42	97	0.37	226,107	226,107	-
Welders	1	8	46	0.45	49,680	Welders	1	2.77	46	0.45	49,680	49,680	-
				<b>Total</b>	<b>693,810</b>					<b>Total</b>	<b>693,810</b>	<b>693,810</b>	<b>-</b>

## Hardscape Tonnage Calculation

ft. = feet  
in. = inches  
s.f. = square feet  
c.f. = cubic feet  
lbs = pounds

Measured on kmz file:

9,847 s.f. existing hardscape to be removed

Assumption:

4.5 in (0.375 ft.) thickness of asphalt

[Asphalt Institute. 2019. Asphalt: Commercial and Residential Paving - Part 2.](#)

[Website: http://asphaltmagazine.com/commercial-and-residential-paving-part-2/.](http://asphaltmagazine.com/commercial-and-residential-paving-part-2/) Accessed August 1, 2019.

145 lbs/c.f. asphalt density

[National Asphalt Pavement Association. 2019. How to Determine Quantities.](#)

[Website: https://www.asphaltpavement.org/index.php?option=com\\_content&view=article&id=144&Itemid=271.](https://www.asphaltpavement.org/index.php?option=com_content&view=article&id=144&Itemid=271) Accessed August 1, 2019.

9,847 s.f. x 0.375 ft. =

3693 c.f.

Multiply square footage by thickness to get asphalt volume in cubic feet.

3,693 c.f. x 145 lbs/c.f. =

535431 lbs.

Multiply asphalt volume by density to get asphalt weight in pounds.

535,431 lbs. / 2000 lbs/ton =

**268 tons**

Convert weight from pounds to tons.

**Building Volume Calculation**

s.f. = square feet  
c.y. = cubic yards

Structure (as pinned on kmz)	Building area (sq. ft.)
1	1607
2	1295
3	353
4	174
5	1400
6	2440
7	4740
8	6691
9	6071
<b>Total building sq. ft. to be removed</b>	<b>24771 sq. ft.</b>

Assumption:  
(cubic yards of debris based on square footage of buildings)

<https://www.hometowndemolitioncontractors.com/blog/how-many-dumpsters-does-it-take-to-demolish-a-house>

**How Many Dumpsters Does it Take to Demo a House?**

House Size	Amount of Debris	# of 40-yard Dumpsters
1,000 sq. ft.	135 cubic yards	3.5
2,000 sq. ft.	270 cubic yards	6.75
3,000 sq. ft.	405 cubic yards	10.5

Debris c.y. to building sq. ft. ratio: **0.135**

Total c.y. of building debris to be removed: 24,771 sq. ft. x 0.135 c.y./sq. ft. = **3344 c.y.**

Assumption:  
(tons of debris based on cubic yards of debris)

<http://syracuselandsbank.org/wp-content/uploads/2014/07/CD-weight-to-volume-calculation-Waste-Cap-from-other-sources.pdf>

**Construction and Demolition Debris Weight to Volume Conversion**  
Note: These numbers are used throughout this training

	Volume	Weight (pounds)	Weight (tons)
Trash <sup>2</sup>			
Residential waste (uncompacted at curb)	1 cubic yard	150 – 300	.075 – .15
Commercial-industrial waste (uncompacted)	1 cubic yard	300 – 600	.15 – .30
Mixed Waste <sup>3</sup>	1 cubic yard	350	.175
Asphalt <sup>3</sup>	1 square yard 1 inch thick	110 - 115	0.055 – 0.057
Asphalt <sup>3</sup>	1 cubic yard	4,050 – 4,140	2.025 – 2.07
Cans & Bottles <sup>2</sup>			
Aluminum cans (whole)	1 cubic yard	50 – 75	.025 – .038
Glass bottles (whole bottles)	1 cubic yard	500 – 700	.25 – .35
Plastic bottles (soda bottles)	1 cubic yard	30 – 40	.015 – .02
Corrugated Cardboard <sup>4</sup>			
Uncompacted	1 cubic yard	50 – 150	.025 – .075
Compacted	1 cubic yard	300 – 500	.15 – .25
Concrete <sup>2</sup>	1 cubic yard	4,050	2
Rubble <sup>1</sup>	1 cubic yard	1,400	.7
Drywall <sup>1</sup>	1 cubic yard	500	.25
Scrap Metal <sup>1</sup> (loose light iron sheet metal)	1 cubic yard	1,000	.5
Wood – pallets <sup>2</sup>	1 cubic yard	286	.143
Wood – pallets <sup>2</sup> (Each)	1 Unit	30 – 50	.015 – .025
Scrap Wood <sup>1</sup>	1 cubic yard	300	.15

1 US Green Building Council. "LEED Reference Guide for Green Building Design and Construction 2009 Edition, Section 6- Calculations, Table 2- Solid Waste Conversion Factors. Page 360.

2 US Environmental Protection Agency. "Measuring Recycling. A Guide for State and Local Governments." September 1997 Appendix B. Standard Volume-to-Weight Conversion Factors pp. 59 – 62. [www.epa.gov/epawaste/conservation/recmeas/docs/guide\\_b.pdf](http://www.epa.gov/epawaste/conservation/recmeas/docs/guide_b.pdf)

3 Asphalt Pavement Association of Michigan (4,050 lbs/yc<sup>3</sup>) and LEED EB v. 2.0 Reference Guide (p. 256) Table 2 Volume to Weight Conversions (115 lbs per yc<sup>3</sup> or 4,140 lbs per yc<sup>3</sup>).

4 Reade Advanced Materials, Providence RI 401.433.7000 [www.reade.com/Particle\\_Briefings/spec\\_gra2.html](http://www.reade.com/Particle_Briefings/spec_gra2.html)

Rubble tons/c.y. of debris ratio: **0.7**

Total tons of building debris to be removed: **3,344 c.y. x 0.7 tons/c.y. = 2341 tons**



**PG&E Electricity Emissions Factors**

Year	lbs CO <sub>2</sub> e/MWh
2025	390.65
2030	292.24

**2008 Electricity Emissions Factor**

Emissions Factors	t/kWh	Share of Portfolio	t/kWh	t/MWh	lbs/MWh
RPS sources	-	14%	-		
Natural Gas	0.000459	44%	0.00020174		
Nuclear	0.000002	22%	0.00000035		
Coal	0.001037	2%	0.00002075		
Other	0.000427	18%	0.00007695		
Total	-	100%	0.00029979	0.30	<b>660.91</b>

**Power Content Label**

PG&E 2008	%	Source
RPS sources	14%	<a href="https://ww2.energy.ca.gov/pcl/labels/2008_index.html">https://ww2.energy.ca.gov/pcl/labels/2008_index.html</a>
Natural Gas	44%	
Nuclear	22%	
Coal	2%	
Other	18%	
Total	100%	

**Natural Gas Facility Emissions Factor Calculation**

**Natural Gas Emissions Factor**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e	Source
kg per mmBtu	53.06	-	-	-	<a href="https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf">https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf</a>
g per mmBtu	53,060	1.00	0.10	-	
t per mmBtu	0.05	0.00	0.00	-	Calculated
t CO <sub>2</sub> e per mmBtu	0.05	0.00	0.00	0.05	Calculated
t CO <sub>2</sub> e per GJ	-	-	-	0.06	Calculated

**Heat Rates**

Value	Units	Source	Notes
7,755	btu/kWh	<a href="http://www.energy.ca.gov/2017publications/CEC-200-2017-003/CEC-200-2017-003.pdf">http://www.energy.ca.gov/2017publications/CEC-200-2017-003/CEC-200-2017-003.pdf</a>	Table 1, State Average w/o Cogeneration (per last paragraph on pg 4)
0.00818196	GJ/kWh	Converted in Google: GJ per btu	

**Natural Gas Facility Emissions Factor**

Natural gas emissions factor	0.06	t CO <sub>2</sub> e per GJ
Natural gas facility heat rate	0.00818196	GJ/kWh
Natural Gas Facility Emissions Factor	0.000458507	t CO <sub>2</sub> e per kWh

**Nuclear Emissions Factor**

Nuclear GHG Emissions	0.40	gCO <sub>2</sub> e/MJ	<a href="https://www.arb.ca.gov/fuels/lcfs/022709lcfs_elec.pdf">https://www.arb.ca.gov/fuels/lcfs/022709lcfs_elec.pdf</a>
Nuclear Emissions Factor	0.00000159	t/kWh	

**Unspecified Electricity Source Emissions Factor Calculation**

**ARB California GHG Inventory Unspecified Electricity Emissions Factors**

2014	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e	Units	Source
Pacific Northwest (PNW)	427	0.008117	0.00094388	427.4774	g/kWh	<a href="https://www.arb.ca.gov/cc/inventory/doc/methods_00-14/annex_1b_electricity_production_imports.pdf">https://www.arb.ca.gov/cc/inventory/doc/methods_00-14/annex_1b_electricity_production_imports.pdf</a>
Pacific Southwest (PSW)	427	0.008117	0.00094388	427.4774	g/kWh	
PNW and PSW	-	-	-	0.000427	t/kWh	-

**Other/Unspecified Emissions Factor**

Unspecified Electricity Emissions Factor	0.000427	t CO <sub>2</sub> e per kWh
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### Coal Electricity Source Emissions Factor Calculation

#### ARB California GHG Inventory Unspecified Electricity Emissions Factors

2007	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e	Units	Source
Coal Electricity Source Emissions Factor Calculation	1033	0.011	0.0153	1037.363	g/kWh	<a href="https://www.arb.ca.gov/cc/inventory/doc/methods_00-14/annex_1b_electricity_production_imports.pdf">https://www.arb.ca.gov/cc/inventory/doc/methods_00-14/annex_1b_electricity_production_imports.pdf</a>
Total	-	-	-	0.001037	t/kWh	-

#### Coal Emissions Factor

Unspecified Electricity Emissions Factor	0.001037	t CO <sub>2</sub> e per kWh
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#### 2025 and 2030 Electricity Emissions Factors

Non-RPS Energy	Year	PG&E RPS Position	Notes	Source
89.0%	2008	11.0%		<a href="https://ww2.energy.ca.gov/pcl/labels/2009/index.html">https://ww2.energy.ca.gov/pcl/labels/2009/index.html</a>
67.0%	2025	33.0%		
50.0%	2030	50.0%		

#### Estimated Power Content Label Sources

PG&E	2008	Share of Non-RPS in 2008	2025	Share of Non-RPS in 2025	2030
RPS	14.0%	-	33.0%	-	50.0%
Natural Gas	44.0%	49%	20.0%	29.9%	14.9%
Nuclear	22.0%	25%	27.0%	40.3%	20.1%
Coal	2.0%	2%	0.0%	0.0%	0.0%
Other	18.0%	20%	20.0%	29.9%	14.9%
Total	100%	97%	100%	100.0%	100%

2025					
Emissions Factors	t/kWh	Share of Portfolio	t/kWh	t/MWh	lbs/MWh
RPS	-	33.0%	-		
Natural Gas	0.000459	20.0%	0.000092		
Nuclear	0.000002	27.0%			
Coal	0.001037	0.0%	-		
Unspecified	0.000427	20.0%	0.000085		
Total	-	100.0%	0.000177	0.18	390.65

2030					
Emissions Factors	t/kWh	Share of Portfolio	t/kWh	t/MWh	lbs/MWh
RPS	-	50.0%	-		
Natural Gas	0.000459	14.9%	0.000068		
Nuclear	0.000002	20.1%	0.000000		
Coal	0.001037	0.0%	-		
Unspecified	0.000427	14.9%	0.000064		
Total	-	100.0%	0.000133	0.13	292.24

## CONVERSION FACTORS

### Conversions

GJ	mmBtu
1	0.947817
g	kg
1	1,000
g	t
1	0.000001
lb	t
2,204.62	1
kW	MW
1	0.001

### GWP Factors

CO <sub>2</sub>	1
CH <sub>4</sub>	28
N <sub>2</sub> O	265