CITY OF RICHMOND, CALIFORNIA

Cherry Blossom Row

INITIAL STUDY &
MITIGATED NEGATIVE DECLARATION

APPENDICES

JUNE 2021

Douglas Herring & Associates
Environmental, Policy, and Planning Services

Appendix A

Air Quality, Greenhouse Gas Emissions & Energy Supporting Information

Attachment A

Construction and Operational Emissions

CalEEMod Output Files

Proposed Project

- Annual
- Summer
- Winter

Richmond Annex 2301 Columbia Avenue

Contra Costa County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	20.00	Space	0.18	8,000.00	0
Condo/Townhouse	100.00	Dwelling Unit	4.56	152,000.00	286

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	5			**Operational Year**	2025
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	290	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Richmond Annex 2301 Columbia Avenue - Contra Costa County, Annual

Project Characteristics - Greenhouse Gas Emission Factors: Guidance for PG&E Customers November 2015

Land Use - Conceptual Site Plan, dated March 17, 2021 and Data Request Response, dated March 23, 2021

Construction Phase - Data Request Response, dated March 23, 2021

Demolition - 1,850 cubic yards of rubble and concrete at 150 pounds per cubic feet

Grading - Data Request Responses, dated March 23, 2021 and March 25, 2021

Vehicle Trips - Lee Reis, Fehr & Peers, Cherry Blossom Row – Transportation Assessment, May 10, 2021

Energy Use - Data Request Response, March 23, 2021 No natural gas to site, all solar electric

Construction Off-road Equipment Mitigation - BAAQMD Basic and Enhanced Mitigation Measures

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation -

Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3

tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	11.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
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tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	5.00
tblConstructionPhase	NumDays	5.00	120.00
tblConstructionPhase	NumDays	8.00	30.00
tblConstructionPhase	NumDays	18.00	30.00
tblConstructionPhase	NumDays	230.00	605.00
tblConstructionPhase	NumDays	18.00	25.00
tblEnergyUse	NT24NG	2,615.00	0.00
tblEnergyUse	T24NG	20,104.20	0.00
tblGrading	AcresOfGrading	15.00	4.74
tblGrading	MaterialExported	0.00	1,850.00
tblGrading	MaterialExported	0.00	6,000.00
tblGrading	MaterialImported	0.00	11,500.00
tblLandUse	LandUseSquareFeet	100,000.00	152,000.00
tblLandUse	LotAcreage	6.25	4.56
tblProjectCharacteristics	CO2IntensityFactor	641.35	290
tblVehicleTrips	HW_TL	10.80	10.20
tblVehicleTrips	ST_TR	5.67	5.66
tblVehicleTrips	SU_TR	4.84	4.83
tblVehicleTrips	WD_TR	5.81	5.80

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					
2022	0.3546	3.6037	2.6812	5.7300e-003	1.2421	0.1648	1.4069	0.6631	0.1526	0.8156	0.0000	508.8054	508.8054	0.1209	0.0000	511.8289
2023	0.2342	2.0030	2.3346	4.5800e-003	0.0876	0.0916	0.1792	0.0235	0.0862	0.1097	0.0000	400.7363	400.7363	0.0743	0.0000	402.5949
2024	1.2768	1.7485	2.1573	4.2500e-003	0.0823	0.0749	0.1573	0.0221	0.0705	0.0926	0.0000	371.7940	371.7940	0.0683	0.0000	373.5014
Maximum	**1.2768**	**3.6037**	**2.6812**	**5.7300e-003**	**1.2421**	**0.1648**	**1.4069**	**0.6631**	**0.1526**	**0.8156**	**0.0000**	**508.8054**	**508.8054**	**0.1209**	**0.0000**	**511.8289**

Mitigated 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					
2022	0.0794	0.5602	2.8730	5.7300e-003	0.5226	2.0900e-003	0.5247	0.2689	2.0400e-003	0.2709	0.0000	508.8050	508.8050	0.1209	0.0000	511.8284
2023	0.0724	0.4234	2.4927	4.5800e-003	0.0876	1.4100e-003	0.0890	0.0235	1.3700e-003	0.0249	0.0000	400.7360	400.7360	0.0743	0.0000	402.5945
2024	1.1376	0.3898	2.3128	4.2500e-003	0.0823	1.3100e-003	0.0837	0.0221	1.2700e-003	0.0234	0.0000	371.7937	371.7937	0.0683	0.0000	373.5010
Maximum	**1.1376**	**0.5602**	**2.8730**	**5.7300e-003**	**0.5226**	**2.0900e-003**	**0.5247**	**0.2689**	**2.0400e-003**	**0.2709**	**0.0000**	**508.8050**	**508.8050**	**0.1209**	**0.0000**	**511.8284**

Richmond Annex 2301 Columbia Avenue - Contra Costa County, Annual

	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	**30.89**	**81.33**	**-7.05**	**0.00**	**50.95**	**98.55**	**60.00**	**55.62**	**98.49**	**68.64**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-1-2022**	**3-31-2022**	1.6130	0.2342
2	**4-1-2022**	**6-30-2022**	1.2163	0.1711
3	**7-1-2022**	**9-30-2022**	0.5141	0.0990
4	**10-1-2022**	**12-31-2022**	0.6219	0.1369
5	**1-1-2023**	**3-31-2023**	0.5542	0.1236
6	**4-1-2023**	**6-30-2023**	0.5591	0.1238
7	**7-1-2023**	**9-30-2023**	0.5653	0.1252
8	**10-1-2023**	**12-31-2023**	0.5665	0.1264
9	**1-1-2024**	**3-31-2024**	0.5251	0.1237
10	**4-1-2024**	**6-30-2024**	0.5240	0.1226
11	**7-1-2024**	**9-30-2024**	0.5298	0.1239
		Highest	1.6130	0.2342

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	0.9543	0.0139	1.0597	6.7000e-004		0.0495	0.0495		0.0495	0.0495	4.5590	3.0858	7.6448	8.4900e-003	3.0000e-004	7.9461
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	66.1475	66.1475	6.6100e-003	1.3700e-003	66.7207
Mobile	0.1122	0.4782	1.2496	4.8400e-003	0.4737	3.7600e-003	0.4775	0.1271	3.5000e-003	0.1306	0.0000	444.2031	444.2031	0.0145	0.0000	444.5647
Waste						0.0000	0.0000		0.0000	0.0000	9.3376	0.0000	9.3376	0.5518	0.0000	23.1335
Water						0.0000	0.0000		0.0000	0.0000	2.0670	6.5286	8.5956	0.2130	5.1500e-003	15.4537
Total	**1.0666**	**0.4921**	**2.3093**	**5.5100e-003**	**0.4737**	**0.0533**	**0.5270**	**0.1271**	**0.0530**	**0.1801**	**15.9636**	**519.9650**	**535.9286**	**0.7944**	**6.8200e-003**	**557.8186**

2.2 Overall Operational

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	0.7236	8.5500e-003	0.7420	4.0000e-005		4.1200e-003	4.1200e-003		4.1200e-003	4.1200e-003	0.0000	1.2132	1.2132	1.1600e-003	0.0000	1.2423
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.1122	0.4782	1.2496	4.8400e-003	0.4737	3.7600e-003	0.4775	0.1271	3.5000e-003	0.1306	0.0000	444.2031	444.2031	0.0145	0.0000	444.5647
Waste						0.0000	0.0000		0.0000	0.0000	9.3376	0.0000	9.3376	0.5518	0.0000	23.1335
Water						0.0000	0.0000		0.0000	0.0000	2.0670	6.5286	8.5956	0.2130	5.1500e-003	15.4537
Total	**0.8358**	**0.4868**	**1.9916**	**4.8800e-003**	**0.4737**	**7.8800e-003**	**0.4816**	**0.1271**	**7.6200e-003**	**0.1347**	**11.4046**	**451.9449**	**463.3495**	**0.7804**	**5.1500e-003**	**484.3941**

	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	**21.63**	**1.08**	**13.76**	**11.43**	**0.00**	**85.22**	**8.62**	**0.00**	**85.63**	**25.22**	**28.56**	**13.08**	**13.54**	**1.75**	**24.49**	**13.16**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2022	1/7/2022	5	5	
2	Site Preparation	Site Preparation	1/8/2022	6/24/2022	5	120	
3	Grading	Grading	1/8/2022	2/18/2022	5	30	
4	Paving	Paving	6/25/2022	8/5/2022	5	30	
5	Building Construction	Building Construction	8/6/2022	11/29/2024	5	605	
6	Architectural Coating	Architectural Coating	10/28/2024	11/29/2024	5	25	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4.74

Acres of Paving: 0.18

Residential Indoor: 307,800; Residential Outdoor: 102,600; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 480 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
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
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

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
Demolition	6	15.00	0.00	14.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	1,438.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	231.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	75.00	12.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2022

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					
Fugitive Dust					1.5000e-003	0.0000	1.5000e-003	2.3000e-004	0.0000	2.3000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.6000e-003	0.0643	0.0515	1.0000e-004		3.1100e-003	3.1100e-003		2.8900e-003	2.8900e-003	0.0000	8.4976	8.4976	2.3900e-003	0.0000	8.5572
Total	**6.6000e-003**	**0.0643**	**0.0515**	**1.0000e-004**	**1.5000e-003**	**3.1100e-003**	**4.6100e-003**	**2.3000e-004**	**2.8900e-003**	**3.1200e-003**	**0.0000**	**8.4976**	**8.4976**	**2.3900e-003**	**0.0000**	**8.5572**

3.2 Demolition - 2022

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	5.0000e-005	1.7200e-003	3.6000e-004	1.0000e-005	1.2000e-004	1.0000e-005	1.2000e-004	3.0000e-005	0.0000	4.0000e-005	0.0000	0.5172	0.5172	2.0000e-005	0.0000	0.5178
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1000e-004	7.0000e-005	7.9000e-004	0.0000	3.0000e-004	0.0000	3.0000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.2423	0.2423	1.0000e-005	0.0000	0.2425
Total	**1.6000e-004**	**1.7900e-003**	**1.1500e-003**	**1.0000e-005**	**4.2000e-004**	**1.0000e-005**	**4.2000e-004**	**1.1000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.7596**	**0.7596**	**3.0000e-005**	**0.0000**	**0.7603**

Mitigated 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					
Fugitive Dust					5.8000e-004	0.0000	5.8000e-004	9.0000e-005	0.0000	9.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.1600e-003	5.0100e-003	0.0582	1.0000e-004		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	8.4976	8.4976	2.3900e-003	0.0000	8.5572
Total	**1.1600e-003**	**5.0100e-003**	**0.0582**	**1.0000e-004**	**5.8000e-004**	**2.0000e-005**	**6.0000e-004**	**9.0000e-005**	**2.0000e-005**	**1.1000e-004**	**0.0000**	**8.4976**	**8.4976**	**2.3900e-003**	**0.0000**	**8.5572**

3.2 Demolition - 2022

Mitigated 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	5.0000e-005	1.7200e-003	3.6000e-004	1.0000e-005	1.2000e-004	1.0000e-005	1.2000e-004	3.0000e-005	0.0000	4.0000e-005	0.0000	0.5172	0.5172	2.0000e-005	0.0000	0.5178
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1000e-004	7.0000e-005	7.9000e-004	0.0000	3.0000e-004	0.0000	3.0000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.2423	0.2423	1.0000e-005	0.0000	0.2425
Total	**1.6000e-004**	**1.7900e-003**	**1.1500e-003**	**1.0000e-005**	**4.2000e-004**	**1.0000e-005**	**4.2000e-004**	**1.1000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.7596**	**0.7596**	**3.0000e-005**	**0.0000**	**0.7603**

3.3 Site Preparation - 2022

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					
Fugitive Dust					1.0850	0.0000	1.0850	0.5960	0.0000	0.5960	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1902	1.9850	1.1819	2.2800e-003		0.0968	0.0968		0.0890	0.0890	0.0000	200.6363	200.6363	0.0649	0.0000	202.2586
Total	**0.1902**	**1.9850**	**1.1819**	**2.2800e-003**	**1.0850**	**0.0968**	**1.1817**	**0.5960**	**0.0890**	**0.6850**	**0.0000**	**200.6363**	**200.6363**	**0.0649**	**0.0000**	**202.2586**

3.3 Site Preparation - 2022

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	5.2600e-003	0.1765	0.0374	5.5000e-004	0.0122	5.2000e-004	0.0127	3.3500e-003	5.0000e-004	3.8500e-003	0.0000	53.1283	53.1283	2.2900e-003	0.0000	53.1855
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1100e-003	2.1000e-003	0.0227	8.0000e-005	8.5700e-003	5.0000e-005	8.6200e-003	2.2800e-003	5.0000e-005	2.3300e-003	0.0000	6.9790	6.9790	1.5000e-004	0.0000	6.9827
Total	**8.3700e-003**	**0.1786**	**0.0602**	**6.3000e-004**	**0.0208**	**5.7000e-004**	**0.0213**	**5.6300e-003**	**5.5000e-004**	**6.1800e-003**	**0.0000**	**60.1073**	**60.1073**	**2.4400e-003**	**0.0000**	**60.1682**

Mitigated 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					
Fugitive Dust					0.4231	0.0000	0.4231	0.2324	0.0000	0.2324	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0279	0.1211	1.2521	2.2800e-003		5.6000e-004	5.6000e-004		5.6000e-004	5.6000e-004	0.0000	200.6361	200.6361	0.0649	0.0000	202.2584
Total	**0.0279**	**0.1211**	**1.2521**	**2.2800e-003**	**0.4231**	**5.6000e-004**	**0.4237**	**0.2324**	**5.6000e-004**	**0.2330**	**0.0000**	**200.6361**	**200.6361**	**0.0649**	**0.0000**	**202.2584**

3.3 Site Preparation - 2022

Mitigated 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	5.2600e-003	0.1765	0.0374	5.5000e-004	0.0122	5.2000e-004	0.0127	3.3500e-003	5.0000e-004	3.8500e-003	0.0000	53.1283	53.1283	2.2900e-003	0.0000	53.1855
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1100e-003	2.1000e-003	0.0227	8.0000e-005	8.5700e-003	5.0000e-005	8.6200e-003	2.2800e-003	5.0000e-005	2.3300e-003	0.0000	6.9790	6.9790	1.5000e-004	0.0000	6.9827
Total	**8.3700e-003**	**0.1786**	**0.0602**	**6.3000e-004**	**0.0208**	**5.7000e-004**	**0.0213**	**5.6300e-003**	**5.5000e-004**	**6.1800e-003**	**0.0000**	**60.1073**	**60.1073**	**2.4400e-003**	**0.0000**	**60.1682**

3.4 Grading - 2022

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					
Fugitive Dust					0.0930	0.0000	0.0930	0.0499	0.0000	0.0499	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0292	0.3128	0.2291	4.4000e-004		0.0141	0.0141		0.0130	0.0130	0.0000	39.0822	39.0822	0.0126	0.0000	39.3982
Total	**0.0292**	**0.3128**	**0.2291**	**4.4000e-004**	**0.0930**	**0.0141**	**0.1071**	**0.0499**	**0.0130**	**0.0629**	**0.0000**	**39.0822**	**39.0822**	**0.0126**	**0.0000**	**39.3982**

3.4 Grading - 2022

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	8.5000e-004	0.0284	6.0100e-003	9.0000e-005	1.9600e-003	8.0000e-005	2.0400e-003	5.4000e-004	8.0000e-005	6.2000e-004	0.0000	8.5345	8.5345	3.7000e-004	0.0000	8.5437
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.5000e-004	4.4000e-004	4.7300e-003	2.0000e-005	1.7800e-003	1.0000e-005	1.8000e-003	4.7000e-004	1.0000e-005	4.9000e-004	0.0000	1.4540	1.4540	3.0000e-005	0.0000	1.4547
Total	**1.5000e-003**	**0.0288**	**0.0107**	**1.1000e-004**	**3.7400e-003**	**9.0000e-005**	**3.8400e-003**	**1.0100e-003**	**9.0000e-005**	**1.1100e-003**	**0.0000**	**9.9885**	**9.9885**	**4.0000e-004**	**0.0000**	**9.9984**

Mitigated 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					
Fugitive Dust					0.0363	0.0000	0.0363	0.0195	0.0000	0.0195	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.4500e-003	0.0236	0.2663	4.4000e-004		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	39.0821	39.0821	0.0126	0.0000	39.3981
Total	**5.4500e-003**	**0.0236**	**0.2663**	**4.4000e-004**	**0.0363**	**1.1000e-004**	**0.0364**	**0.0195**	**1.1000e-004**	**0.0196**	**0.0000**	**39.0821**	**39.0821**	**0.0126**	**0.0000**	**39.3981**

3.4 Grading - 2022

Mitigated 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	8.5000e-004	0.0284	6.0100e-003	9.0000e-005	1.9600e-003	8.0000e-005	2.0400e-003	5.4000e-004	8.0000e-005	6.2000e-004	0.0000	8.5345	8.5345	3.7000e-004	0.0000	8.5437
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.5000e-004	4.4000e-004	4.7300e-003	2.0000e-005	1.7800e-003	1.0000e-005	1.8000e-003	4.7000e-004	1.0000e-005	4.9000e-004	0.0000	1.4540	1.4540	3.0000e-005	0.0000	1.4547
Total	**1.5000e-003**	**0.0288**	**0.0107**	**1.1000e-004**	**3.7400e-003**	**9.0000e-005**	**3.8400e-003**	**1.0100e-003**	**9.0000e-005**	**1.1100e-003**	**0.0000**	**9.9885**	**9.9885**	**4.0000e-004**	**0.0000**	**9.9984**

3.5 Paving - 2022

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					
Off-Road	0.0147	0.1428	0.1829	2.8000e-004		7.3100e-003	7.3100e-003		6.7600e-003	6.7600e-003	0.0000	24.5638	24.5638	7.7200e-003	0.0000	24.7567
Paving	2.4000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0149**	**0.1428**	**0.1829**	**2.8000e-004**		**7.3100e-003**	**7.3100e-003**		**6.7600e-003**	**6.7600e-003**	**0.0000**	**24.5638**	**24.5638**	**7.7200e-003**	**0.0000**	**24.7567**

3.5 Paving - 2022

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.6000e-004	5.8000e-004	6.3100e-003	2.0000e-005	2.3800e-003	2.0000e-005	2.3900e-003	6.3000e-004	1.0000e-005	6.5000e-004	0.0000	1.9386	1.9386	4.0000e-005	0.0000	1.9396
Total	**8.6000e-004**	**5.8000e-004**	**6.3100e-003**	**2.0000e-005**	**2.3800e-003**	**2.0000e-005**	**2.3900e-003**	**6.3000e-004**	**1.0000e-005**	**6.5000e-004**	**0.0000**	**1.9386**	**1.9386**	**4.0000e-005**	**0.0000**	**1.9396**

Mitigated 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					
Off-Road	3.2900e-003	0.0143	0.2030	2.8000e-004		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005	0.0000	24.5638	24.5638	7.7200e-003	0.0000	24.7567
Paving	2.4000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.5300e-003**	**0.0143**	**0.2030**	**2.8000e-004**		**7.0000e-005**	**7.0000e-005**		**7.0000e-005**	**7.0000e-005**	**0.0000**	**24.5638**	**24.5638**	**7.7200e-003**	**0.0000**	**24.7567**

3.5 Paving - 2022

Mitigated 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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.6000e-004	5.8000e-004	6.3100e-003	2.0000e-005	2.3800e-003	2.0000e-005	2.3900e-003	6.3000e-004	1.0000e-005	6.5000e-004	0.0000	1.9386	1.9386	4.0000e-005	0.0000	1.9396
Total	**8.6000e-004**	**5.8000e-004**	**6.3100e-003**	**2.0000e-005**	**2.3800e-003**	**2.0000e-005**	**2.3900e-003**	**6.3000e-004**	**1.0000e-005**	**6.5000e-004**	**0.0000**	**1.9386**	**1.9386**	**4.0000e-005**	**0.0000**	**1.9396**

3.6 Building Construction - 2022

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					
Off-Road	0.0896	0.8198	0.8591	1.4100e-003		0.0425	0.0425		0.0400	0.0400	0.0000	121.6558	121.6558	0.0292	0.0000	122.3844
Total	**0.0896**	**0.8198**	**0.8591**	**1.4100e-003**		**0.0425**	**0.0425**		**0.0400**	**0.0400**	**0.0000**	**121.6558**	**121.6558**	**0.0292**	**0.0000**	**122.3844**

3.6 Building Construction - 2022

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.9200e-003	0.0615	0.0155	1.7000e-004	4.1400e-003	1.3000e-004	4.2700e-003	1.2000e-003	1.2000e-004	1.3200e-003	0.0000	16.1315	16.1315	7.2000e-004	0.0000	16.1494
Worker	0.0113	7.6400e-003	0.0828	2.8000e-004	0.0312	2.0000e-004	0.0314	8.3100e-003	1.8000e-004	8.4900e-003	0.0000	25.4444	25.4444	5.4000e-004	0.0000	25.4578
Total	**0.0133**	**0.0692**	**0.0983**	**4.5000e-004**	**0.0354**	**3.3000e-004**	**0.0357**	**9.5100e-003**	**3.0000e-004**	**9.8100e-003**	**0.0000**	**41.5758**	**41.5758**	**1.2600e-003**	**0.0000**	**41.6072**

Mitigated 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					
Off-Road	0.0172	0.1173	0.9167	1.4100e-003		3.2000e-004	3.2000e-004		3.2000e-004	3.2000e-004	0.0000	121.6556	121.6556	0.0292	0.0000	122.3842
Total	**0.0172**	**0.1173**	**0.9167**	**1.4100e-003**		**3.2000e-004**	**3.2000e-004**		**3.2000e-004**	**3.2000e-004**	**0.0000**	**121.6556**	**121.6556**	**0.0292**	**0.0000**	**122.3842**

3.6 Building Construction - 2022

Mitigated 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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.9200e-003	0.0615	0.0155	1.7000e-004	4.1400e-003	1.3000e-004	4.2700e-003	1.2000e-003	1.2000e-004	1.3200e-003	0.0000	16.1315	16.1315	7.2000e-004	0.0000	16.1494
Worker	0.0113	7.6400e-003	0.0828	2.8000e-004	0.0312	2.0000e-004	0.0314	8.3100e-003	1.8000e-004	8.4900e-003	0.0000	25.4444	25.4444	5.4000e-004	0.0000	25.4578
Total	**0.0133**	**0.0692**	**0.0983**	**4.5000e-004**	**0.0354**	**3.3000e-004**	**0.0357**	**9.5100e-003**	**3.0000e-004**	**9.8100e-003**	**0.0000**	**41.5758**	**41.5758**	**1.2600e-003**	**0.0000**	**41.6072**

3.6 Building Construction - 2023

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					
Off-Road	0.2045	1.8700	2.1117	3.5000e-003		0.0910	0.0910		0.0856	0.0856	0.0000	301.3462	301.3462	0.0717	0.0000	303.1383
Total	**0.2045**	**1.8700**	**2.1117**	**3.5000e-003**		**0.0910**	**0.0910**		**0.0856**	**0.0856**	**0.0000**	**301.3462**	**301.3462**	**0.0717**	**0.0000**	**303.1383**

3.6 Building Construction - 2023

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.5900e-003	0.1159	0.0342	4.1000e-004	0.0103	1.4000e-004	0.0104	2.9700e-003	1.3000e-004	3.1000e-003	0.0000	38.8327	38.8327	1.4600e-003	0.0000	38.8692
Worker	0.0262	0.0170	0.1886	6.7000e-004	0.0773	4.8000e-004	0.0778	0.0206	4.4000e-004	0.0210	0.0000	60.5575	60.5575	1.1900e-003	0.0000	60.5873
Total	**0.0297**	**0.1329**	**0.2229**	**1.0800e-003**	**0.0876**	**6.2000e-004**	**0.0882**	**0.0235**	**5.7000e-004**	**0.0241**	**0.0000**	**99.3902**	**99.3902**	**2.6500e-003**	**0.0000**	**99.4566**

Mitigated 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					
Off-Road	0.0426	0.2905	2.2698	3.5000e-003		8.0000e-004	8.0000e-004		8.0000e-004	8.0000e-004	0.0000	301.3458	301.3458	0.0717	0.0000	303.1380
Total	**0.0426**	**0.2905**	**2.2698**	**3.5000e-003**		**8.0000e-004**	**8.0000e-004**		**8.0000e-004**	**8.0000e-004**	**0.0000**	**301.3458**	**301.3458**	**0.0717**	**0.0000**	**303.1380**

3.6 Building Construction - 2023

Mitigated 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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.5900e-003	0.1159	0.0342	4.1000e-004	0.0103	1.4000e-004	0.0104	2.9700e-003	1.3000e-004	3.1000e-003	0.0000	38.8327	38.8327	1.4600e-003	0.0000	38.8692
Worker	0.0262	0.0170	0.1886	6.7000e-004	0.0773	4.8000e-004	0.0778	0.0206	4.4000e-004	0.0210	0.0000	60.5575	60.5575	1.1900e-003	0.0000	60.5873
Total	**0.0297**	**0.1329**	**0.2229**	**1.0800e-003**	**0.0876**	**6.2000e-004**	**0.0882**	**0.0235**	**5.7000e-004**	**0.0241**	**0.0000**	**99.3902**	**99.3902**	**2.6500e-003**	**0.0000**	**99.4566**

3.6 Building Construction - 2024

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					
Off-Road	0.1766	1.6133	1.9400	3.2300e-003		0.0736	0.0736		0.0692	0.0692	0.0000	278.2189	278.2189	0.0658	0.0000	279.8637
Total	**0.1766**	**1.6133**	**1.9400**	**3.2300e-003**		**0.0736**	**0.0736**		**0.0692**	**0.0692**	**0.0000**	**278.2189**	**278.2189**	**0.0658**	**0.0000**	**279.8637**

3.6 Building Construction - 2024

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.2000e-003	0.1056	0.0303	3.7000e-004	9.4700e-003	1.3000e-004	9.6000e-003	2.7400e-003	1.2000e-004	2.8600e-003	0.0000	35.6114	35.6114	1.3100e-003	0.0000	35.6442
Worker	0.0226	0.0141	0.1610	5.9000e-004	0.0714	4.3000e-004	0.0718	0.0190	4.0000e-004	0.0194	0.0000	53.6543	53.6543	9.9000e-004	0.0000	53.6791
Total	**0.0258**	**0.1197**	**0.1913**	**9.6000e-004**	**0.0809**	**5.6000e-004**	**0.0814**	**0.0217**	**5.2000e-004**	**0.0222**	**0.0000**	**89.2657**	**89.2657**	**2.3000e-003**	**0.0000**	**89.3233**

Mitigated 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					
Off-Road	0.0393	0.2682	2.0952	3.2300e-003		7.3000e-004	7.3000e-004		7.3000e-004	7.3000e-004	0.0000	278.2186	278.2186	0.0658	0.0000	279.8634
Total	**0.0393**	**0.2682**	**2.0952**	**3.2300e-003**		**7.3000e-004**	**7.3000e-004**		**7.3000e-004**	**7.3000e-004**	**0.0000**	**278.2186**	**278.2186**	**0.0658**	**0.0000**	**279.8634**

3.6 Building Construction - 2024

Mitigated 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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.2000e-003	0.1056	0.0303	3.7000e-004	9.4700e-003	1.3000e-004	9.6000e-003	2.7400e-003	1.2000e-004	2.8600e-003	0.0000	35.6114	35.6114	1.3100e-003	0.0000	35.6442
Worker	0.0226	0.0141	0.1610	5.9000e-004	0.0714	4.3000e-004	0.0718	0.0190	4.0000e-004	0.0194	0.0000	53.6543	53.6543	9.9000e-004	0.0000	53.6791
Total	**0.0258**	**0.1197**	**0.1913**	**9.6000e-004**	**0.0809**	**5.6000e-004**	**0.0814**	**0.0217**	**5.2000e-004**	**0.0222**	**0.0000**	**89.2657**	**89.2657**	**2.3000e-003**	**0.0000**	**89.3233**

3.7 Architectural Coating - 2024

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	1.0717					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.2600e-003	0.0152	0.0226	4.0000e-005		7.6000e-004	7.6000e-004		7.6000e-004	7.6000e-004	0.0000	3.1916	3.1916	1.8000e-004	0.0000	3.1961
Total	**1.0739**	**0.0152**	**0.0226**	**4.0000e-005**		**7.6000e-004**	**7.6000e-004**		**7.6000e-004**	**7.6000e-004**	**0.0000**	**3.1916**	**3.1916**	**1.8000e-004**	**0.0000**	**3.1961**

3.7 Architectural Coating - 2024

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.7000e-004	2.9000e-004	3.3500e-003	1.0000e-005	1.4900e-003	1.0000e-005	1.5000e-003	4.0000e-004	1.0000e-005	4.0000e-004	0.0000	1.1178	1.1178	2.0000e-005	0.0000	1.1183
Total	**4.7000e-004**	**2.9000e-004**	**3.3500e-003**	**1.0000e-005**	**1.4900e-003**	**1.0000e-005**	**1.5000e-003**	**4.0000e-004**	**1.0000e-005**	**4.0000e-004**	**0.0000**	**1.1178**	**1.1178**	**2.0000e-005**	**0.0000**	**1.1183**

Mitigated 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	1.0717					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.7000e-004	1.6100e-003	0.0229	4.0000e-005		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.1916	3.1916	1.8000e-004	0.0000	3.1961
Total	**1.0720**	**1.6100e-003**	**0.0229**	**4.0000e-005**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**3.1916**	**3.1916**	**1.8000e-004**	**0.0000**	**3.1961**

3.7 Architectural Coating - 2024

Mitigated 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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.7000e-004	2.9000e-004	3.3500e-003	1.0000e-005	1.4900e-003	1.0000e-005	1.5000e-003	4.0000e-004	1.0000e-005	4.0000e-004	0.0000	1.1178	1.1178	2.0000e-005	0.0000	1.1183
Total	**4.7000e-004**	**2.9000e-004**	**3.3500e-003**	**1.0000e-005**	**1.4900e-003**	**1.0000e-005**	**1.5000e-003**	**4.0000e-004**	**1.0000e-005**	**4.0000e-004**	**0.0000**	**1.1178**	**1.1178**	**2.0000e-005**	**0.0000**	**1.1183**

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	0.1122	0.4782	1.2496	4.8400e-003	0.4737	3.7600e-003	0.4775	0.1271	3.5000e-003	0.1306	0.0000	444.2031	444.2031	0.0145	0.0000	444.5647
Unmitigated	0.1122	0.4782	1.2496	4.8400e-003	0.4737	3.7600e-003	0.4775	0.1271	3.5000e-003	0.1306	0.0000	444.2031	444.2031	0.0145	0.0000	444.5647

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Condo/Townhouse	580.00	566.00	483.00	1,269,051	1,269,051
Parking Lot	0.00	0.00	0.00		
Total	580.00	566.00	483.00	1,269,051	1,269,051

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-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Condo/Townhouse	10.20	4.80	5.70	31.00	15.00	54.00	86	11	3
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Condo/Townhouse	0.597341	0.036425	0.184736	0.114304	0.014288	0.004933	0.010771	0.025203	0.001643	0.001653	0.005254	0.002704	0.000746
Parking Lot	0.597341	0.036425	0.184736	0.114304	0.014288	0.004933	0.010771	0.025203	0.001643	0.001653	0.005254	0.002704	0.000746

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Percent of Electricity Use Generated with Renewable Energy

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						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	66.1475	66.1475	6.6100e-003	1.3700e-003	66.7207
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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					
Condo/Townhouse	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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					
Condo/Townhouse	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Condo/Townhouse	500063	65.7792	6.5800e-003	1.3600e-003	66.3492
Parking Lot	2800	0.3683	4.0000e-005	1.0000e-005	0.3715
Total		**66.1475**	**6.6200e-003**	**1.3700e-003**	**66.7207**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Condo/Townhouse	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

No Hearths Installed

	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	0.7236	8.5500e-003	0.7420	4.0000e-005		4.1200e-003	4.1200e-003		4.1200e-003	4.1200e-003	0.0000	1.2132	1.2132	1.1600e-003	0.0000	1.2423
Unmitigated	0.9543	0.0139	1.0597	6.7000e-004		0.0495	0.0495		0.0495	0.0495	4.5590	3.0858	7.6448	8.4900e-003	3.0000e-004	7.9461

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	0.1072					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.5942					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.2307	5.3100e-003	0.3177	6.3000e-004		0.0454	0.0454		0.0454	0.0454	4.5590	1.8726	6.4316	7.3300e-003	3.0000e-004	6.7038
Landscaping	0.0223	8.5500e-003	0.7420	4.0000e-005		4.1200e-003	4.1200e-003		4.1200e-003	4.1200e-003	0.0000	1.2132	1.2132	1.1600e-003	0.0000	1.2423
Total	**0.9543**	**0.0139**	**1.0597**	**6.7000e-004**		**0.0495**	**0.0495**		**0.0495**	**0.0495**	**4.5590**	**3.0858**	**7.6448**	**8.4900e-003**	**3.0000e-004**	**7.9461**

6.2 Area by SubCategory

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	0.1072					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.5942					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0223	8.5500e-003	0.7420	4.0000e-005		4.1200e-003	4.1200e-003		4.1200e-003	4.1200e-003	0.0000	1.2132	1.2132	1.1600e-003	0.0000	1.2423
Total	**0.7236**	**8.5500e-003**	**0.7420**	**4.0000e-005**		**4.1200e-003**	**4.1200e-003**		**4.1200e-003**	**4.1200e-003**	**0.0000**	**1.2132**	**1.2132**	**1.1600e-003**	**0.0000**	**1.2423**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	8.5956	0.2130	5.1500e-003	15.4537
Unmitigated	8.5956	0.2130	5.1500e-003	15.4537

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Condo/Townhouse	6.5154 / 4.10754	8.5956	0.2130	5.1500e-003	15.4537
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**8.5956**	**0.2130**	**5.1500e-003**	**15.4537**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Condo/Townhouse	6.5154 / 4.10754	8.5956	0.2130	5.1500e-003	15.4537
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**8.5956**	**0.2130**	**5.1500e-003**	**15.4537**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	9.3376	0.5518	0.0000	23.1335
Unmitigated	9.3376	0.5518	0.0000	23.1335

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Condo/Townhouse	46	9.3376	0.5518	0.0000	23.1335
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**9.3376**	**0.5518**	**0.0000**	**23.1335**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Condo/Townhouse	46	9.3376	0.5518	0.0000	23.1335
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**9.3376**	**0.5518**	**0.0000**	**23.1335**

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Richmond Annex 2301 Columbia Avenue

Contra Costa County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	20.00	Space	0.18	8,000.00	0
Condo/Townhouse	100.00	Dwelling Unit	4.56	152,000.00	286

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	5			**Operational Year**	2025
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	290	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Richmond Annex 2301 Columbia Avenue - Contra Costa County, Summer

Project Characteristics - Greenhouse Gas Emission Factors: Guidance for PG&E Customers November 2015

Land Use - Conceptual Site Plan, dated March 17, 2021 and Data Request Response, dated March 23, 2021

Construction Phase - Data Request Response, dated March 23, 2021

Demolition - 1,850 cubic yards of rubble and concrete at 150 pounds per cubic feet

Grading - Data Request Responses, dated March 23, 2021 and March 25, 2021

Vehicle Trips - Lee Reis, Fehr & Peers, Cherry Blossom Row – Transportation Assessment, May 10, 2021

Energy Use - Data Request Response, March 23, 2021 No natural gas to site, all solar electric

Construction Off-road Equipment Mitigation - BAAQMD Basic and Enhanced Mitigation Measures

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation -

Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3

tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	11.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	5.00
tblConstructionPhase	NumDays	5.00	120.00
tblConstructionPhase	NumDays	8.00	30.00
tblConstructionPhase	NumDays	18.00	30.00
tblConstructionPhase	NumDays	230.00	605.00
tblConstructionPhase	NumDays	18.00	25.00
tblEnergyUse	NT24NG	2,615.00	0.00
tblEnergyUse	T24NG	20,104.20	0.00
tblGrading	AcresOfGrading	15.00	4.74
tblGrading	MaterialExported	0.00	1,850.00
tblGrading	MaterialExported	0.00	6,000.00
tblGrading	MaterialImported	0.00	11,500.00
tblLandUse	LandUseSquareFeet	100,000.00	152,000.00
tblLandUse	LotAcreage	6.25	4.56
tblProjectCharacteristics	CO2IntensityFactor	641.35	290
tblVehicleTrips	HW_TL	10.80	10.20
tblVehicleTrips	ST_TR	5.67	5.66
tblVehicleTrips	SU_TR	4.84	4.83
tblVehicleTrips	WD_TR	5.81	5.80

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2022	5.3641	58.7416	36.7438	0.0854	24.8943	2.5692	27.4635	13.4287	2.3642	15.7929	0.0000	8,429.3843	8,429.3843	2.1938	0.0000	8,484.2288
2023	1.8174	15.3871	18.1274	0.0357	0.6973	0.7045	1.4018	0.1868	0.6628	0.8496	0.0000	3,447.7566	3,447.7566	0.6308	0.0000	3,463.5274
2024	87.6551	15.6629	20.0338	0.0395	0.8206	0.6796	1.5002	0.2195	0.6428	0.8623	0.0000	3,812.4312	3,812.4312	0.6438	0.0000	3,828.5251
Maximum	**87.6551**	**58.7416**	**36.7438**	**0.0854**	**24.8943**	**2.5692**	**27.4635**	**13.4287**	**2.3642**	**15.7929**	**0.0000**	**8,429.3843**	**8,429.3843**	**2.1938**	**0.0000**	**8,484.2288**

Mitigated 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	lb/day										lb/day					
2022	1.0740	8.3941	40.3950	0.0854	10.0839	0.0323	10.1162	5.3385	0.0316	5.3701	0.0000	8,429.3843	8,429.3843	2.1938	0.0000	8,484.2288
2023	0.5725	3.2369	19.3436	0.0357	0.6973	0.0109	0.7082	0.1868	0.0105	0.1973	0.0000	3,447.7566	3,447.7566	0.6308	0.0000	3,463.5274
2024	86.3603	3.3638	21.3495	0.0395	0.8206	0.0121	0.8327	0.2195	0.0117	0.2312	0.0000	3,812.4312	3,812.4312	0.6438	0.0000	3,828.5251
Maximum	**86.3603**	**8.3941**	**40.3950**	**0.0854**	**10.0839**	**0.0323**	**10.1162**	**5.3385**	**0.0316**	**5.3701**	**0.0000**	**8,429.3843**	**8,429.3843**	**2.1938**	**0.0000**	**8,484.2288**

Richmond Annex 2301 Columbia Avenue - Contra Costa County, Summer

	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	**7.20**	**83.30**	**-8.25**	**0.00**	**56.07**	**98.60**	**61.61**	**58.48**	**98.53**	**66.87**	**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	lb/day										lb/day					
Area	45.2165	1.0041	62.5799	0.1051		7.7595	7.7595		7.7595	7.7595	837.0846	385.4478	1,222.5325	1.1597	0.0592	1,269.1580
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.7643	2.6296	7.5047	0.0293	2.7702	0.0212	2.7914	0.7409	0.0198	0.7607		2,957.4519	2,957.4519	0.0910		2,959.7272
Total	**45.9808**	**3.6337**	**70.0846**	**0.1344**	**2.7702**	**7.7807**	**10.5509**	**0.7409**	**7.7792**	**8.5202**	**837.0846**	**3,342.8997**	**4,179.9844**	**1.2508**	**0.0592**	**4,228.8852**

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	lb/day										lb/day					
Area	4.0905	0.0950	8.2444	4.4000e-004		0.0457	0.0457		0.0457	0.0457	0.0000	14.8596	14.8596	0.0142	0.0000	15.2155
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.7643	2.6296	7.5047	0.0293	2.7702	0.0212	2.7914	0.7409	0.0198	0.7607		2,957.4519	2,957.4519	0.0910		2,959.7272
Total	**4.8548**	**2.7246**	**15.7491**	**0.0297**	**2.7702**	**0.0670**	**2.8372**	**0.7409**	**0.0655**	**0.8064**	**0.0000**	**2,972.3115**	**2,972.3115**	**0.1053**	**0.0000**	**2,974.9428**

	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	**89.44**	**25.02**	**77.53**	**77.90**	**0.00**	**99.14**	**73.11**	**0.00**	**99.16**	**90.53**	**100.00**	**11.09**	**28.89**	**91.59**	**100.00**	**29.65**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2022	1/7/2022	5	5	
2	Site Preparation	Site Preparation	1/8/2022	6/24/2022	5	120	
3	Grading	Grading	1/8/2022	2/18/2022	5	30	
4	Paving	Paving	6/25/2022	8/5/2022	5	30	
5	Building Construction	Building Construction	8/6/2022	11/29/2024	5	605	
6	Architectural Coating	Architectural Coating	10/28/2024	11/29/2024	5	25	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4.74

Acres of Paving: 0.18

Residential Indoor: 307,800; Residential Outdoor: 102,600; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 480 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
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
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

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
Demolition	6	15.00	0.00	14.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	1,438.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	231.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	75.00	12.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2022

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	lb/day										lb/day					
Fugitive Dust					0.5992	0.0000	0.5992	0.0907	0.0000	0.0907			0.0000			0.0000
Off-Road	2.6392	25.7194	20.5941	0.0388		1.2427	1.2427		1.1553	1.1553		3,746.7812	3,746.7812	1.0524		3,773.0920
Total	**2.6392**	**25.7194**	**20.5941**	**0.0388**	**0.5992**	**1.2427**	**1.8418**	**0.0907**	**1.1553**	**1.2460**		**3,746.7812**	**3,746.7812**	**1.0524**		**3,773.0920**

3.2 Demolition - 2022

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	lb/day										lb/day					
Hauling	0.0203	0.6751	0.1412	2.1600e-003	0.0489	2.0100e-003	0.0509	0.0134	1.9200e-003	0.0153		229.7435	229.7435	9.5800e-003		229.9830
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0468	0.0261	0.3549	1.1700e-003	0.1232	7.5000e-004	0.1240	0.0327	7.0000e-004	0.0334		116.4700	116.4700	2.4600e-003		116.5316
Total	**0.0670**	**0.7011**	**0.4961**	**3.3300e-003**	**0.1721**	**2.7600e-003**	**0.1749**	**0.0461**	**2.6200e-003**	**0.0487**		**346.2135**	**346.2135**	**0.0120**		**346.5145**

Mitigated 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	lb/day										lb/day					
Fugitive Dust					0.2337	0.0000	0.2337	0.0354	0.0000	0.0354			0.0000			0.0000
Off-Road	0.4623	2.0032	23.2798	0.0388		9.2500e-003	9.2500e-003		9.2500e-003	9.2500e-003	0.0000	3,746.7812	3,746.7812	1.0524		3,773.0920
Total	**0.4623**	**2.0032**	**23.2798**	**0.0388**	**0.2337**	**9.2500e-003**	**0.2429**	**0.0354**	**9.2500e-003**	**0.0446**	**0.0000**	**3,746.7812**	**3,746.7812**	**1.0524**		**3,773.0920**

3.2 Demolition - 2022

Mitigated 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	lb/day										lb/day					
Hauling	0.0203	0.6751	0.1412	2.1600e-003	0.0489	2.0100e-003	0.0509	0.0134	1.9200e-003	0.0153		229.7435	229.7435	9.5800e-003		229.9830
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0468	0.0261	0.3549	1.1700e-003	0.1232	7.5000e-004	0.1240	0.0327	7.0000e-004	0.0334		116.4700	116.4700	2.4600e-003		116.5316
Total	**0.0670**	**0.7011**	**0.4961**	**3.3300e-003**	**0.1721**	**2.7600e-003**	**0.1749**	**0.0461**	**2.6200e-003**	**0.0487**		**346.2135**	**346.2135**	**0.0120**		**346.5145**

3.3 Site Preparation - 2022

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	lb/day										lb/day					
Fugitive Dust					18.0828	0.0000	18.0828	9.9332	0.0000	9.9332			0.0000			0.0000
Off-Road	3.1701	33.0835	19.6978	0.0380		1.6126	1.6126		1.4836	1.4836		3,686.0619	3,686.0619	1.1922		3,715.8655
Total	**3.1701**	**33.0835**	**19.6978**	**0.0380**	**18.0828**	**1.6126**	**19.6953**	**9.9332**	**1.4836**	**11.4168**		**3,686.0619**	**3,686.0619**	**1.1922**		**3,715.8655**

3.3 Site Preparation - 2022

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	lb/day										lb/day					
Hauling	0.0867	2.8891	0.6042	9.2400e-003	0.2093	8.5800e-003	0.2179	0.0574	8.2100e-003	0.0656		983.2475	983.2475	0.0410		984.2723
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0561	0.0313	0.4259	1.4000e-003	0.1479	9.1000e-004	0.1488	0.0392	8.3000e-004	0.0401		139.7640	139.7640	2.9600e-003		139.8379
Total	**0.1428**	**2.9204**	**1.0302**	**0.0106**	**0.3572**	**9.4900e-003**	**0.3667**	**0.0966**	**9.0400e-003**	**0.1056**		**1,123.0115**	**1,123.0115**	**0.0440**		**1,124.1102**

Mitigated 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	lb/day										lb/day					
Fugitive Dust					7.0523	0.0000	7.0523	3.8739	0.0000	3.8739			0.0000			0.0000
Off-Road	0.4656	2.0175	20.8690	0.0380		9.3100e-003	9.3100e-003		9.3100e-003	9.3100e-003	0.0000	3,686.0619	3,686.0619	1.1922		3,715.8655
Total	**0.4656**	**2.0175**	**20.8690**	**0.0380**	**7.0523**	**9.3100e-003**	**7.0616**	**3.8739**	**9.3100e-003**	**3.8833**	**0.0000**	**3,686.0619**	**3,686.0619**	**1.1922**		**3,715.8655**

3.3 Site Preparation - 2022

Mitigated 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	lb/day										lb/day					
Hauling	0.0867	2.8891	0.6042	9.2400e-003	0.2093	8.5800e-003	0.2179	0.0574	8.2100e-003	0.0656		983.2475	983.2475	0.0410		984.2723
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0561	0.0313	0.4259	1.4000e-003	0.1479	9.1000e-004	0.1488	0.0392	8.3000e-004	0.0401		139.7640	139.7640	2.9600e-003		139.8379
Total	**0.1428**	**2.9204**	**1.0302**	**0.0106**	**0.3572**	**9.4900e-003**	**0.3667**	**0.0966**	**9.0400e-003**	**0.1056**		**1,123.0115**	**1,123.0115**	**0.0440**		**1,124.1102**

3.4 Grading - 2022

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	lb/day										lb/day					
Fugitive Dust					6.1966	0.0000	6.1966	3.3294	0.0000	3.3294			0.0000			0.0000
Off-Road	1.9486	20.8551	15.2727	0.0297		0.9409	0.9409		0.8656	0.8656		2,872.0464	2,872.0464	0.9289		2,895.2684
Total	**1.9486**	**20.8551**	**15.2727**	**0.0297**	**6.1966**	**0.9409**	**7.1375**	**3.3294**	**0.8656**	**4.1950**		**2,872.0464**	**2,872.0464**	**0.9289**		**2,895.2684**

3.4 Grading - 2022

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	lb/day										lb/day					
Hauling	0.0557	1.8564	0.3883	5.9400e-003	0.1345	5.5100e-003	0.1400	0.0369	5.2800e-003	0.0421		631.7946	631.7946	0.0263		632.4532
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0468	0.0261	0.3549	1.1700e-003	0.1232	7.5000e-004	0.1240	0.0327	7.0000e-004	0.0334		116.4700	116.4700	2.4600e-003		116.5316
Total	**0.1025**	**1.8825**	**0.7432**	**7.1100e-003**	**0.2577**	**6.2600e-003**	**0.2640**	**0.0695**	**5.9800e-003**	**0.0755**		**748.2646**	**748.2646**	**0.0288**		**748.9847**

Mitigated 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	lb/day										lb/day					
Fugitive Dust					2.4167	0.0000	2.4167	1.2985	0.0000	1.2985			0.0000			0.0000
Off-Road	0.3632	1.5737	17.7527	0.0297		7.2600e-003	7.2600e-003		7.2600e-003	7.2600e-003	0.0000	2,872.0464	2,872.0464	0.9289		2,895.2684
Total	**0.3632**	**1.5737**	**17.7527**	**0.0297**	**2.4167**	**7.2600e-003**	**2.4239**	**1.2985**	**7.2600e-003**	**1.3057**	**0.0000**	**2,872.0464**	**2,872.0464**	**0.9289**		**2,895.2684**

3.4 Grading - 2022

Mitigated 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	lb/day										lb/day					
Hauling	0.0557	1.8564	0.3883	5.9400e-003	0.1345	5.5100e-003	0.1400	0.0369	5.2800e-003	0.0421		631.7946	631.7946	0.0263		632.4532
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0468	0.0261	0.3549	1.1700e-003	0.1232	7.5000e-004	0.1240	0.0327	7.0000e-004	0.0334		116.4700	116.4700	2.4600e-003		116.5316
Total	**0.1025**	**1.8825**	**0.7432**	**7.1100e-003**	**0.2577**	**6.2600e-003**	**0.2640**	**0.0695**	**5.9800e-003**	**0.0755**		**748.2646**	**748.2646**	**0.0288**		**748.9847**

3.5 Paving - 2022

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	lb/day										lb/day					
Off-Road	0.9765	9.5221	12.1940	0.0189		0.4877	0.4877		0.4504	0.4504		1,805.1297	1,805.1297	0.5672		1,819.3091
Paving	0.0157					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9922**	**9.5221**	**12.1940**	**0.0189**		**0.4877**	**0.4877**		**0.4504**	**0.4504**		**1,805.1297**	**1,805.1297**	**0.5672**		**1,819.3091**

3.5 Paving - 2022

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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0624	0.0348	0.4732	1.5600e-003	0.1643	1.0100e-003	0.1653	0.0436	9.3000e-004	0.0445		155.2933	155.2933	3.2800e-003		155.3754
Total	**0.0624**	**0.0348**	**0.4732**	**1.5600e-003**	**0.1643**	**1.0100e-003**	**0.1653**	**0.0436**	**9.3000e-004**	**0.0445**		**155.2933**	**155.2933**	**3.2800e-003**		**155.3754**

Mitigated 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	lb/day										lb/day					
Off-Road	0.2194	0.9509	13.5323	0.0189		4.3900e-003	4.3900e-003		4.3900e-003	4.3900e-003	0.0000	1,805.1297	1,805.1297	0.5672		1,819.3091
Paving	0.0157					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.2352**	**0.9509**	**13.5323**	**0.0189**		**4.3900e-003**	**4.3900e-003**		**4.3900e-003**	**4.3900e-003**	**0.0000**	**1,805.1297**	**1,805.1297**	**0.5672**		**1,819.3091**

3.5 Paving - 2022

Mitigated 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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0624	0.0348	0.4732	1.5600e-003	0.1643	1.0100e-003	0.1653	0.0436	9.3000e-004	0.0445		155.2933	155.2933	3.2800e-003		155.3754
Total	**0.0624**	**0.0348**	**0.4732**	**1.5600e-003**	**0.1643**	**1.0100e-003**	**0.1653**	**0.0436**	**9.3000e-004**	**0.0445**		**155.2933**	**155.2933**	**3.2800e-003**		**155.3754**

3.6 Building Construction - 2022

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	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

3.6 Building Construction - 2022

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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0358	1.1603	0.2756	3.2500e-003	0.0812	2.3800e-003	0.0836	0.0234	2.2700e-003	0.0257		342.4090	342.4090	0.0145		342.7707
Worker	0.2339	0.1303	1.7747	5.8400e-003	0.6161	3.7700e-003	0.6199	0.1634	3.4800e-003	0.1669		582.3498	582.3498	0.0123		582.6577
Total	**0.2697**	**1.2906**	**2.0503**	**9.0900e-003**	**0.6973**	**6.1500e-003**	**0.7035**	**0.1868**	**5.7500e-003**	**0.1926**		**924.7588**	**924.7588**	**0.0268**		**925.4284**

Mitigated 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	lb/day										lb/day					
Off-Road	0.3278	2.2347	17.4603	0.0269		6.1200e-003	6.1200e-003		6.1200e-003	6.1200e-003	0.0000	2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**0.3278**	**2.2347**	**17.4603**	**0.0269**		**6.1200e-003**	**6.1200e-003**		**6.1200e-003**	**6.1200e-003**	**0.0000**	**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

3.6 Building Construction - 2022

Mitigated 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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0358	1.1603	0.2756	3.2500e-003	0.0812	2.3800e-003	0.0836	0.0234	2.2700e-003	0.0257		342.4090	342.4090	0.0145		342.7707
Worker	0.2339	0.1303	1.7747	5.8400e-003	0.6161	3.7700e-003	0.6199	0.1634	3.4800e-003	0.1669		582.3498	582.3498	0.0123		582.6577
Total	**0.2697**	**1.2906**	**2.0503**	**9.0900e-003**	**0.6973**	**6.1500e-003**	**0.7035**	**0.1868**	**5.7500e-003**	**0.1926**		**924.7588**	**924.7588**	**0.0268**		**925.4284**

3.6 Building Construction - 2023

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	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584		2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**		**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

3.6 Building Construction - 2023

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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0270	0.8851	0.2470	3.1500e-003	0.0812	1.0500e-003	0.0823	0.0234	1.0000e-003	0.0244		332.8417	332.8417	0.0119		333.1401
Worker	0.2177	0.1171	1.6364	5.6100e-003	0.6161	3.7000e-003	0.6198	0.1634	3.4000e-003	0.1668		559.7049	559.7049	0.0111		559.9812
Total	**0.2447**	**1.0022**	**1.8834**	**8.7600e-003**	**0.6973**	**4.7500e-003**	**0.7021**	**0.1868**	**4.4000e-003**	**0.1912**		**892.5467**	**892.5467**	**0.0230**		**893.1214**

Mitigated 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	lb/day										lb/day					
Off-Road	0.3278	2.2347	17.4603	0.0269		6.1200e-003	6.1200e-003		6.1200e-003	6.1200e-003	0.0000	2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**0.3278**	**2.2347**	**17.4603**	**0.0269**		**6.1200e-003**	**6.1200e-003**		**6.1200e-003**	**6.1200e-003**	**0.0000**	**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

3.6 Building Construction - 2023

Mitigated 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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0270	0.8851	0.2470	3.1500e-003	0.0812	1.0500e-003	0.0823	0.0234	1.0000e-003	0.0244		332.8417	332.8417	0.0119		333.1401
Worker	0.2177	0.1171	1.6364	5.6100e-003	0.6161	3.7000e-003	0.6198	0.1634	3.4000e-003	0.1668		559.7049	559.7049	0.0111		559.9812
Total	**0.2447**	**1.0022**	**1.8834**	**8.7600e-003**	**0.6973**	**4.7500e-003**	**0.7021**	**0.1868**	**4.4000e-003**	**0.1912**		**892.5467**	**892.5467**	**0.0230**		**893.1214**

3.6 Building Construction - 2024

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	lb/day										lb/day					
Off-Road	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769		2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**		**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

3.6 Building Construction - 2024

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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0261	0.8736	0.2369	3.1300e-003	0.0812	1.0300e-003	0.0823	0.0234	9.8000e-004	0.0244		330.6379	330.6379	0.0116		330.9284
Worker	0.2034	0.1056	1.5166	5.3900e-003	0.6161	3.6200e-003	0.6197	0.1634	3.3300e-003	0.1668		537.2054	537.2054	9.9500e-003		537.4540
Total	**0.2295**	**0.9792**	**1.7535**	**8.5200e-003**	**0.6973**	**4.6500e-003**	**0.7020**	**0.1868**	**4.3100e-003**	**0.1911**		**867.8432**	**867.8432**	**0.0216**		**868.3824**

Mitigated 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	lb/day										lb/day					
Off-Road	0.3278	2.2347	17.4603	0.0270		6.1200e-003	6.1200e-003		6.1200e-003	6.1200e-003	0.0000	2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**0.3278**	**2.2347**	**17.4603**	**0.0270**		**6.1200e-003**	**6.1200e-003**		**6.1200e-003**	**6.1200e-003**	**0.0000**	**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

3.6 Building Construction - 2024

Mitigated 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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0261	0.8736	0.2369	3.1300e-003	0.0812	1.0300e-003	0.0823	0.0234	9.8000e-004	0.0244		330.6379	330.6379	0.0116		330.9284
Worker	0.2034	0.1056	1.5166	5.3900e-003	0.6161	3.6200e-003	0.6197	0.1634	3.3300e-003	0.1668		537.2054	537.2054	9.9500e-003		537.4540
Total	**0.2295**	**0.9792**	**1.7535**	**8.5200e-003**	**0.6973**	**4.6500e-003**	**0.7020**	**0.1868**	**4.3100e-003**	**0.1911**		**867.8432**	**867.8432**	**0.0216**		**868.3824**

3.7 Architectural Coating - 2024

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	lb/day										lb/day					
Archit. Coating	85.7327					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609		281.4481	281.4481	0.0159		281.8443
Total	**85.9134**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**		**281.4481**	**281.4481**	**0.0159**		**281.8443**

3.7 Architectural Coating - 2024

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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0407	0.0211	0.3033	1.0800e-003	0.1232	7.2000e-004	0.1240	0.0327	6.7000e-004	0.0334		107.4411	107.4411	1.9900e-003		107.4908
Total	**0.0407**	**0.0211**	**0.3033**	**1.0800e-003**	**0.1232**	**7.2000e-004**	**0.1240**	**0.0327**	**6.7000e-004**	**0.0334**		**107.4411**	**107.4411**	**1.9900e-003**		**107.4908**

Mitigated 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	lb/day										lb/day					
Archit. Coating	85.7327					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0297	0.1288	1.8324	2.9700e-003		5.9000e-004	5.9000e-004		5.9000e-004	5.9000e-004	0.0000	281.4481	281.4481	0.0159		281.8443
Total	**85.7624**	**0.1288**	**1.8324**	**2.9700e-003**		**5.9000e-004**	**5.9000e-004**		**5.9000e-004**	**5.9000e-004**	**0.0000**	**281.4481**	**281.4481**	**0.0159**		**281.8443**

3.7 Architectural Coating - 2024

Mitigated 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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0407	0.0211	0.3033	1.0800e-003	0.1232	7.2000e-004	0.1240	0.0327	6.7000e-004	0.0334		107.4411	107.4411	1.9900e-003		107.4908
Total	**0.0407**	**0.0211**	**0.3033**	**1.0800e-003**	**0.1232**	**7.2000e-004**	**0.1240**	**0.0327**	**6.7000e-004**	**0.0334**		**107.4411**	**107.4411**	**1.9900e-003**		**107.4908**

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	lb/day										lb/day					
Mitigated	0.7643	2.6296	7.5047	0.0293	2.7702	0.0212	2.7914	0.7409	0.0198	0.7607		2,957.4519	2,957.4519	0.0910		2,959.7272
Unmitigated	0.7643	2.6296	7.5047	0.0293	2.7702	0.0212	2.7914	0.7409	0.0198	0.7607		2,957.4519	2,957.4519	0.0910		2,959.7272

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Condo/Townhouse	580.00	566.00	483.00	1,269,051	1,269,051
Parking Lot	0.00	0.00	0.00		
Total	580.00	566.00	483.00	1,269,051	1,269,051

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-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Condo/Townhouse	10.20	4.80	5.70	31.00	15.00	54.00	86	11	3
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Condo/Townhouse	0.597341	0.036425	0.184736	0.114304	0.014288	0.004933	0.010771	0.025203	0.001643	0.001653	0.005254	0.002704	0.000746
Parking Lot	0.597341	0.036425	0.184736	0.114304	0.014288	0.004933	0.010771	0.025203	0.001643	0.001653	0.005254	0.002704	0.000746

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Percent of Electricity Use Generated with Renewable Energy

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	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

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	lb/day										lb/day					
Condo/Townhouse	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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	lb/day										lb/day					
Condo/Townhouse	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

Richmond Annex 2301 Columbia Avenue - Contra Costa County, Summer

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

No Hearths Installed

	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	lb/day										lb/day					
Mitigated	4.0905	0.0950	8.2444	4.4000e-004		0.0457	0.0457		0.0457	0.0457	0.0000	14.8596	14.8596	0.0142	0.0000	15.2155
Unmitigated	45.2165	1.0041	62.5799	0.1051		7.7595	7.7595		7.7595	7.7595	837.0846	385.4478	1,222.5325	1.1597	0.0592	1,269.1580

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	lb/day										lb/day					
Architectural Coating	0.5872					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.2556					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	41.1260	0.9092	54.3356	0.1047		7.7137	7.7137		7.7137	7.7137	837.0846	370.5882	1,207.6729	1.1455	0.0592	1,253.9424
Landscaping	0.2477	0.0950	8.2444	4.4000e-004		0.0457	0.0457		0.0457	0.0457		14.8596	14.8596	0.0142		15.2155
Total	**45.2165**	**1.0041**	**62.5799**	**0.1051**		**7.7595**	**7.7595**		**7.7595**	**7.7595**	**837.0846**	**385.4479**	**1,222.5325**	**1.1598**	**0.0592**	**1,269.1580**

6.2 Area by SubCategory

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	lb/day										lb/day					
Architectural Coating	0.5872					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.2556					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2477	0.0950	8.2444	4.4000e-004		0.0457	0.0457		0.0457	0.0457		14.8596	14.8596	0.0142		15.2155
Total	**4.0905**	**0.0950**	**8.2444**	**4.4000e-004**		**0.0457**	**0.0457**		**0.0457**	**0.0457**	**0.0000**	**14.8596**	**14.8596**	**0.0142**	**0.0000**	**15.2155**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Richmond Annex 2301 Columbia Avenue

Contra Costa County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	20.00	Space	0.18	8,000.00	0
Condo/Townhouse	100.00	Dwelling Unit	4.56	152,000.00	286

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	5			**Operational Year**	2025
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	290	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Richmond Annex 2301 Columbia Avenue - Contra Costa County, Winter

Project Characteristics - Greenhouse Gas Emission Factors: Guidance for PG&E Customers November 2015

Land Use - Conceptual Site Plan, dated March 17, 2021 and Data Request Response, dated March 23, 2021

Construction Phase - Data Request Response, dated March 23, 2021

Demolition - 1,850 cubic yards of rubble and concrete at 150 pounds per cubic feet

Grading - Data Request Responses, dated March 23, 2021 and March 25, 2021

Vehicle Trips - Lee Reis, Fehr & Peers, Cherry Blossom Row – Transportation Assessment, May 10, 2021

Energy Use - Data Request Response, March 23, 2021 No natural gas to site, all solar electric

Construction Off-road Equipment Mitigation - BAAQMD Basic and Enhanced Mitigation Measures

Mobile Land Use Mitigation -

Area Mitigation -

Energy Mitigation -

Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3

tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	11.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	20.00	5.00
tblConstructionPhase	NumDays	5.00	120.00
tblConstructionPhase	NumDays	8.00	30.00
tblConstructionPhase	NumDays	18.00	30.00
tblConstructionPhase	NumDays	230.00	605.00
tblConstructionPhase	NumDays	18.00	25.00
tblEnergyUse	NT24NG	2,615.00	0.00
tblEnergyUse	T24NG	20,104.20	0.00
tblGrading	AcresOfGrading	15.00	4.74
tblGrading	MaterialExported	0.00	1,850.00
tblGrading	MaterialExported	0.00	6,000.00
tblGrading	MaterialImported	0.00	11,500.00
tblLandUse	LandUseSquareFeet	100,000.00	152,000.00
tblLandUse	LotAcreage	6.25	4.56
tblProjectCharacteristics	CO2IntensityFactor	641.35	290
tblVehicleTrips	HW_TL	10.80	10.20
tblVehicleTrips	ST_TR	5.67	5.66
tblVehicleTrips	SU_TR	4.84	4.83
tblVehicleTrips	WD_TR	5.81	5.80

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2022	5.3697	58.8539	36.7502	0.0849	24.8943	2.5694	27.4638	13.4287	2.3644	15.7931	0.0000	8,377.2276	8,377.2276	2.1973	0.0000	8,432.1603
2023	1.8231	15.4185	18.0071	0.0351	0.6973	0.7045	1.4019	0.1868	0.6629	0.8497	0.0000	3,386.7172	3,386.7172	0.6309	0.0000	3,402.4888
2024	87.6620	15.6962	19.8887	0.0388	0.8206	0.6796	1.5002	0.2195	0.6428	0.8623	0.0000	3,743.5700	3,743.5700	0.6436	0.0000	3,759.6608
Maximum	**87.6620**	**58.8539**	**36.7502**	**0.0849**	**24.8943**	**2.5694**	**27.4638**	**13.4287**	**2.3644**	**15.7931**	**0.0000**	**8,377.2276**	**8,377.2276**	**2.1973**	**0.0000**	**8,432.1603**

Mitigated 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	lb/day										lb/day					
2022	1.0797	8.5064	40.4014	0.0849	10.0839	0.0326	10.1165	5.3385	0.0318	5.3704	0.0000	8,377.2276	8,377.2276	2.1973	0.0000	8,432.1603
2023	0.5782	3.2683	19.2233	0.0351	0.6973	0.0109	0.7082	0.1868	0.0106	0.1974	0.0000	3,386.7172	3,386.7172	0.6309	0.0000	3,402.4888
2024	86.3672	3.3971	21.2045	0.0388	0.8206	0.0121	0.8327	0.2195	0.0117	0.2312	0.0000	3,743.5700	3,743.5700	0.6436	0.0000	3,759.6608
Maximum	**86.3672**	**8.5064**	**40.4014**	**0.0849**	**10.0839**	**0.0326**	**10.1165**	**5.3385**	**0.0318**	**5.3704**	**0.0000**	**8,377.2276**	**8,377.2276**	**2.1973**	**0.0000**	**8,432.1603**

Richmond Annex 2301 Columbia Avenue - Contra Costa County, Winter

	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	**7.20**	**83.14**	**-8.28**	**0.00**	**56.07**	**98.59**	**61.61**	**58.48**	**98.53**	**66.87**	**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	lb/day										lb/day					
Area	45.2165	1.0041	62.5799	0.1051		7.7595	7.7595		7.7595	7.7595	837.0846	385.4478	1,222.5325	1.1597	0.0592	1,269.1580
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.6161	2.7534	7.3941	0.0270	2.7702	0.0213	2.7915	0.7409	0.0199	0.7608		2,732.8489	2,732.8489	0.0924		2,735.1595
Total	**45.8326**	**3.7576**	**69.9741**	**0.1321**	**2.7702**	**7.7808**	**10.5510**	**0.7409**	**7.7793**	**8.5203**	**837.0846**	**3,118.2968**	**3,955.3814**	**1.2522**	**0.0592**	**4,004.3175**

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	lb/day										lb/day					
Area	4.0905	0.0950	8.2444	4.4000e-004		0.0457	0.0457		0.0457	0.0457	0.0000	14.8596	14.8596	0.0142	0.0000	15.2155
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.6161	2.7534	7.3941	0.0270	2.7702	0.0213	2.7915	0.7409	0.0199	0.7608		2,732.8489	2,732.8489	0.0924		2,735.1595
Total	**4.7066**	**2.8484**	**15.6385**	**0.0275**	**2.7702**	**0.0671**	**2.8373**	**0.7409**	**0.0656**	**0.8065**	**0.0000**	**2,747.7085**	**2,747.7085**	**0.1067**	**0.0000**	**2,750.3751**

	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	**89.73**	**24.20**	**77.65**	**79.22**	**0.00**	**99.14**	**73.11**	**0.00**	**99.16**	**90.53**	**100.00**	**11.88**	**30.53**	**91.48**	**100.00**	**31.31**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2022	1/7/2022	5	5	
2	Site Preparation	Site Preparation	1/8/2022	6/24/2022	5	120	
3	Grading	Grading	1/8/2022	2/18/2022	5	30	
4	Paving	Paving	6/25/2022	8/5/2022	5	30	
5	Building Construction	Building Construction	8/6/2022	11/29/2024	5	605	
6	Architectural Coating	Architectural Coating	10/28/2024	11/29/2024	5	25	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4.74

Acres of Paving: 0.18

Residential Indoor: 307,800; Residential Outdoor: 102,600; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 480 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
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
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

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
Demolition	6	15.00	0.00	14.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	1,438.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	231.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	75.00	12.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2022

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	lb/day										lb/day					
Fugitive Dust					0.5992	0.0000	0.5992	0.0907	0.0000	0.0907			0.0000			0.0000
Off-Road	2.6392	25.7194	20.5941	0.0388		1.2427	1.2427		1.1553	1.1553		3,746.7812	3,746.7812	1.0524		3,773.0920
Total	**2.6392**	**25.7194**	**20.5941**	**0.0388**	**0.5992**	**1.2427**	**1.8418**	**0.0907**	**1.1553**	**1.2460**		**3,746.7812**	**3,746.7812**	**1.0524**		**3,773.0920**

3.2 Demolition - 2022

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	lb/day										lb/day					
Hauling	0.0208	0.6892	0.1522	2.1200e-003	0.0489	2.0400e-003	0.0510	0.0134	1.9500e-003	0.0154		225.7479	225.7479	0.0102		226.0016
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0475	0.0321	0.3226	1.0600e-003	0.1232	7.5000e-004	0.1240	0.0327	7.0000e-004	0.0334		105.5296	105.5296	2.2500e-003		105.5859
Total	**0.0683**	**0.7213**	**0.4748**	**3.1800e-003**	**0.1721**	**2.7900e-003**	**0.1749**	**0.0461**	**2.6500e-003**	**0.0487**		**331.2776**	**331.2776**	**0.0124**		**331.5875**

Mitigated 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	lb/day										lb/day					
Fugitive Dust					0.2337	0.0000	0.2337	0.0354	0.0000	0.0354			0.0000			0.0000
Off-Road	0.4623	2.0032	23.2798	0.0388		9.2500e-003	9.2500e-003		9.2500e-003	9.2500e-003	0.0000	3,746.7812	3,746.7812	1.0524		3,773.0920
Total	**0.4623**	**2.0032**	**23.2798**	**0.0388**	**0.2337**	**9.2500e-003**	**0.2429**	**0.0354**	**9.2500e-003**	**0.0446**	**0.0000**	**3,746.7812**	**3,746.7812**	**1.0524**		**3,773.0920**

3.2 Demolition - 2022

Mitigated 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	lb/day										lb/day					
Hauling	0.0208	0.6892	0.1522	2.1200e-003	0.0489	2.0400e-003	0.0510	0.0134	1.9500e-003	0.0154		225.7479	225.7479	0.0102		226.0016
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0475	0.0321	0.3226	1.0600e-003	0.1232	7.5000e-004	0.1240	0.0327	7.0000e-004	0.0334		105.5296	105.5296	2.2500e-003		105.5859
Total	**0.0683**	**0.7213**	**0.4748**	**3.1800e-003**	**0.1721**	**2.7900e-003**	**0.1749**	**0.0461**	**2.6500e-003**	**0.0487**		**331.2776**	**331.2776**	**0.0124**		**331.5875**

3.3 Site Preparation - 2022

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	lb/day										lb/day					
Fugitive Dust					18.0828	0.0000	18.0828	9.9332	0.0000	9.9332			0.0000			0.0000
Off-Road	3.1701	33.0835	19.6978	0.0380		1.6126	1.6126		1.4836	1.4836		3,686.0619	3,686.0619	1.1922		3,715.8655
Total	**3.1701**	**33.0835**	**19.6978**	**0.0380**	**18.0828**	**1.6126**	**19.6953**	**9.9332**	**1.4836**	**11.4168**		**3,686.0619**	**3,686.0619**	**1.1922**		**3,715.8655**

3.3 Site Preparation - 2022

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	lb/day										lb/day					
Hauling	0.0891	2.9494	0.6514	9.0800e-003	0.2093	8.7400e-003	0.2181	0.0574	8.3600e-003	0.0657		966.1474	966.1474	0.0434		967.2330
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0570	0.0386	0.3871	1.2700e-003	0.1479	9.1000e-004	0.1488	0.0392	8.3000e-004	0.0401		126.6356	126.6356	2.7000e-003		126.7031
Total	**0.1461**	**2.9879**	**1.0385**	**0.0104**	**0.3572**	**9.6500e-003**	**0.3669**	**0.0966**	**9.1900e-003**	**0.1058**		**1,092.7829**	**1,092.7829**	**0.0461**		**1,093.9361**

Mitigated 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	lb/day										lb/day					
Fugitive Dust					7.0523	0.0000	7.0523	3.8739	0.0000	3.8739			0.0000			0.0000
Off-Road	0.4656	2.0175	20.8690	0.0380		9.3100e-003	9.3100e-003		9.3100e-003	9.3100e-003	0.0000	3,686.0619	3,686.0619	1.1922		3,715.8655
Total	**0.4656**	**2.0175**	**20.8690**	**0.0380**	**7.0523**	**9.3100e-003**	**7.0616**	**3.8739**	**9.3100e-003**	**3.8833**	**0.0000**	**3,686.0619**	**3,686.0619**	**1.1922**		**3,715.8655**

3.3 Site Preparation - 2022

Mitigated 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	lb/day										lb/day					
Hauling	0.0891	2.9494	0.6514	9.0800e-003	0.2093	8.7400e-003	0.2181	0.0574	8.3600e-003	0.0657		966.1474	966.1474	0.0434		967.2330
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0570	0.0386	0.3871	1.2700e-003	0.1479	9.1000e-004	0.1488	0.0392	8.3000e-004	0.0401		126.6356	126.6356	2.7000e-003		126.7031
Total	**0.1461**	**2.9879**	**1.0385**	**0.0104**	**0.3572**	**9.6500e-003**	**0.3669**	**0.0966**	**9.1900e-003**	**0.1058**		**1,092.7829**	**1,092.7829**	**0.0461**		**1,093.9361**

3.4 Grading - 2022

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	lb/day										lb/day					
Fugitive Dust					6.1966	0.0000	6.1966	3.3294	0.0000	3.3294			0.0000			0.0000
Off-Road	1.9486	20.8551	15.2727	0.0297		0.9409	0.9409		0.8656	0.8656		2,872.0464	2,872.0464	0.9289		2,895.2684
Total	**1.9486**	**20.8551**	**15.2727**	**0.0297**	**6.1966**	**0.9409**	**7.1375**	**3.3294**	**0.8656**	**4.1950**		**2,872.0464**	**2,872.0464**	**0.9289**		**2,895.2684**

3.4 Grading - 2022

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	lb/day										lb/day					
Hauling	0.0573	1.8952	0.4186	5.8300e-003	0.1345	5.6200e-003	0.1401	0.0369	5.3700e-003	0.0422		620.8068	620.8068	0.0279		621.5044
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0475	0.0321	0.3226	1.0600e-003	0.1232	7.5000e-004	0.1240	0.0327	7.0000e-004	0.0334		105.5296	105.5296	2.2500e-003		105.5859
Total	**0.1048**	**1.9273**	**0.7412**	**6.8900e-003**	**0.2577**	**6.3700e-003**	**0.2641**	**0.0695**	**6.0700e-003**	**0.0756**		**726.3364**	**726.3364**	**0.0302**		**727.0903**

Mitigated 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	lb/day										lb/day					
Fugitive Dust					2.4167	0.0000	2.4167	1.2985	0.0000	1.2985			0.0000			0.0000
Off-Road	0.3632	1.5737	17.7527	0.0297		7.2600e-003	7.2600e-003		7.2600e-003	7.2600e-003	0.0000	2,872.0464	2,872.0464	0.9289		2,895.2684
Total	**0.3632**	**1.5737**	**17.7527**	**0.0297**	**2.4167**	**7.2600e-003**	**2.4239**	**1.2985**	**7.2600e-003**	**1.3057**	**0.0000**	**2,872.0464**	**2,872.0464**	**0.9289**		**2,895.2684**

3.4 Grading - 2022

Mitigated 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	lb/day										lb/day					
Hauling	0.0573	1.8952	0.4186	5.8300e-003	0.1345	5.6200e-003	0.1401	0.0369	5.3700e-003	0.0422		620.8068	620.8068	0.0279		621.5044
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0475	0.0321	0.3226	1.0600e-003	0.1232	7.5000e-004	0.1240	0.0327	7.0000e-004	0.0334		105.5296	105.5296	2.2500e-003		105.5859
Total	**0.1048**	**1.9273**	**0.7412**	**6.8900e-003**	**0.2577**	**6.3700e-003**	**0.2641**	**0.0695**	**6.0700e-003**	**0.0756**		**726.3364**	**726.3364**	**0.0302**		**727.0903**

3.5 Paving - 2022

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	lb/day										lb/day					
Off-Road	0.9765	9.5221	12.1940	0.0189		0.4877	0.4877		0.4504	0.4504		1,805.1297	1,805.1297	0.5672		1,819.3091
Paving	0.0157					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9922**	**9.5221**	**12.1940**	**0.0189**		**0.4877**	**0.4877**		**0.4504**	**0.4504**		**1,805.1297**	**1,805.1297**	**0.5672**		**1,819.3091**

3.5 Paving - 2022

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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0634	0.0428	0.4302	1.4100e-003	0.1643	1.0100e-003	0.1653	0.0436	9.3000e-004	0.0445		140.7062	140.7062	3.0000e-003		140.7813
Total	**0.0634**	**0.0428**	**0.4302**	**1.4100e-003**	**0.1643**	**1.0100e-003**	**0.1653**	**0.0436**	**9.3000e-004**	**0.0445**		**140.7062**	**140.7062**	**3.0000e-003**		**140.7813**

Mitigated 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	lb/day										lb/day					
Off-Road	0.2194	0.9509	13.5323	0.0189		4.3900e-003	4.3900e-003		4.3900e-003	4.3900e-003	0.0000	1,805.1297	1,805.1297	0.5672		1,819.3091
Paving	0.0157					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.2352**	**0.9509**	**13.5323**	**0.0189**		**4.3900e-003**	**4.3900e-003**		**4.3900e-003**	**4.3900e-003**	**0.0000**	**1,805.1297**	**1,805.1297**	**0.5672**		**1,819.3091**

3.5 Paving - 2022

Mitigated 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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0634	0.0428	0.4302	1.4100e-003	0.1643	1.0100e-003	0.1653	0.0436	9.3000e-004	0.0445		140.7062	140.7062	3.0000e-003		140.7813
Total	**0.0634**	**0.0428**	**0.4302**	**1.4100e-003**	**0.1643**	**1.0100e-003**	**0.1653**	**0.0436**	**9.3000e-004**	**0.0445**		**140.7062**	**140.7062**	**3.0000e-003**		**140.7813**

3.6 Building Construction - 2022

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	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

3.6 Building Construction - 2022

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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0380	1.1689	0.3188	3.1600e-003	0.0812	2.4600e-003	0.0837	0.0234	2.3500e-003	0.0257		333.5902	333.5902	0.0158		333.9850
Worker	0.2375	0.1606	1.6131	5.2900e-003	0.6161	3.7700e-003	0.6199	0.1634	3.4800e-003	0.1669		527.6482	527.6482	0.0113		527.9297
Total	**0.2755**	**1.3295**	**1.9318**	**8.4500e-003**	**0.6973**	**6.2300e-003**	**0.7036**	**0.1868**	**5.8300e-003**	**0.1926**		**861.2384**	**861.2384**	**0.0271**		**861.9147**

Mitigated 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	lb/day										lb/day					
Off-Road	0.3278	2.2347	17.4603	0.0269		6.1200e-003	6.1200e-003		6.1200e-003	6.1200e-003	0.0000	2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**0.3278**	**2.2347**	**17.4603**	**0.0269**		**6.1200e-003**	**6.1200e-003**		**6.1200e-003**	**6.1200e-003**	**0.0000**	**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

3.6 Building Construction - 2022

Mitigated 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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0380	1.1689	0.3188	3.1600e-003	0.0812	2.4600e-003	0.0837	0.0234	2.3500e-003	0.0257		333.5902	333.5902	0.0158		333.9850
Worker	0.2375	0.1606	1.6131	5.2900e-003	0.6161	3.7700e-003	0.6199	0.1634	3.4800e-003	0.1669		527.6482	527.6482	0.0113		527.9297
Total	**0.2755**	**1.3295**	**1.9318**	**8.4500e-003**	**0.6973**	**6.2300e-003**	**0.7036**	**0.1868**	**5.8300e-003**	**0.1926**		**861.2384**	**861.2384**	**0.0271**		**861.9147**

3.6 Building Construction - 2023

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	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584		2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**		**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

3.6 Building Construction - 2023

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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0287	0.8894	0.2820	3.0700e-003	0.0812	1.0900e-003	0.0823	0.0234	1.0400e-003	0.0244		324.3540	324.3540	0.0130		324.6777
Worker	0.2216	0.1443	1.4811	5.0900e-003	0.6161	3.7000e-003	0.6198	0.1634	3.4000e-003	0.1668		507.1533	507.1533	0.0101		507.4051
Total	**0.2504**	**1.0336**	**1.7631**	**8.1600e-003**	**0.6973**	**4.7900e-003**	**0.7021**	**0.1868**	**4.4400e-003**	**0.1912**		**831.5072**	**831.5072**	**0.0230**		**832.0827**

Mitigated 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	lb/day										lb/day					
Off-Road	0.3278	2.2347	17.4603	0.0269		6.1200e-003	6.1200e-003		6.1200e-003	6.1200e-003	0.0000	2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**0.3278**	**2.2347**	**17.4603**	**0.0269**		**6.1200e-003**	**6.1200e-003**		**6.1200e-003**	**6.1200e-003**	**0.0000**	**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

3.6 Building Construction - 2023

Mitigated 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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0287	0.8894	0.2820	3.0700e-003	0.0812	1.0900e-003	0.0823	0.0234	1.0400e-003	0.0244		324.3540	324.3540	0.0130		324.6777
Worker	0.2216	0.1443	1.4811	5.0900e-003	0.6161	3.7000e-003	0.6198	0.1634	3.4000e-003	0.1668		507.1533	507.1533	0.0101		507.4051
Total	**0.2504**	**1.0336**	**1.7631**	**8.1600e-003**	**0.6973**	**4.7900e-003**	**0.7021**	**0.1868**	**4.4400e-003**	**0.1912**		**831.5072**	**831.5072**	**0.0230**		**832.0827**

3.6 Building Construction - 2024

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	lb/day										lb/day					
Off-Road	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769		2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**		**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

3.6 Building Construction - 2024

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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0277	0.8776	0.2703	3.0500e-003	0.0812	1.0700e-003	0.0823	0.0234	1.0200e-003	0.0244		322.2762	322.2762	0.0126		322.5910
Worker	0.2077	0.1300	1.3679	4.8800e-003	0.6161	3.6200e-003	0.6197	0.1634	3.3300e-003	0.1668		486.7890	486.7890	9.0400e-003		487.0149
Total	**0.2355**	**1.0076**	**1.6382**	**7.9300e-003**	**0.6973**	**4.6900e-003**	**0.7020**	**0.1868**	**4.3500e-003**	**0.1912**		**809.0652**	**809.0652**	**0.0216**		**809.6059**

Mitigated 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	lb/day										lb/day					
Off-Road	0.3278	2.2347	17.4603	0.0270		6.1200e-003	6.1200e-003		6.1200e-003	6.1200e-003	0.0000	2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**0.3278**	**2.2347**	**17.4603**	**0.0270**		**6.1200e-003**	**6.1200e-003**		**6.1200e-003**	**6.1200e-003**	**0.0000**	**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

3.6 Building Construction - 2024

Mitigated 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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0277	0.8776	0.2703	3.0500e-003	0.0812	1.0700e-003	0.0823	0.0234	1.0200e-003	0.0244		322.2762	322.2762	0.0126		322.5910
Worker	0.2077	0.1300	1.3679	4.8800e-003	0.6161	3.6200e-003	0.6197	0.1634	3.3300e-003	0.1668		486.7890	486.7890	9.0400e-003		487.0149
Total	**0.2355**	**1.0076**	**1.6382**	**7.9300e-003**	**0.6973**	**4.6900e-003**	**0.7020**	**0.1868**	**4.3500e-003**	**0.1912**		**809.0652**	**809.0652**	**0.0216**		**809.6059**

3.7 Architectural Coating - 2024

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	lb/day										lb/day					
Archit. Coating	85.7327					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609		281.4481	281.4481	0.0159		281.8443
Total	**85.9134**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**		**281.4481**	**281.4481**	**0.0159**		**281.8443**

3.7 Architectural Coating - 2024

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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0415	0.0260	0.2736	9.8000e-004	0.1232	7.2000e-004	0.1240	0.0327	6.7000e-004	0.0334		97.3578	97.3578	1.8100e-003		97.4030
Total	**0.0415**	**0.0260**	**0.2736**	**9.8000e-004**	**0.1232**	**7.2000e-004**	**0.1240**	**0.0327**	**6.7000e-004**	**0.0334**		**97.3578**	**97.3578**	**1.8100e-003**		**97.4030**

Mitigated 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	lb/day										lb/day					
Archit. Coating	85.7327					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0297	0.1288	1.8324	2.9700e-003		5.9000e-004	5.9000e-004		5.9000e-004	5.9000e-004	0.0000	281.4481	281.4481	0.0159		281.8443
Total	**85.7624**	**0.1288**	**1.8324**	**2.9700e-003**		**5.9000e-004**	**5.9000e-004**		**5.9000e-004**	**5.9000e-004**	**0.0000**	**281.4481**	**281.4481**	**0.0159**		**281.8443**

3.7 Architectural Coating - 2024

Mitigated 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	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0415	0.0260	0.2736	9.8000e-004	0.1232	7.2000e-004	0.1240	0.0327	6.7000e-004	0.0334		97.3578	97.3578	1.8100e-003		97.4030
Total	**0.0415**	**0.0260**	**0.2736**	**9.8000e-004**	**0.1232**	**7.2000e-004**	**0.1240**	**0.0327**	**6.7000e-004**	**0.0334**		**97.3578**	**97.3578**	**1.8100e-003**		**97.4030**

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	lb/day										lb/day					
Mitigated	0.6161	2.7534	7.3941	0.0270	2.7702	0.0213	2.7915	0.7409	0.0199	0.7608		2,732.8489	2,732.8489	0.0924		2,735.1595
Unmitigated	0.6161	2.7534	7.3941	0.0270	2.7702	0.0213	2.7915	0.7409	0.0199	0.7608		2,732.8489	2,732.8489	0.0924		2,735.1595

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Condo/Townhouse	580.00	566.00	483.00	1,269,051	1,269,051
Parking Lot	0.00	0.00	0.00		
Total	580.00	566.00	483.00	1,269,051	1,269,051

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-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Condo/Townhouse	10.20	4.80	5.70	31.00	15.00	54.00	86	11	3
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Condo/Townhouse	0.597341	0.036425	0.184736	0.114304	0.014288	0.004933	0.010771	0.025203	0.001643	0.001653	0.005254	0.002704	0.000746
Parking Lot	0.597341	0.036425	0.184736	0.114304	0.014288	0.004933	0.010771	0.025203	0.001643	0.001653	0.005254	0.002704	0.000746

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Percent of Electricity Use Generated with Renewable Energy

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	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

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	lb/day										lb/day					
Condo/Townhouse	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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	lb/day										lb/day					
Condo/Townhouse	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

No Hearths Installed

	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	lb/day										lb/day					
Mitigated	4.0905	0.0950	8.2444	4.4000e-004		0.0457	0.0457		0.0457	0.0457	0.0000	14.8596	14.8596	0.0142	0.0000	15.2155
Unmitigated	45.2165	1.0041	62.5799	0.1051		7.7595	7.7595		7.7595	7.7595	837.0846	385.4478	1,222.5325	1.1597	0.0592	1,269.1580

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	lb/day										lb/day					
Architectural Coating	0.5872					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.2556					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	41.1260	0.9092	54.3356	0.1047		7.7137	7.7137		7.7137	7.7137	837.0846	370.5882	1,207.6729	1.1455	0.0592	1,253.9424
Landscaping	0.2477	0.0950	8.2444	4.4000e-004		0.0457	0.0457		0.0457	0.0457		14.8596	14.8596	0.0142		15.2155
Total	**45.2165**	**1.0041**	**62.5799**	**0.1051**		**7.7595**	**7.7595**		**7.7595**	**7.7595**	**837.0846**	**385.4479**	**1,222.5325**	**1.1598**	**0.0592**	**1,269.1580**

6.2 Area by SubCategory

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	lb/day										lb/day					
Architectural Coating	0.5872					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.2556					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2477	0.0950	8.2444	4.4000e-004		0.0457	0.0457		0.0457	0.0457		14.8596	14.8596	0.0142		15.2155
Total	**4.0905**	**0.0950**	**8.2444**	**4.4000e-004**		**0.0457**	**0.0457**		**0.0457**	**0.0457**	**0.0000**	**14.8596**	**14.8596**	**0.0142**	**0.0000**	**15.2155**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Attachment B

Health Risk Assessment Methodology, Assumptions, and Results

A health risk assessment (HRA) is accomplished in four steps: 1) hazards identification, 2) exposure assessment, 3) toxicity assessment, and 4) risk characterization. These steps cover the estimation of air emissions, the estimation of the air concentrations resulting from a dispersion analysis, the incorporation of the toxicity of the pollutants emitted, and the characterization of the risk based on exposure parameters such as breathing rate, age adjustment factors, and exposure duration; each depending on receptor type (i.e., residence, school, daycare centers, hospitals, senior care facilities, recreational areas, adult, infant, child).

This HRA was conducted in accordance with technical guidelines developed by federal, state, and regional agencies, including U.S. Environmental Protection Agency (USEPA), California Environmental Protection Agency (CalEPA), California Office of Environmental Health Hazard Assessment (OEHHA) *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*[1] and the Bay Area Air Quality Management District (BAAQMD) *Health Risk Screening Analysis Guidelines*.[2] This HRA addresses the emissions from construction activities including onsite equipment and haul trucks. Specific focus is on diesel particulate matter (DPM) and particulate matter equal to or less than 2.5 micrometers (fine particulate or $PM_{2.5}$) emissions. Gasoline-fueled vehicles emit air toxics in much smaller quantities and toxicity levels compared to DPM. Thus, gasoline-fueled emission sources were not included in the HRA. Secondly, air toxics emissions from project operations is not expected to be substantial and thus, the HRA focused on construction equipment emissions of DPM and nearby cumulative emission sources.

According to CalEPA, a HRA should not be interpreted as the expected rates of cancer or other potential human health effects, but rather as estimates of potential risk or likelihood of adverse effects based on current knowledge, under a number of highly conservative assumptions and the best assessment tools currently available.

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[1] Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*, March 6, 2015, Accessed March 23, 2021, http://oehha.ca.gov/air/hot_spots/hotspots2015.html.

[2] Bay Area Air Quality Management District, Health Risk Screening Analysis Guidelines, January 2010, Accessed March 23, 2021, http://www.baaqmd.gov/~/media/Files/Engineering/Air%20Toxics%20Programs/hrsa_guidelines.ashx

TERMS AND DEFINITIONS

As the practice of conducting a HRA is particularly complex and involves concepts that are not altogether familiar to most people, several terms and definitions are provided that are considered essential to the understanding of the approach, methodology and results:

Acute effect – a health effect (non-cancer) produced within a short period of time (few minutes to several days) following an exposure to toxic air contaminants (TAC).

Cancer risk – the probability of an individual contracting cancer from a lifetime (i.e., 70 year) exposure to TAC such as DPM in the ambient air.

Chronic effect – a health effect (non-cancer) produced from a continuous exposure occurring over an extended period of time (weeks, months, years).

Hazard Index (HI) – the unitless ratio of an exposure level over the acceptable reference dose. The HI can be applied to multiple compounds in an additive manner.

Hazard Quotient (HQ) – the unitless ratio of an exposure level over the acceptable reference dose. The HQ is applied to individual compounds.

Toxic Air Contaminants – any air pollutant that is capable of causing short-term (acute) and/or long-term (chronic or carcinogenic, i.e., cancer causing) adverse human health effects (i.e., injury or illness). The current California list of TAC lists approximately 200 compounds, including particulate emissions from diesel-fueled engines.

Human Health Effects - comprise disorders such as eye watering, respiratory or heart ailments, and other (i.e., non-cancer) related diseases.

Health Risk Assessment – an analysis designed to predict the generation and dispersion of TAC in the outdoor environment, evaluate the potential for exposure of human populations, and to assess and quantify both the individual and population-wide health risks associated with those levels of exposure.

Incremental – under CEQA, the net difference (or change) in conditions or impacts when comparing the baseline to future year project conditions.

Maximum exposed individual (MEI) – an individual assumed to be located at the point where the highest concentrations of TAC, and therefore, health risks are predicted to occur.

Non-cancer risks – health risks such as eye watering, respiratory or heart ailments, and other non-cancer related diseases.

Receptors – the locations where potential health impacts or risks are predicted (i.e., schools, residences, and recreational sites).

LIMITATIONS AND UNCERTAINTIES

There are a number of important limitations and uncertainties commonly associated with a HRA due to the wide variability of human exposures to TAC, the extended timeframes over which the exposures are evaluated, and the inability to verify the results. Limitations and uncertainties associated with the HRA and identified by the CalEPA include: (a.) lack of reliable monitoring data; (b.) extrapolation of toxicity data in animals to humans; (c.) estimation errors in calculating TAC emissions; (d.) concentration prediction errors with dispersion models; and (e.) the variability in lifestyles, fitness and other confounding factors of the human population. This HRA was performed using the best available data and methodologies, notwithstanding the following uncertainties:

- There are uncertainties associated with the estimation of emissions from project activities. Where project-specific data, such as emission factors, are not available, default assumptions in emission models were used.
- The limitations of the air dispersion model provide a source of uncertainty in the estimation of exposure concentrations. According to USEPA, errors due to the limitation of the algorithms implemented in the air dispersion model in the highest estimated concentrations of +/- 10 percent to 40 percent are typical.[3]
- The source parameters used to model emission sources add uncertainty. For all emission sources, the source parameters used source-specific, recommended as defaults, or expected to produce more conservative results. Discrepancies might exist in actual emissions characteristics of an emission source and its representation in the dispersion model.
- The exposure duration estimates do not take into account that people do not usually reside at the same location for 30 years and that other exposures (i.e., school children) are also of much shorter durations than was assumed in this HRA. This exposure duration is a highly conservative assumption, since most people do not remain at home all day and on average residents change residences every 11 to 12 years. In addition, this assumption adopts that residents are experiencing outdoor concentrations for the entire exposure period.
- For the risk and hazards calculations as well as the cumulative health impact, numerous assumptions must be made in order to estimate human exposure to pollutants. These assumptions include parameters such as breathing rates, exposure time and frequency,

[3] US Environmental Protection Agency, Title 40 CFR Part 51, *Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions; Final Rule,* Accessed March 23, 2021, https://www.federalregister.gov/documents/2005/11/09/05-21627/revision-to-the-guideline-on-air-quality-models-adoption-of-a-preferred-general-purpose-flat-and

exposure duration, and human activity patterns. While a mean value derived from scientifically defensible studies is the best estimate of central tendency, most of the exposure variables used in this HRA are high-end estimates. The combination of several high-end estimates used as exposure parameters may substantially overestimate pollutant intake. The excess lifetime cancer risks calculated in this HRA are therefore likely to be higher than may be required to be protective of public health.

- The Cal/EPA cancer potency factor for DPM was used to estimate cancer risks associated with exposure to DPM emissions from construction activities. However, the cancer potency factor derived by Cal/EPA for DPM is highly uncertain in both the estimation of response and dose. In the past, due to inadequate animal test data and epidemiology data on diesel exhaust, the International Agency for Research on Cancer (IARC), a branch of the World Health Organization, had classified DPM as Probably Carcinogenic to Humans (Group 2); the USEPA had also concluded that the existing data did not provide an adequate basis for quantitative risk assessment.[4] However, based on two recent scientific studies,[5] IARC recently re-classified DPM as Carcinogenic to Humans to Group 1,[6] which means that the agency has determined that there is "sufficient evidence of carcinogenicity" of a substance in humans and represents the strongest weight-of-evidence rating in IARC's carcinogen classification scheme. This determination by the IARC may provide additional impetus for the USEPA to identify a quantitative dose-response relationship between exposure to DPM and cancer.

In summary, the estimated health impacts are based primarily on a series of conservative assumptions related to predicted environmental concentrations, exposure, and chemical toxicity. The use of conservative assumptions tends to produce upper-bound estimates of risk. BAAQMD acknowledges this uncertainty by stating: "the methods used [to estimate risk] are conservative, meaning that the real risks from the source may be lower than the calculations, but it is unlikely that they will be higher." The USEPA notes that the conservative assumptions used in a HRA are intended to assure that the estimated risks do not underestimate the actual

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[4] US Environmental Protection Agency, *Health Assessment Document for Diesel Engine Exhaust*, May 2002, Accessed March 23, 2021, https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=29060

[5] Attfield MD, Schleiff PL, Lubin JH, Blair A, Stewart PA, Vermeulen R, Coble JB, Silverman DT, *The Diesel Exhaust in Miners Study: A Nested Case-Control Study of Lung Cancer and Diesel Exhaust*, June 2012, Accessed March 23, 2021, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3369553/

[6] International Agency for Research on Cancer, *Diesel Engine Exhaust Carcinogenic*, June 2012, Accessed March 23, 2021, https://www.iarc.fr/en/media-centre/pr/2012/pdfs/pr213_E.pdf

risks posed by a site and that the estimated risks do not necessarily represent actual risks experienced by populations at or near a site.[7]

HAZARDS IDENTIFICATION

California Air Resources Board (CARB) has developed a list of TAC, where a TAC is "an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health (California Health and Safety Code Section 39655). All USEPA hazardous air pollutants are TAC. CARB administers the Air Toxics "Hot Spots" program under Assembly Bill 2588 "Hot Spots" Information and Assessment Act, which requires periodic local review of facilities which emit TAC. Local air agencies periodically must prioritize stationary sources of TAC and prepare health risk assessments for high-priority sources.

Diesel exhaust is a complex mixture of numerous individual gaseous and particulate compounds emitted from diesel-fueled combustion engines. Diesel particulate matter is formed primarily through the incomplete combustion of diesel fuel. DPM is removed from the atmosphere through physical processes including atmospheric fall-out and washout by rain. Humans can be exposed to airborne DPM by deposition on water, soil, and vegetation; although the main pathway of exposure is inhalation. Cal/EPA has concluded that potential cancer risk from inhalation exposure to whole diesel exhaust outweigh the multi-pathway cancer risk from the speciated components.

In August 1998, the CARB identified DPM as an air toxic. CARB developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel- Fueled Engines and Vehicles* and *Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines* and approved these documents on September 28, 2000.[8] [9] The documents represent proposals to reduce DPM emissions, with the goal of reducing emissions and the associated health risk by 75 percent in 2010 and by 85 percent in 2020. The program aimed to require the use of state-of-the-art catalyzed DPM filters and ultra-low-sulfur diesel fuel.

In 2001, CARB assessed the state-wide health risks from exposure to diesel exhaust and to other toxic air contaminants. It is difficult to distinguish the health risks of diesel emissions from those of other air toxics, since diesel exhaust contains approximately 40 different TAC. The CARB study detected diesel exhaust by using ambient air carbon soot measurements as a

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[7] US Environmental Protection Agency, *Risk Assessment Guidance for Superfund Human Health Risk Assessment*, December 1989, Accessed March 23, 2021, https://www.epa.gov/sites/production/files/2015-09/documents/rags_a.pdf

[8] California Air Resources Board, *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*, October 2000, Accessed March 23, 2021, http://www.arb.ca.gov/diesel/documents/rrpfinal.pdf

[9] California Air Resources Board, *Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines*, October 2000, Accessed March 23, 2021, https://www.arb.ca.gov/diesel/documents/rmgFinal.pdf

surrogate for diesel emissions. The study reported that the state-wide cancer risk from exposure to diesel exhaust was about 540 per million population as compared to a total risk for exposure to all ambient air toxics of 760 per million. This estimate, which accounts for about 70 percent of the total risk from TAC, included both urban and rural areas in the state. The estimate can also be considered an average worst-case for the state, since it assumes constant exposure to outdoor concentrations of diesel exhaust and does not account for expected lower concentrations indoors, where most of time is spent. DPM is estimated to increase statewide cancer risk by 520 cancers per million residents exposed over a lifetime.[10]

Exposure to DPM results in a greater incidence of chronic non-cancer health effects, such as cough, labored breathing, chest tightness, wheezing, and bronchitis. Individuals particularly vulnerable to DPM are children, whose lung tissue is still developing, the elderly and people with illnesses who may have other serious health problems that can be aggravated by exposure to DPM. In general, children are more vulnerable than adults to air pollutants because they have higher inhalation rates, narrower airways, and less mature immune systems. In addition, children with allergies may have an enhanced allergic response when exposed to diesel exhaust).

EXPOSURE ASSESSMENT

Dispersion is the process by which atmospheric pollutants disseminate due to wind and vertical stability. The results of a dispersion analysis are used to assess pollutant concentrations at or near an emission source. The results of an analysis allow predicted concentrations of pollutants to be compared directly to air quality standards and other criteria such as health risks based on modeled concentrations.

A rising pollutant plume reacts with the environment in several ways before it levels off. First, the plume's own turbulence interacts with atmospheric turbulence to entrain ambient air. This mixing process reduces and eventually eliminates the density and momentum differences that cause the plume to rise. Second, the wind transports the plume during its rise and entrainment process. Higher winds mix the plume more rapidly, resulting in a lower final rise. Third, the plume interacts with the vertical temperature stratification of the atmosphere, rising as a result of buoyancy in the unstable-to-neutrally stratified mixed layer. However, after the plume encounters the mixing lid and the stably stratified air above, its vertical motion is dampened.

Molecules of gas or small particles injected into the atmosphere will separate from each other as they are acted on by turbulent eddies. The Gaussian mathematical model such as AERMOD simulates the dispersion of the gas or particles within the atmosphere. The formulation of the Gaussian model is based on the following assumptions:

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[10] California Air Resources Board, *Summary: Diesel Particulate Matter Health Impacts*, April 12, 2016, Accessed March 23, 2021, https://www.arb.ca.gov/research/diesel/diesel-health_summ.htm

- The predictions are not time-dependent (all conditions remain unchanged with time)
- The wind speed and direction are uniform, both horizontally and vertically, throughout the region of concern
- The rate of diffusion is not a function of position
- Diffusion in the direction of the transporting wind is negligible when compared to the transport flow

Dispersion Modeling Approach

Air dispersion modeling was performed to estimate the downwind dispersion of DPM exhaust emissions resulting from construction activities. The following sections present the fundamental components of an air dispersion modeling analysis including air dispersion model selection and options, receptor locations, meteorological data, and source exhaust parameters.

Model Selection and Options

AERMOD (Version 19191)[11] was used for the dispersion analysis. AERMOD is the USEPA preferred atmospheric dispersion modeling system for general industrial sources. The model can simulate point, area, volume, and line sources. AERMOD is the appropriate model for this analysis based on the coverage of simple, intermediate, and complex terrain. It also predicts both short-term and long-term (annual) average concentrations. The model was executed using the regulatory default options (stack-tip downwash, buoyancy-induced dispersion, and final plume rise), default wind speed profile categories, default potential temperature gradients, and assuming no pollutant decay.

The selection of the appropriate dispersion coefficients depends on the land use within three kilometers (km) of the project site. The types of land use were based on the classification method defined by Auer (1978); using pertinent United States Geological Survey (USGS) 1:24,000 scale (7.5 minute) topographic maps of the area. If the Auer land use types of heavy industrial, light-to-moderate industrial, commercial, and compact residential account for 50 percent or more of the total area, the USEPA *Guideline on Air Quality Models*[12] recommends using urban dispersion coefficients; otherwise, the appropriate rural coefficients can be used. Based on observation of the area surrounding the project site, rural dispersion coefficients were applied within AERMOD (for dispersion modeling, urban coefficients are only applied to areas such as downtown San Francisco).

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[11] US Environmental Protection Agency, AERMOD Modeling System, Accessed March 23, 2021, https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models

[12] US Environmental Protection Agency, Title 40 CFR Part 51, *Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions; Final Rule,* Accessed March 23, 2021, https://www.federalregister.gov/documents/2005/11/09/05-21627/revision-to-the-guideline-on-air-quality-models-adoption-of-a-preferred-general-purpose-flat-and

Receptor Locations

Some receptors are considered more sensitive to air pollutants than others, because of preexisting health problems, proximity to the emissions source, or duration of exposure to air pollutants. Land uses such as primary and secondary schools, hospitals, and convalescent homes are considered to be relatively sensitive to poor air quality because the very young, the old, and the infirm are more susceptible to respiratory infections and other air quality-related health problems than the general public. Residential areas are also considered sensitive to poor air quality because people in residential areas are often at home for extended periods. Recreational land uses are moderately sensitive to air pollution because vigorous exercise associated with recreation places having a high demand on respiratory system function.

Sensitive receptors were placed at receptors to estimate health impacts due to proposed project construction on existing or future residences. The project site is surrounded by residential, light industrial, and open space. No schools and daycare facilities are within approximately 1,000 feet of the project site. **Figure B-1** displays the location of the sensitive receptors used in this HRA. Receptors were placed at a height of 1.8 meters (typical breathing height). Terrain elevations for receptor locations were used based on available USGS information for the area.

Meteorological Data

Hourly meteorological data from BAAQMD's University of California at Richmond monitoring station (surface data), located approximately two miles to the east of the proposed project, and Oakland International Airport (upper air) were used in the dispersion modeling analysis. Meteorological data from 2010 through 2014 were used (the most recent available data from the BAAQMD's monitoring station). **Figure B-2** displays the annual wind rose. Wind directions are predominately from the south-southwest and a low frequency of calm with moderate wind speed conditions, as shown in **Figure B-3**. The average annual wind speed is 10.7 miles per hour.

FIGURE B-1
HEALTH RISK ASSESSMENT RECEPTORS

FIGURE B-2
WINDROSE FOR UNIVERSITY OF CALIFORNIA AT RICHMOND

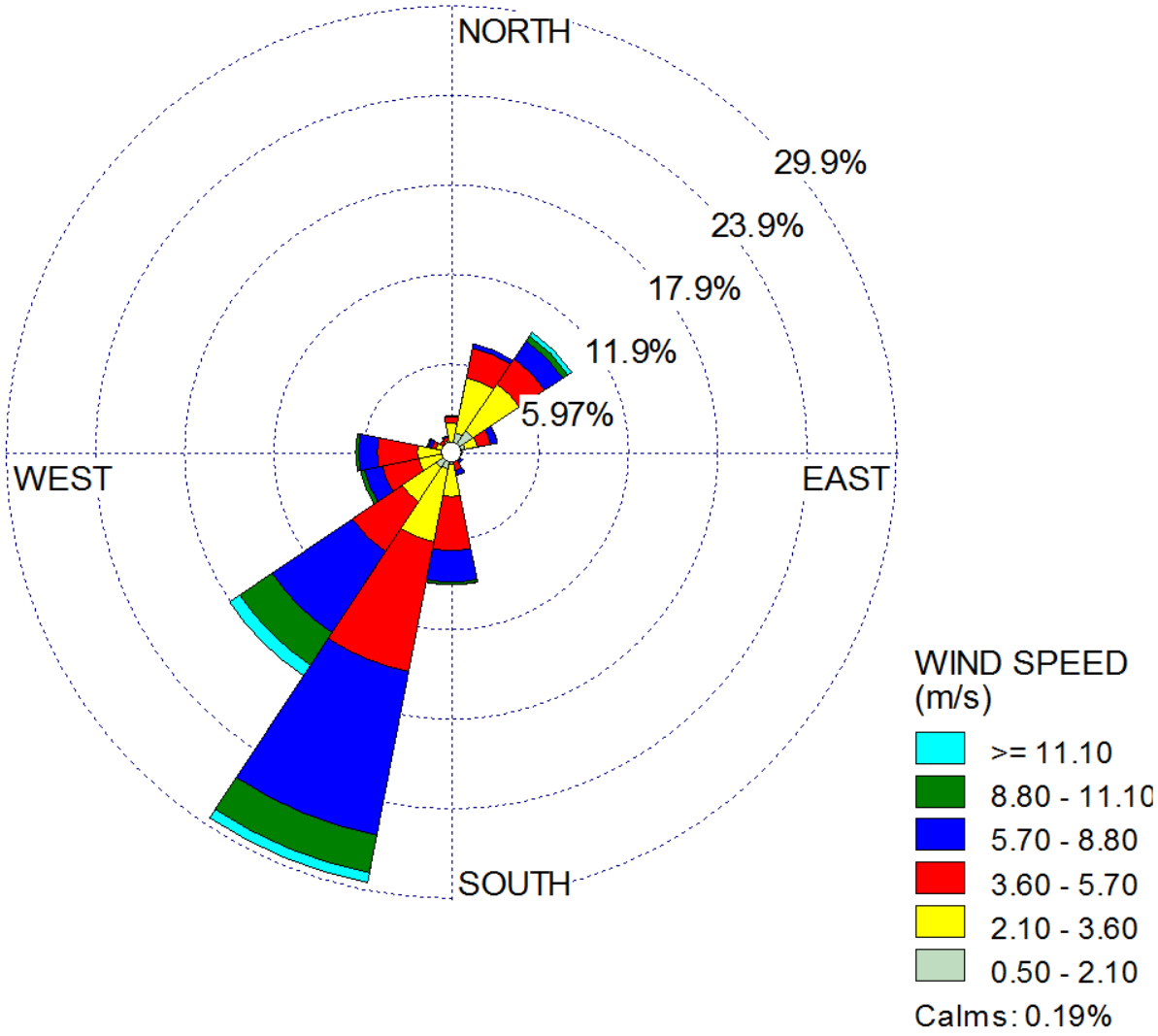
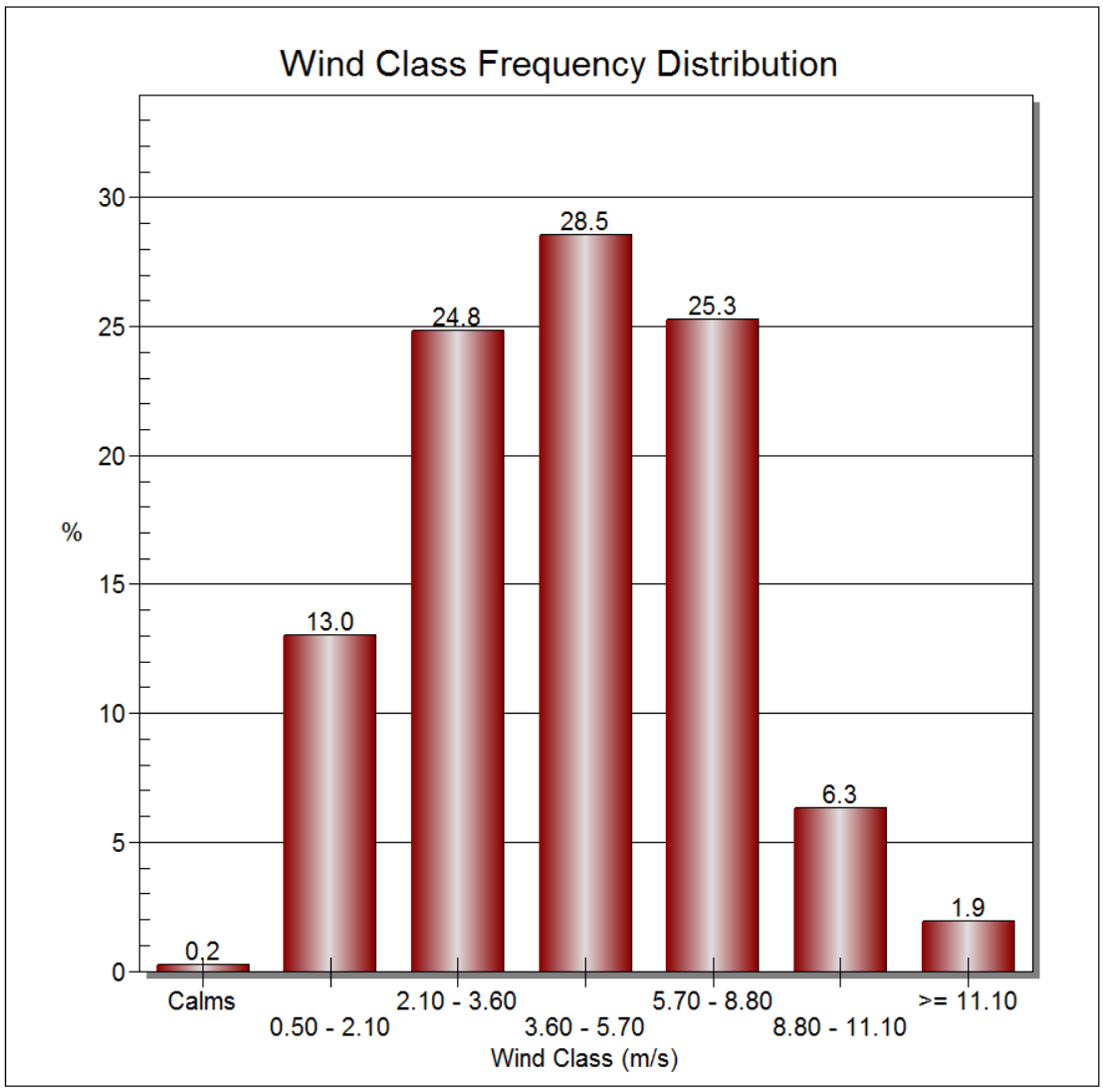


FIGURE B-3
WIND SPEED DISTRIBUTION FOR UNIVERSITY OF CALIFORNIA AT RICHMOND



Source Release Characteristics

Construction equipment activities were treated as an area source. The release height of the off-road equipment exhaust was 3.05 meters and an initial vertical dimension of 4.15 meters, which reflects the height of the equipment plus an additional height of the exhaust plume above the exhaust point to account for plume rise due to buoyancy and momentum. Haul trucks were treated as a line source (i.e., volume sources placed at regular intervals) located along an access road. The haul trucks were assigned a release height of 3.05 meters and an initial vertical dimension of 4.15 meters, which accounts for dispersion from the movement of vehicles.[13] Typically, construction activities would occur between 8 a.m. and 5 p.m., on Monday through Friday. Terrain elevations for emission source locations were used based on available USGS information for the area. AERMAP (Version 14134)[14] was used to develop the terrain elevations.

EXPOSURE PARAMETERS

This HRA was conducted following methodologies in OEHHA's *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*.[15] This was accomplished by applying the estimated concentrations at the receptors analyzed to the established cancer risk estimates and acceptable reference concentrations for non-cancer health effects.

OEHHA's revisions to its *Guidance Manual* were primarily designed to ensure that the greater sensitivity of children to cancer and other health risks is reflected in HRAs. For example, OEHHA now recommends that risks be analyzed separately for multiple age groups, focusing especially on young children and teenagers, rather than the past practice of analyzing risks to the general population, without distinction by age. OEHHA also now recommends that statistical "age sensitivity factors" be incorporated into a HRA, and that children's relatively high breathing rates be accounted for. On the other hand, the *Guidance Manual* revisions also include some changes that would reduce calculated health risks. For example, under the former guidance, OEHHA recommended that residential cancer risks be assessed by assuming 70 years of exposure at a residential receptor; under the *Guidance Manual*, this assumption is lessened to 30 years.

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[13] While haul truck emissions contribute substantially to overall project emissions, they are spread over many miles. Hence, the portion of trucking emissions that would impact one receptor is much smaller than the emissions that the clustered off-road activity at the project site would impact a receptor near the site. For example, the DPM emissions from truck travel within 1,000 feet of the project site would be less than one percent of the total off-road DPM emissions.

[14] US Environmental Protection Agency, AERMAP, https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models

[15] Office of Environmental Health Hazard Assessment, *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*, March 6, 2015, http://oehha.ca.gov/air/hot_spots/hotspots2015.html

OEHHA has developed exposure factors (e.g., daily breathing rates) for six age groups including the last trimester to birth, birth to 2 years, 2 to 9 years, 2 to 16 years, 16 to 30 years, and 16 to 70 years. These age bins allow for more refined exposure information to be used when estimating exposure and the potential for developing cancer over a lifetime. This means that exposure variates are needed for the third trimester, ages zero to less than two, ages two to less than nine, ages two to less than 16, ages 16 to less than 30, and ages 16 to 70. Residential receptors utilize the 95th percentile breathing rate values. The breathing rates are age-specific and are 1,090 liters per kilogram-day for ages less than 2 years, 745 liters per kilogram-day for ages 2 to 16 years, 335 liters per kilogram-day for ages 16 to 30 years, and 290 liters per kilogram-day for ages 30 to 70 years. A school child breathing rate is 520 liters per kilogram-day and an off-site worker breathing rate is 230 liters per kilogram-day.

OEHHA developed age sensitivity factors (ASF) to take into account the increased sensitivity to carcinogens during early-in-life exposures. OEHHA recommends that cancer risks be weighted by a factor of 10 for exposures that occur from the third trimester of pregnancy to 2 years of age, and by a factor of 3 for exposures from 2 years through 15 years of age.

Based on OEHHA recommendations, the cancer risk to residential receptors assumes exposure occurs 24 hours per day for 350 days per year while accounting for a percentage of time at home. OEHHA evaluated information from activity pattern databases to estimate the fraction of time at home (FAH) during the day. This information was used to adjust exposure duration and cancer risk based on the assumption that a person is not present at home continuously for 24 hours and therefore exposure to emissions is not occurring when a person is away from their home. In general, the FAH factors are age-specific and are 0.85 for ages less than 2 years, 0.72 for ages 2 to 16 years, and 0.73 for ages 30 to 70 years.

OEHHA has decreased the exposure duration currently being used for estimating cancer risk at the maximum exposed individual resident from 70 years to 30 years. This is based on studies showing that 30 years is a reasonable estimate of the 90th to 95th percentile of residency duration in the population. Additionally, OEHHA recommends using the 9 and 70-year exposure duration to represent the potential impacts over the range of residency periods.

Given the exposure durations of less than 24 hours, sensitive recreational receptors were evaluated for acute impacts only. Based on OEHHA recommendations, for children at school sites, exposure is assumed to occur 10 hours per day for 180 days (or 36 weeks) per year. Cancer risk estimates for children at school sites are calculated based on 9-year exposure duration. School sites also include teachers and other adult staff which are treated as off-site workers.

RISK CHARACTERIZATION

Cancer risk is defined as the lifetime probability of developing cancer from exposure to carcinogenic substances. Cancer risks are expressed as the chance in one million of getting

cancer (i.e., number of cancer cases among one million people exposed). The cancer risks are assumed to occur exclusively through the inhalation pathway. The cancer risk can be estimated by using the cancer potency factor (milligrams per kilogram of body weight per day [mg/kg-day]), the 30-year annual average concentration (microgram per cubic meter [$\mu g/m^3$]), and the lifetime exposure adjustment.

Following guidelines established by OEHHA, the incremental cancer risks attributable to the proposed project were calculated by applying exposure parameters to modeled DPM concentrations in order to determine the inhalation dose (mg/kg-day) or the amount of pollutants inhaled per body weight mass per day. The cancer risks occur exclusively through the inhalation pathway; therefore, the cancer risks can be estimated from the following equation:

$$\text{Dose-inh} = \frac{C_{air} * \{DBR\} * A * ASF * FAH * EF * ED * 10^{-6}}{AT}$$

where:

Dose-inh	= Dose of the toxic substance through inhalation in mg/kg-day
10^{-6}	= Micrograms to milligrams conversion, Liters to cubic meters conversion
C_{air}	= Concentration in air in microgram (μg)/cubic meter (m^3)
{DBR}	= Daily breathing rate in liter (L)/kg body weight – day
A	= Inhalation absorption factor, 1.0
ASF	= Age Sensitivity Factor
EF	= Exposure frequency (days/year)
ED	= Exposure duration (years)
FAH	= Fraction of Time at Home
AT	= Averaging time period over which exposure is averaged in days (25,550 days for a 70-year cancer risk)

To determine incremental cancer risk, the estimated inhalation dose attributed to the proposed project was multiplied by the cancer potency slope factor (cancer risk per mg/kg-day). The cancer potency slope factor is the upper bound on the increased cancer risk from a lifetime exposure to a pollutant. These slope factors are based on epidemiological studies and are different values for different pollutants. This allows the estimated inhalation dose to be equated to a cancer risk.

Non-cancer adverse health impacts, acute (short-term) and chronic (long-term), are measured against a hazard index (HI), which is defined as the ratio of the predicted incremental exposure

concentration from the proposed project to a published reference exposure level (REL) that could cause adverse health effects as established by OEHHA. The ratio (referred to as the Hazard Quotient [HQ]) of each non-carcinogenic substance that affects a certain organ system is added to produce an overall HI for that organ system. The overall HI is calculated as the total for each organ system. If the overall HI for the highest-impacted organ system is greater than one, then the impact is considered to be significant.

The HI is an expression used for the potential for non-cancer health effects. The relationship for the non-cancer health effects is given by the annual concentration (in $\mu g/m^3$) and the REL (in $\mu g/m^3$). The acute hazard index was determined using the "simple" concurrent maximum approach, which tends to be conservative (i.e., overpredicts).

The relationship for the non-cancer health effects is given by the following equation:

$$HI = C/REL$$

Where:

HI = Hazard index; an expression of the potential for non-cancer health effects.

C = Annual average concentration ($\mu g/m^3$) during the 70-year exposure period.

REL = Concentration at which no adverse health effects are anticipated.

The chronic REL for DPM was established by the California OEHHA as 5 $\mu g/m^3$.[16] There is no acute REL for DPM. However, diesel exhaust does contain acrolein and other compounds, which do have an acute REL. BAAQMD's DPM speciation table (based on profile 4674 within the USEPA Speciate 4.2)[17] was used to assess the acute impacts. Acrolein emissions are approximately 1.3 percent of the total diesel fuel emissions. The acute REL for acrolein was established by the California OEHHA as 2.5 $\mu g/m^3$.[18]

CUMULATIVE SOURCES

The BAAQMD's *CEQA Air Quality Guidelines* include standards and methods for determining the significance of cumulative health risk impacts.[19] The method for determining cumulative health risk requires the tallying of health risk from permitted stationary sources, rail activities, and roadways in the vicinity of a project (i.e., within a 1,000-foot radius or "zone of influence") to determine whether the cumulative health risk thresholds are exceeded.

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[16] Office of Environmental Health Hazards Assessment - Acute, 8-hour, and Chronic Reference Exposure Levels, June 2014, Accessed March 23, 2021, http://www.oehha.ca.gov/air/allrels.html

[17] Provides for a speciation faction of 1.3 percent of acrolein per DPM emission rate

[18] Office of Environmental Health Hazards Assessment - Acute, 8-hour, and Chronic Reference Exposure Levels, June 2014, Accessed March 23, 2021, http://www.oehha.ca.gov/air/allrels.html

[19] Bay Area Air Quality Management District, *CEQA Air Quality Guidelines*, May 2017, Accessed March 23, 2021, http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en

BAAQMD has developed a geo-referenced database of permitted emissions sources throughout the San Francisco Bay Area, and has developed the *Stationary Source Risk & Hazard Analysis Tool* for estimating cumulative health risks from permitted sources.[20] Three permitted sources (diesel generators and gasoline fueling) are located within 1,000 feet of the project site. **Table B-1** provide the estimated cancer risk, hazard impacts, and the $PM_{2.5}$ concentrations for the nearby permitted sources.

TABLE B-1
HEALTH IMPACTS – PERMITTED SOURCES

Facility ID	Facility Type	Address	Cancer Risk	Hazard Impact	$PM_{2.5}$ Concentration
14734	U S Postal Service	2501 Rydin Road	0.62	0	0.07
19207	ABS CBN International	2301 Columbia Blvd	1.5	0	0
22754	City of Richmond Water Pollution Control	Burlingame Ave & Monterey St	1.38	0	0

SOURCE: Bay Area Air Quality Management District, *Stationary Source Risk & Hazard Analysis Tool*, Accessed March 19, 2021, https://baaqmd.maps.arcgis.com/apps/webappviewer/index.html?id=2387ae674013413f987b1071715daa65

BAAQMD has also developed a geo-referenced database of roadways throughout the San Francisco Bay Area for estimating cumulative health risks from major roadways and rail activities. I-80 and I-580 are major roadways within 1,000 feet of the project site. Rail activities are associated with Amtrak's Capitol Corridor Express and a freight line are located within 1,000 feet of the project site

BAAQMD *CEQA Air Quality Guidelines* also require the inclusion of secondary surface streets with annual average daily traffic of 10,000 or greater. BAAQMD has developed a county-specific tool, *Roadway Screening Analysis Calculator*, for estimating cumulative health risks from these minor roadways.[21] Upon review of nearby roadways, no secondary surface streets within 1,000 feet meets the criteria.

ADJUSTMENT OF BAAQMD DATA FOR REVISED OEHHA GUIDANCE

The revised OEHHA guidance has developed exposure factors (e.g., daily breathing rates) for six age groups including the last trimester to birth, birth to 2 years, 2 to 9 years, 2 to 16 years, 16 to 30 years, and 16 to 70 years. OEHHA also developed age sensitivity factors (ASF) to take into account the increased sensitivity to carcinogens during early-in-life exposures. OEHHA recommends that cancer risks be weighted by a factor of 10 for exposures that occur from the

[20] Bay Area Air Quality Management District, *CEQA Tools and Methodologies*, Accessed March 23, 2021, https://baaqmd.maps.arcgis.com/apps/webappviewer/index.html?id=2387ae674013413f987b1071715daa65

[21] Bay Area Air Quality Management District, *CEQA Tools and Methodologies*, Accessed March 23, 2021, https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/ceqa-tools

third trimester of pregnancy to 2 years of age, and by a factor of 3 for exposures from 2 years through 15 years of age.

In the previous OEHHA guidance, the adult breathing rate of 302 liters per kilogram per day (L/kg-day) and the children breathing rate of 581 L/kg-day was recommended. For estimating cancer risks for residential receptors over a 70-year lifetime, the incorporation of the ASF results in a cancer risk adjustment factor of 1.7.

In the revised OEHHA guidance, residential receptors utilize the 95th percentile breathing rate values. The breathing rates are age-specific and are 1,090 liters per kilogram-day for ages less than 2 years, 745 liters per kilogram-day for ages 2 to 16 years, and 335 liters per kilogram-day for ages 16 to 30 years.

These differences in breathing rates, exposure duration, and other factors result in difference in health risk results. According to the SJVAPCD, these differences would increase the likelihood of finding significant health risks by as much as three-fold. Based on calculations for this proposed project, an adjustment factor of 2.6 was calculated to account for differences in the previous OEHHA and revised OEHHA guidance related to differences in breathing rates, incorporation of a age sensitivity factors, incorporation of a fraction of time at home during the day, and a modification of the lifetime exposure of 70 to 30 years. The adjustment factor was determined by evaluating the cancer risk for the rail activities using the previous OEHHA guidance and comparing to the cancer risk for the rail activities using the revised OEHHA guidance.

Several presentations have reviewed the differences between the previous and revised OEHHA guidance and have determined that the differences range from 2.1 to 3.0, using a 30-year exposure and 95th percentile breathing rates, depending on the type of emission source.[22]

The cancer risks for project construction activities as well as nearby permitted stationary sources were developed using the revised OEHHA guidance and thus were not further adjusted. However, cancer risks associated with major roadways and rail activities were based on BAAQMD data associated with the previous OEHHA guidance thus were adjusted by a factor of 2.6.

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[22] San Joaquin Valley Air Pollution Control District, *Update to District's Risk Management Policy to Address OEHHA's Revised Risk Assessment Guidance Document*, May 28, 2015, http://www.valleyair.org/busind/pto/staff-report-5-28-15.pdf
San Joaquin Valley Air Pollution Control District, *Update On District's Implementation Of OEHHA's Revised Air Toxics Health Risk Assessment Guidelines*, August 20, 2015, http://www.valleyair.org/Board_meetings/GB/agenda_minutes/Agenda/2015/August/presentations/09.pdf

Health Risk Assessment Assumptions

5	Chronic Reference Exposure Level (ug/m3) for DPM	
2.5	Acute Reference Exposure Level (ug/m3) for Acrolien	
1.1	Cancer Potency Slope Factor (cancer risk per mg/kg-day) for DPM	
350	days per year	
25,550	days per lifetime	
1,090	95th Percentile Daily Breathing Rates (L/kg-day)	0<2 Years
861	95th Percentile Daily Breathing Rates (L/kg-day)	2<9 Years
745	95th Percentile Daily Breathing Rates (L/kg-day)	2<16 Years
335	95th Percentile Daily Breathing Rates (L/kg-day)	16<30 Years
290	95th Percentile Daily Breathing Rates (L/kg-day)	30<70 Years
0.85	fraction of time at home	0<2 Years
0.72	fraction of time at home	2<16 Years
0.73	fraction of time at home	16<70 Years

Project:	Richmond Annex
Date:	April 7, 2021
Condition:	Unmitigated
Receptor:	Existing Residence

Exposure Year	Calender Year	Maximum 1-Hour Acrolien Concentration (ug/m3)	Annual PM2.5 Concentration (ug/m3)	Daily Breathing Rates (L/kg-day)	Exposure Factor	fraction of time at home	Cancer Risk
1	2022	5.47	5.37	1,090	10.0	0.85	750
2	2023	1.78	2.59	1,090	10.0	0.85	361
3	2024	2.03	0.65	745	4.75	0.72	25.1
4	2025			745	3.00	0.72	
5	2026			745	3.00	0.72	
6	2027			745	3.00	0.72	
7	2028			745	3.00	0.72	
8	2029			745	3.00	0.72	
9	2030			745	3.00	0.72	
10	2031			745	3.00	0.72	
11	2032			745	3.00	0.72	
12	2033			745	3.00	0.72	
13	2034			745	3.00	0.72	
14	2035			745	3.00	0.72	
15	2036			745	3.00	0.72	
16	2037			745	3.00	0.72	
17	2038			335	1.70	0.73	
18	2039			335	1.00	0.73	
19	2040			335	1.00	0.73	
20	2041			335	1.00	0.73	
21	2042			335	1.00	0.73	
22	2043			335	1.00	0.73	
23	2044			335	1.00	0.73	
24	2045			335	1.00	0.73	
25	2046			335	1.00	0.73	
26	2047			335	1.00	0.73	
27	2048			335	1.00	0.73	
28	2049			335	1.00	0.73	
29	2050			335	1.00	0.73	
30	2051			335	1.00	0.73	

5.37	Maximum Annual PM2.5 Concentration (ug/m3)
0.3	Significance Threshold (ug/m3)
Yes	Significant?
1.07	Chronic Hazard Impact
1	Significance Threshold
Yes	Significant?
2.19	Acute Hazard Impact
1	Significance Threshold
Yes	Significant?
1,137	Cancer Risk (Child)
10	Significance Threshold
Yes	Significant?
54.0	Cancer Risk (Adult)
10	Significance Threshold
Yes	Significant?

Health Risk Assessment Assumptions

5	Chronic Reference Exposure Level (ug/m3) for DPM	
2.5	Acute Reference Exposure Level (ug/m3) for Acrolien	
1.1	Cancer Potency Slope Factor (cancer risk per mg/kg-day) for DPM	
350	days per year	
25,550	days per lifetime	
1,090	95th Percentile Daily Breathing Rates (L/kg-day)	0<2 Years
861	95th Percentile Daily Breathing Rates (L/kg-day)	2<9 Years
745	95th Percentile Daily Breathing Rates (L/kg-day)	2<16 Years
335	95th Percentile Daily Breathing Rates (L/kg-day)	16<30 Years
290	95th Percentile Daily Breathing Rates (L/kg-day)	30<70 Years
0.85	fraction of time at home	0<2 Years
0.72	fraction of time at home	2<16 Years
0.73	fraction of time at home	16<70 Years

Project:	Richmond Annex
Date:	April 7, 2021
Condition:	Mitigated
Receptor:	Existing Residence

Exposure Year	Calender Year	Maximum 1-Hour Acrolien Concentration (ug/m3)	Annual PM2.5 Concentration (ug/m3)	Daily Breathing Rates (L/kg-day)	Exposure Factor	fraction of time at home	Cancer Risk
1	2022	0.04	0.04	1,090	10.0	0.85	5.34
2	2023	0.02	0.02	1,090	10.0	0.85	3.38
3	2024	0.02	0.01	745	4.75	0.72	0.27
4	2025			745	3.00	0.72	
5	2026			745	3.00	0.72	
6	2027			745	3.00	0.72	
7	2028			745	3.00	0.72	
8	2029			745	3.00	0.72	
9	2030			745	3.00	0.72	
10	2031			745	3.00	0.72	
11	2032			745	3.00	0.72	
12	2033			745	3.00	0.72	
13	2034			745	3.00	0.72	
14	2035			745	3.00	0.72	
15	2036			745	3.00	0.72	
16	2037			745	3.00	0.72	
17	2038			335	1.70	0.73	
18	2039			335	1.00	0.73	
19	2040			335	1.00	0.73	
20	2041			335	1.00	0.73	
21	2042			335	1.00	0.73	
22	2043			335	1.00	0.73	
23	2044			335	1.00	0.73	
24	2045			335	1.00	0.73	
25	2046			335	1.00	0.73	
26	2047			335	1.00	0.73	
27	2048			335	1.00	0.73	
28	2049			335	1.00	0.73	
29	2050			335	1.00	0.73	
30	2051			335	1.00	0.73	

0.04	Maximum Annual PM2.5 Concentration (ug/m3)
0.3	Significance Threshold (ug/m3)
No	Significant?
0.01	Chronic Hazard Impact
1	Significance Threshold
No	Significant?
0.02	Acute Hazard Impact
1	Significance Threshold
No	Significant?
8.99	Cancer Risk (Child)
10	Significance Threshold
No	Significant?
0.43	Cancer Risk (Adult)
10	Significance Threshold
No	Significant?

Appendix B

Noise Appendix

Cherry Blossom Row Project

Noise Appendix

Veneklasen Associates Exterior Noise and Exterior Facade Analysis, Aug, 2020.

Long-Term Noise Measurement Graphs (Site 1 and 2)

RCH GROUP
planning & environmental consulting

Veneklasen Associates
Consultants in Acoustics | Noise | Vibration | AV | IT

August 21, 2020

City Ventures, Inc.
444 Spear Street Suite 200
San Francisco, California 91405

Attention: **Samantha Hauser | Senior Vice President of Development**

Subject: **Richmond Site B**
Richmond, California
Exterior Noise and Exterior Façade Analysis
Veneklasen Project No. 4616-023

Dear Samantha:

Veneklasen Associates, Inc. (Veneklasen) has completed our review of the Richmond Site B project located in Richmond, California. This report predicts the exterior noise level at the site using measurements and computer modeling. Using this information, interior noise levels were calculated based on the exterior noise exposure and the construction types proposed. From this, the exterior façade design was determined. This report represents the results of our findings.

1.0 INTRODUCTION

This study was conducted to determine the impact of the exterior noise and vibration sources on the Richmond Site B project in Richmond, California. Veneklasen's scope of work included calculating the exterior noise levels impacting the site and determining the method, if any, required to reduce the interior and exterior sound levels to meet the applicable code requirements of the State of California and the City of Richmond.

The project consists of a 102-townhome residential development. The project is bounded by Interstate 80 to the east, Interstate 580 and a rail line to the west, existing commercial uses to the north, and existing residential uses to the south.

2.0 NOISE CRITERIA

CNEL (Community Noise Equivalent Level) is the 24-hour equivalent (average) sound pressure level in which the evening (7 pm–10 pm) and nighttime (10 pm – 7 am) noise is weighted by adding 5 and 10 dB, respectively, to the hourly level. Since this is a 24-hour metric, short-duration noise events (truck pass-by's, buses, trains, etc.) are not as prominent in the analysis.

Leq (equivalent continuous sound level) is defined as the steady sound pressure level which, over a given period of time, has the same total energy as the actual fluctuating noise.

2.1 Interior Noise Levels - Residential

The State of California Building Code (Section 1206, "Sound Transmission") and the City of Richmond Noise Element state that interior CNEL values for residential land uses are not to exceed 45 CNEL in any habitable room.

If the windows must be closed to meet an interior level of 45 CNEL, then a mechanical ventilating system or other means of natural ventilation shall be provided.

Although not a regulatory requirement, Veneklasen suggests adopting a voluntary criterion that the maximum noise level from short-duration noise events during the night not exceed 55 dBA. This criterion is based on sleep disturbance research and our experience with similar projects.

2.2 CALGreen – Non-residential

Section 5.507.4.2 of the 2016 California Green Building Code stipulates that for buildings exposed to a noise level of 65 dB or more when measured as a 1-hour Equivalent Sound Level (Leq), the building façade, including walls, windows, and roofs, shall provide enough sound insulation so that the interior sound level from exterior sources does not exceed 50 dBA during any hour of operation. This applies to non-residential spaces such as retail space, leasing, and amenities.

2.3 Train Vibration Levels

While not a code requirement, the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual, dated September 2018, provides recommended ground-borne vibration threshold guidelines for various land uses. These guidelines for human annoyance due to transit vibration events are presented in Table 1 below.

Table 1 – FTA Ground-Borne Vibration Threshold Guidelines

Land Use Category	Ground-Borne Vibration Impact Levels [VdB re: 1 micro-inch/second]		
	Frequent Events	Occasional Events	Infrequent Events
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB	65 VdB	65 VdB
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

Note that in the FTA Manual, “Frequent” events are described as more than 70 events per day, “Occasional” events are described as between 30 and 70 events per day, and “Infrequent” events are described as fewer than 30 events per day. For this project, the applicable criterion would be Category 2, Occasional Events, since it is a residential project with approximately 60 events per day, 75 VdB.

3.0 EXTERIOR NOISE ENVIRONMENT

3.1 Noise Measurements

Traffic on I-80, I-580, and San Joaquin Street, as well as train activity on the nearby rail, were the primary sources of noise affecting the site. Veneklasen visited the site on Monday, August 17, 2020, and placed a noise and vibration monitor on the site for a period of approximately 72 hours. Veneklasen also completed short-term noise measurements. Table 2 and Figure 1 show the location and summary of the noise measurements. Note that the L1 microphone was extended approximately 16 feet high. The remaining noise measurements were made at a height of 4 feet above the ground. The sound barrier along the eastern portion of the project site, shown in blue in Figure 1 below, was measured to be approximately 25 feet tall.

Table 2 – Measured Sound and Vibration Levels

Location	Loudest Daytime Hour, Leq dBA	Event Level, dBA	Maximum Ground-borne Vibration Level, VdB	CNEL
Long-Term 1	68	82	-	-
Long-Term 2	68	83	70	73
Short-Term 1	57	61	-	-
Short-Term 2	59	70	-	-
Short-Term 3	58	63	-	-

Location	Loudest Daytime Hour, Leq dBA	Event Level, dBA	Maximum Ground-borne Vibration Level, VdB	CNEL
Short-Term 4	65	71	-	-
Short-Term 5	68	84	-	-

Figure 1 – Aerial View of Project Site Showing Measurement Locations

3.2 West Rail Line

The Department of Transportation (DOT) Federal Roadway Administration (FRA) Crossings Inventory Database indicates that there are approximately 60 train pass-by events daily on the west rail line. Approximately 45 of these are labeled as passenger train events and the rest are labeled as freight train events. This is consistent with the count and mix of trains observed during Veneklasen's survey.

The L2 long-term monitor measured noise and vibration levels from train events for a period of 72 hours. Passenger trains were primarily measured along this line, however, there were several freight trains measured. Passenger trains moved quickly, while freight trains were slow-moving and took approximately 120 seconds on average to pass by the monitor. Only two horn blasts were measured during the monitoring time. This is largely due to the fact that the nearest crossing over an automobile roadway is approximately two miles from the project site. Trains blast their horns when approaching a roadway/railway intersection as a warning to vehicles. As a result, Veneklasen anticipates the infrequency of horn events observed to be a typical condition.

As is shown in Table 2 above, the maximum measured vibration level from train pass-by events was approximately 70 VdB. The crossing inventory count of 60 train events per day would be considered as an "Occasional" number of events per the FTA manual. Therefore, the FTA recommended vibration level threshold for a Category 2 (residential) land use is 75 VdB, according to Table 1 above. The maximum measured train vibration level does not exceed this threshold, indicating that the level of ground-borne vibration from train activity is acceptable.

The event sound pressure level shown in Table 2, 83 dBA, is the average train pass-by event sound level measured during the 3-day period. For residences along the western edge of the property, this is the exterior noise level used to evaluate compliance with the voluntary short-duration event level criterion of 55 dBA described above in Section 2.1.

3.3 Computer Modeling

Veneklasen has utilized the Traffic Noise Model computer software program developed by the FHWA (Federal Highway Administration TNM 2.5) in order to predict vehicular noise levels at various locations. The primary purpose of the computer model was to determine how the noise environment will change due to traffic and site changes.

Traffic counts for local streets were obtained from Caltrans.

3.4 Overall Exterior Exposure

Based on the computer model and measurements, Veneklasen calculated the noise level at different locations across the project site. To simplify the presentation of the exterior noise levels, Veneklasen has separated the site into locations based on the sound exposure and required mitigation.

Veneklasen understands that other factors may limit the land area available for development and that a portion of the western side of the property may not be constructed. Therefore, Veneklasen has presented noise zones as well as mitigation recommendations for both possibilities. The predicted sound levels at each zone for both site plan conditions, shown in Figure 2 and Figure 3, are summarized in Table 3 and Table 4.

Table 3 – Exterior Noise Levels: Full Site Plan

Location	Floor	Exterior Noise Level, CNEL	Event Level, dBA
Zone A	3	73 – 76	80 – 83
	2	66 – 69	80 – 83
	1	< 65	80 – 83
Zone B	3	73	80
	1 – 2	65 – 66	80
Zone C	All	70 – 73	80 – 83
Zone D	All	70	80
Zone E	All	65 - 70	79 - 80
Remaining Units	All	< 60	< 75

Table 4 – Exterior Noise Levels: Partial Site Plan

Location	Floor	Exterior Noise Level, CNEL	Event Level, dBA
Zone A	3	73 – 76	80 – 83
	2	66 – 69	80 – 83
	1	< 65	80 – 83
Zone B	3	73	80
	1 – 2	65 – 66	80
Zone D	All	67 – 70	70
Zone E	All	65 - 70	79 - 80
Remaining Units	All	< 60	< 75

Figure 2 – Noise Zones: Full Site Plan

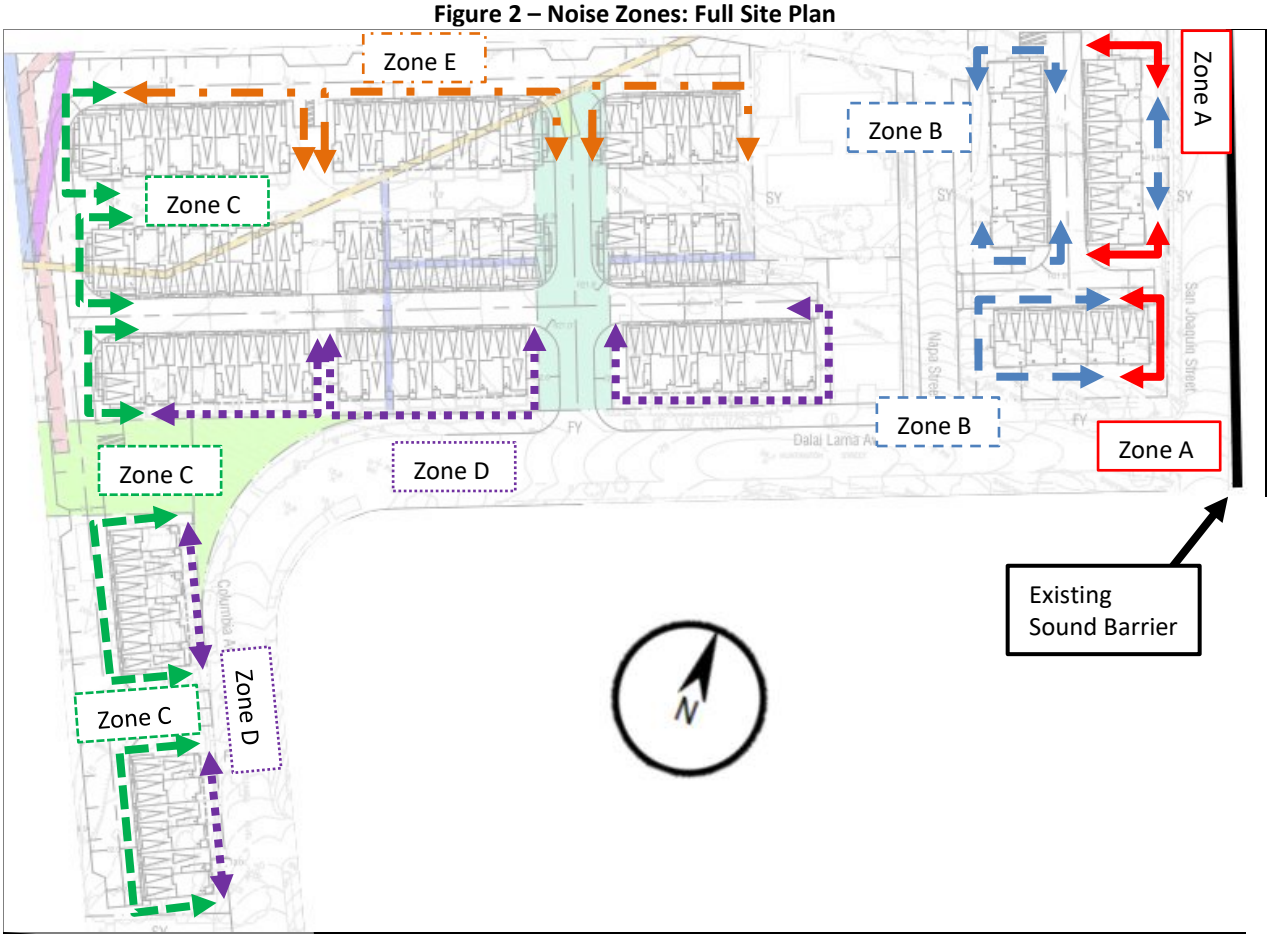


Figure 3 – Noise Zones: Partial Site Plan

4.0 INTERIOR NOISE CALCULATION

4.1 Exterior Facade Construction

An exterior wall detail has not yet been developed for this project. For the purposes of this analysis, Veneklasen has utilized a typical exterior wall which consists of 3-coat stucco over sheathing on wood studs with a single layer of gypsum board on the interior and batt insulation in the cavity.

Veneklasen's calculations included the roof path, but this was insignificant in the interior noise level calculated.

Veneklasen utilized the glazing ratings (glass, frame and seals) shown in Appendix I.

4.2 Interior Average Noise Level (CNEL) – Residential

Veneklasen calculated the interior level within the residential units given the measured noise environment and the exterior facade construction described above. Calculations were based on the plans dated July 27, 2020. Calculations were performed for both the full site plan and partial site plan layouts. Table 5 and Table 6 show the predicted interior CNEL noise levels based on the windows and doors with STC ratings as shown and glazing construction as described in Appendix I.

Table 5 – Calculated Interior CNEL Noise Levels: Full Site Plan

Location	Floor	Exterior Noise Level, CNEL	Exterior Event Level, dBA	Window/ Door Rating	Interior Noise Level, CNEL	Interior Event Level, dBA
Zone A	3	73 – 76	80 – 83	STC 35	44	53
	2	66 – 69	80 – 83	STC 33	44	58
	1	< 65	80 – 83	STC 30	44	61
Zone B	3	73	80	STC 35	42 – 45	50 – 53
	1 – 2	65 – 66	80	STC 30	43	55 – 58
Zone C	All	70 – 73	80 – 83	STC 35	42 – 45	54 – 56
Zone D	All	70	≤80	STC 30	41	53
Zone E	All	65 - 70	79 - 80	STC 33	45	53 - 55
Remaining Units	All	< 60	< 75	No STC Requirement. STC 30 recommended.		

Table 6 – Calculated Interior CNEL Noise Levels: Partial Site Plan

Location	Floor	Exterior Noise Level, CNEL	Exterior Event Level, dBA	Window/ Door Rating	Interior Noise Level, CNEL	Interior Event Level, dBA
Zone A	3	73 – 76	80 – 83	STC 35	44	53
	2	66 – 69	80 – 83	STC 33	44	58
	1	< 65	80 – 83	STC 30	44	61
Zone B	3	73	80	STC 35	42 – 45	50 – 53
	1 – 2	65 – 66	80	STC 30	43	55 – 58
Zone D	All	67 – 70	70	STC 30	42 – 44	44 – 46
Zone E	All	65 - 70	79 - 80	STC 33	45	53 - 55
Remaining Units	All	< 60	< 75	No STC Requirement. STC 30 recommended.		

Where the noise level does not exceed 60 CNEL, sound-rated assemblies are not required. However, Veneklasen recommends specifying a window with a minimum rating of STC-30 to maintain a consistent level of acoustical quality.

4.3 Interior Short-duration Noise Event – Veneklasen Recommended Glazing (Optional)

In a similar manner Veneklasen calculated the interior noise levels from the single-event noise sources such as trains and heavy truck pass-by's. As described in Section 2.1, Veneklasen's recommended interior nighttime noise level criterion is 55 dBA. Calculations were performed for both the full site plan and partial site plan layouts. Table 7 and Table 8 show Veneklasen's recommended mitigation to reduce the interior noise levels due to short-duration noise events.

Table 7 – Calculated Interior Short-duration Event Noise Levels: Full Site Plan

Location	Floor	Exterior Event Level, dBA	Glazing Rating	Interior Event Level, dBA
Zone A	3	80 – 83	STC 35	53
	1 – 2	80 – 83	STC 35	56
Zone B	3	80	STC 35	50 – 53
	1 – 2	80	STC 30	55 – 58
Zone C	All	80 – 83	STC 36	52 – 54
Zone D	All	80	STC 30	53
Zone E	All	79 - 80	STC 33	53 - 55

Table 8 – Calculated Interior Short-duration Event Noise Levels: Partial Site Plan

Location	Floor	Exterior Event Level, dBA	Glazing Rating	Interior Event Level, dBA
Zone A	3	80 – 83	STC 35	53
	1 – 2	80 – 83	STC 35	56
Zone B	3	80	STC 35	50 – 53
	1 – 2	80	STC 30	55 – 58
Zone D	All	70	STC 30	44 – 46
Zone E	All	79 - 80	STC 33	53 -55

4.4 Mechanical Ventilation - Residential

Because the windows and doors must be kept closed to meet the noise requirements, mechanical or other means of ventilation may be required for all units in Zones A, B, C, D, and E. The ventilation system shall not compromise the sound insulation capability of the exterior facade assembly.

4.5 CALGreen – Non-Residential

The plans provided did not show any retail, commercial, or other non-residential buildings or spaces on the project site. Therefore, no CALGreen analysis is required. Notify Veneklasen if this changes.

5.0 SUMMARY

The following summarizes the acoustical items required to satisfy the noise criteria as described in this report.

Residential

- Measured vibration levels do not exceed FTA recommended transit ground-borne vibration guidelines as described in Section 3.2.
- Exterior wall assembly is acceptable as described in Section 4.1.
- The roof assembly was included in our calculations and is not a significant path of sound and can remain as designed.
- Windows and glass doors with minimum STC ratings as shown in Table 5 and Table 6, defined in Appendix I are required.
- Optional: In order to meet the voluntary criterion for short-duration noise events, windows and glass doors with minimum STC ratings as shown in Table 7 and Table 8 are recommended. This is not required by code but will increase occupant comfort.
- Residential mechanical ventilation, or other means of natural ventilation, may be required for all units in Zones A, B, C, D, and E.

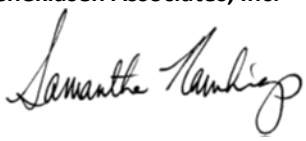
Non-Residential

- No retail, commercial, or other non-residential spaces are included in this project. No CALGreen requirements.

Various noise mitigation methods may be utilized to satisfy the noise criteria described in this report. Alteration of mitigation methods that deviate from requirements should be reviewed by the acoustical consultant.

If you have any questions or comments regarding this report, please do not hesitate to contact us.

Sincerely,
Veneklasen Associates, Inc.



Samantha Rawlings, *LEED AP BD+C*
Associate Principal

Kevin Patterson
Associate

APPENDIX I – GLAZING REQUIREMENTS

In order to meet the predicted interior noise levels described in Section 4.0, the glazing shall meet the following requirements:

Table 9 – Acoustical Glazing Requirements: Minimum Octave Band Transmission Loss and STC Rating

Nominal Thickness	Minimum Transmission Loss Octave Band Center Frequency (Hz)						Min. STC Rating
	125	250	500	1000	2000	4000	
1” dual	21	18	27	34	37	32	**30**
1” dual	22	21	30	36	37	36	**33**
1” dual	23	22	32	37	38	38	**35**
1” dual	24	28	36	39	36	36	**36**

The transmission loss values in the table above can likely be met with the following glazing assemblies:

1. STC 30: 1/8” monolithic – 3/4” airspace – 1/8” monolithic
2. STC 33: 3/16” monolithic – 11/16” airspace – 1/8” monolithic
3. STC 35: 1/4" monolithic – 1/2” airspace – 1/4” monolithic
4. STC 36: 7/16" laminated – 3/8” airspace – 3/16” monolithic

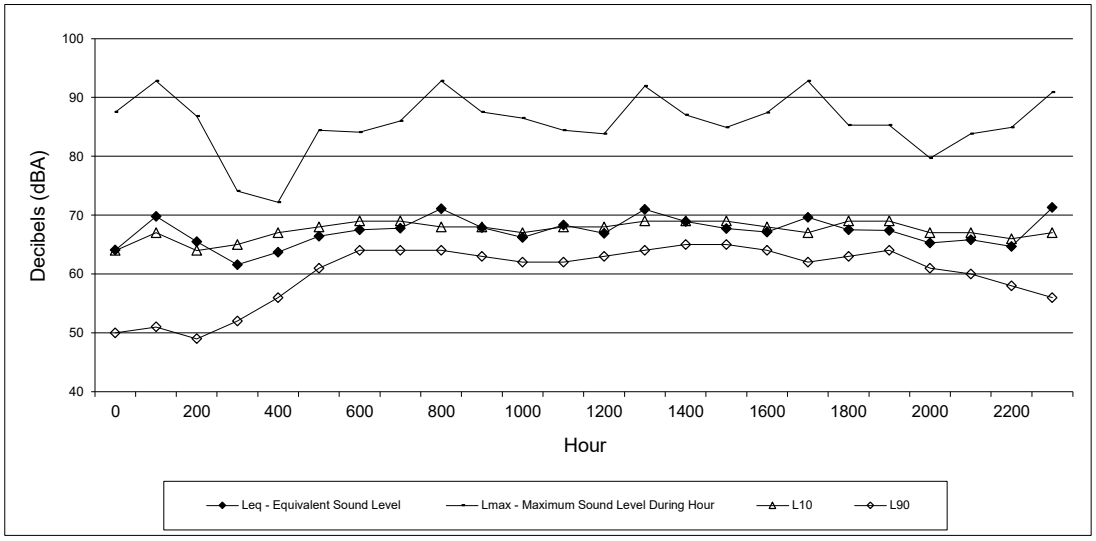
An assembly’s frame and seals may limit the performance of the overall system. Therefore, the window and door systems selected for the project shall not be selected on the basis of the STC rating of the glass alone, but on the entire assembly including frame and seals. Additionally, the assemblies given above are provided as a basis of design, but regardless of construction, the octave band Transmission Loss (TL) and STC value of the system selected must meet the minimum values in Table 9 above.

Independent laboratory acoustical test reports should be submitted for review by the design team to ensure compliance with glazing acoustical performance requirements. Laboratories shall be accredited by the Department of Commerce National Voluntary Laboratory Accreditation Program (NVLAP). Labs shall be pre-approved by Veneklasen Associates. Tests shall be required to be performed in North America. Lab tests and lab reports shall be in compliance with ASTM standard E90 and be no more than 10 years old from the date of submission for this project.

If test reports are not available for a proposed assembly, the assembly, including frame, seals and hardware, shall be tested at an independent pre-approved NVLAP-accredited laboratory to demonstrate compliance with the requirements of this report. Veneklasen shall be invited to witness acoustical testing completed and reserves the right to exclude test reports from laboratories that are not pre-approved by Veneklasen.

Long-Term Noise Measurement Graphs (Site 1 and 2)

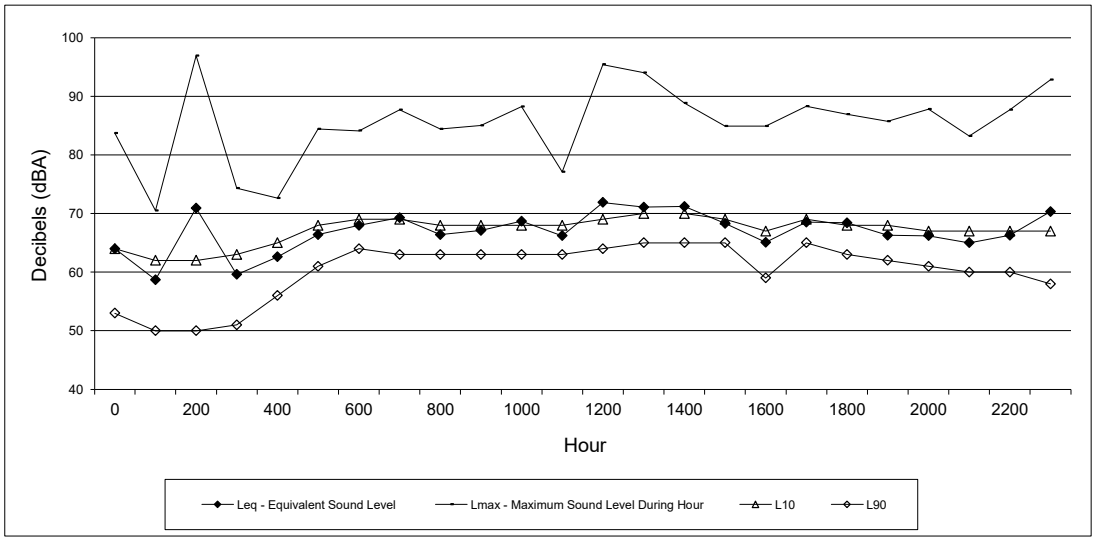
RCH GROUP
planning & environmental consulting



Site 1: West Property line of the project site
Thursday April 29, 2021

Hour	Leq - Equivalent Sound Level	Lmax - Maximum Sound Level During Hour	L10	L90
0	64	88	64	50
100	70	93	67	51
200	66	87	64	49
300	62	74	65	52
400	64	72	67	56
500	66	84	68	61
600	68	84	69	64
700	68	86	69	64
800	71	93	68	64
900	68	88	68	63
1000	66	87	67	62
1100	68	84	68	62
1200	67	84	68	63
1300	71	92	69	64
1400	69	87	69	65
1500	68	85	69	65
1600	67	87	68	64
1700	70	93	67	62
1800	68	85	69	63
1900	67	85	69	64
2000	65	80	67	61
2100	66	84	67	60
2200	65	85	66	58
2300	71	91	67	56

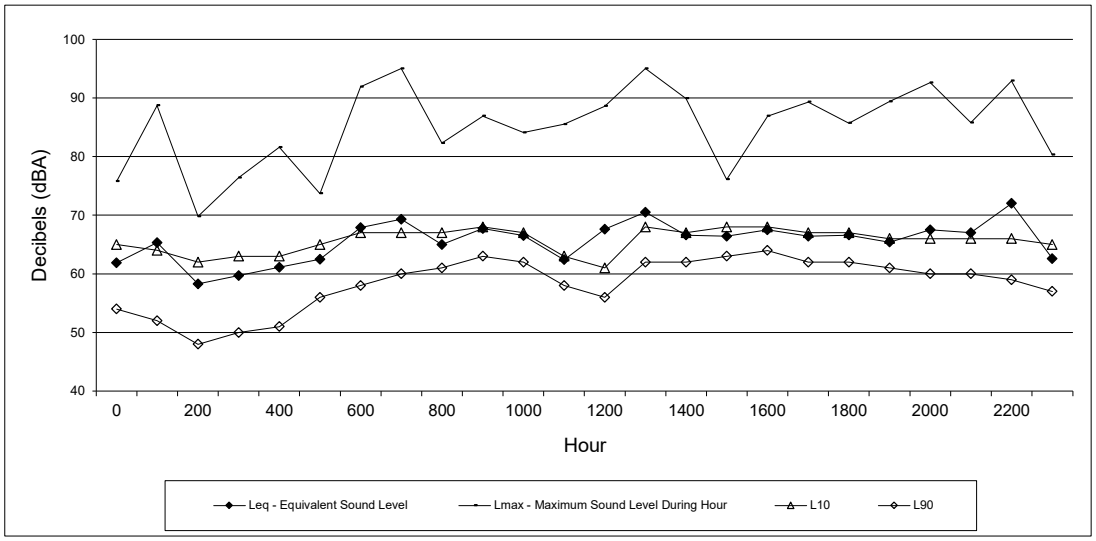
CNEL 74



Site 1: West Property line of the project site
Friday April 30, 2021

Hour	Leq - Equivalent Sound Level	Lmax - Maximum Sound Level During Hour	L10	L90
0	64	84	64	53
100	59	71	62	50
200	71	97	62	50
300	60	74	63	51
400	63	73	65	56
500	66	84	68	61
600	68	84	69	64
700	69	88	69	63
800	66	84	68	63
900	67	85	68	63
1000	69	88	68	63
1100	66	77	68	63
1200	72	95	69	64
1300	71	94	70	65
1400	71	89	70	65
1500	68	85	69	65
1600	65	85	67	59
1700	69	88	69	65
1800	68	87	68	63
1900	66	86	68	62
2000	66	88	67	61
2100	65	83	67	60
2200	66	88	67	60
2300	70	93	67	58

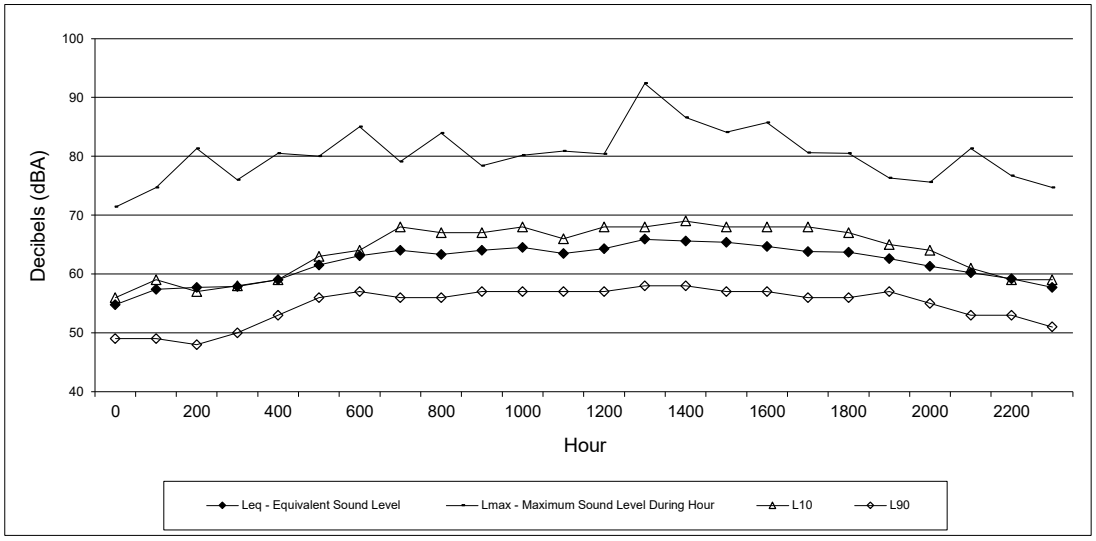
CNEL: 74



Site 1: West Property line of the project site
Saturday May 1, 2021

Hour	Leq - Equivalent Sound Level	Lmax - Maximum Sound Level During Hour	L10	L90
0	62	76	65	54
100	65	89	64	52
200	58	70	62	48
300	60	76	63	50
400	61	82	63	51
500	63	74	65	56
600	68	92	67	58
700	69	95	67	60
800	65	82	67	61
900	68	87	68	63
1000	67	84	67	62
1100	62	86	63	58
1200	68	89	61	56
1300	71	95	68	62
1400	67	90	67	62
1500	66	76	68	63
1600	68	87	68	64
1700	66	89	67	62
1800	67	86	67	62
1900	65	89	66	61
2000	68	93	66	60
2100	67	86	66	60
2200	72	93	66	59
2300	63	80	65	57

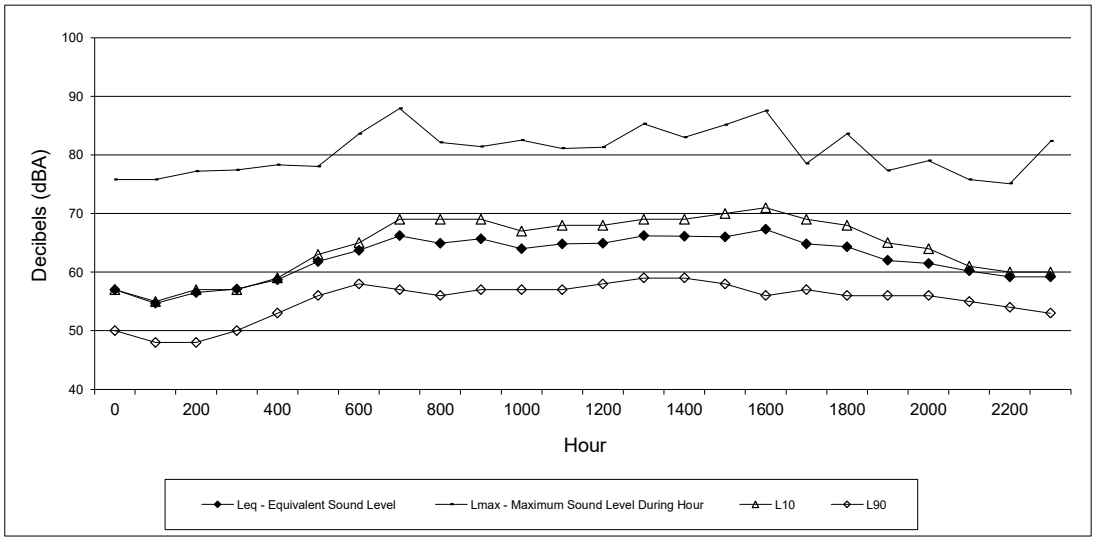
CNEL: 73



Site 2: East property line of project site
Thursday April 29, 2021

Hour	Leq - Equivalent Sound Level	Lmax - Maximum Sound Level During Hour	L10	L90
0	55	71	56	49
100	57	75	59	49
200	58	81	57	48
300	58	76	58	50
400	59	81	59	53
500	62	80	63	56
600	63	85	64	57
700	64	79	68	56
800	63	84	67	56
900	64	78	67	57
1000	65	80	68	57
1100	64	81	66	57
1200	64	80	68	57
1300	66	92	68	58
1400	66	87	69	58
1500	65	84	68	57
1600	65	86	68	57
1700	64	81	68	56
1800	64	81	67	56
1900	63	76	65	57
2000	61	76	64	55
2100	60	81	61	53
2200	59	77	59	53
2300	58	75	59	51

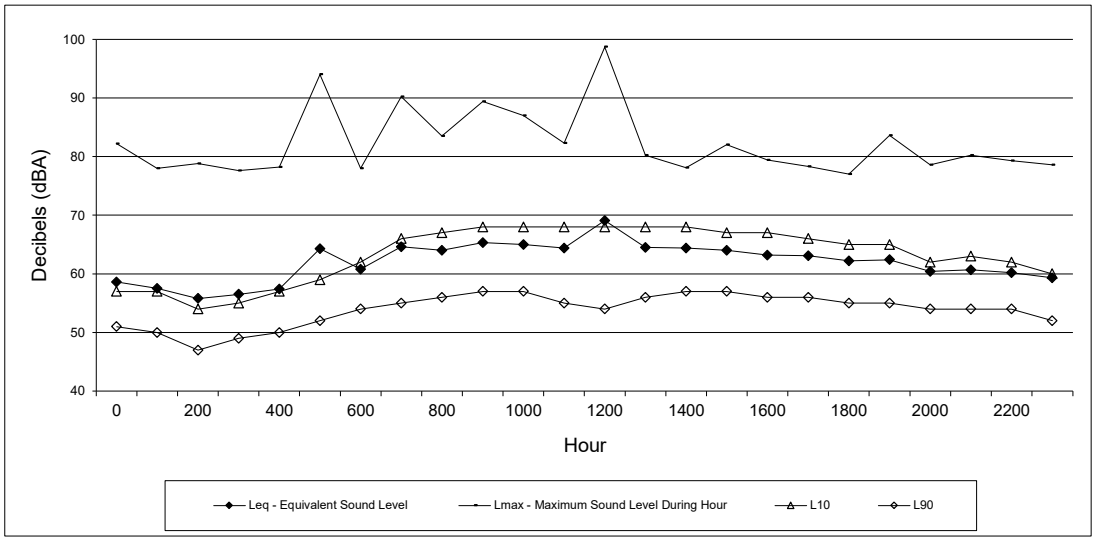
CNEL 67



Site 2: East property line of project site
Friday April 30, 2021

Hour	Leq - Equivalent Sound Level	Lmax - Maximum Sound Level During Hour	L10	L90
0	57	76	57	50
100	55	76	55	48
200	57	77	57	48
300	57	77	57	50
400	59	78	59	53
500	62	78	63	56
600	64	84	65	58
700	66	88	69	57
800	65	82	69	56
900	66	81	69	57
1000	64	83	67	57
1100	65	81	68	57
1200	65	81	68	58
1300	66	85	69	59
1400	66	83	69	59
1500	66	85	70	58
1600	67	88	71	56
1700	65	79	69	57
1800	64	84	68	56
1900	62	77	65	56
2000	62	79	64	56
2100	60	76	61	55
2200	59	75	60	54
2300	59	82	60	53

CNEL: 68



Site 2: East property line of project site
Saturday May 1, 2021

Hour	Leq - Equivalent Sound Level	Lmax - Maximum Sound Level During Hour	L10	L90
0	59	82	57	51
100	58	78	57	50
200	56	79	54	47
300	57	78	55	49
400	57	78	57	50
500	64	94	59	52
600	61	78	62	54
700	65	90	66	55
800	64	84	67	56
900	65	89	68	57
1000	65	87	68	57
1100	64	82	68	55
1200	69	99	68	54
1300	65	80	68	56
1400	64	78	68	57
1500	64	82	67	57
1600	63	79	67	56
1700	63	78	66	56
1800	62	77	65	55
1900	62	84	65	55
2000	60	79	62	54
2100	61	80	63	54
2200	60	79	62	54
2300	59	79	60	52

CNEL: 67