

# **Appendix D**

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**Air Quality, GHG, and Energy Modeling**

**Calculation Sheets**

**Proposed Project**



**Construction Emission Off-Road and On-Road**

*Off-Road Total, Landside + Waterside Construction*

Construction Activities	Daily Emissions (lbs/day)					
	ROG	NOx	CO	SOx	PM10E	PM2.5E
Landside Demolition	0.4092	3.3766	4.6025	0.0082	0.1808	0.1663
Waterside Demolition	4.5563	66.8974	31.0535	0.0375	1.6665	1.5753
Waterside Construction	2.2223	26.2200	16.4462	0.0319	0.7803	0.7313

*On-Road Total, Exhaust + Fugitive*

Phase	Trip type	Daily Emissions (lbs/day)							
		ROG	NOx	CO	SOx	PM10E	PM2.5E	PM10D	PM2.5D
Landside Demolition	Haul Truck	0.3219	1.2745	2.0779	0.0056	0.1803	0.1725	0.3965	0.1006
Waterside Demolition Part 1	Haul Truck	0.3221	1.2983	2.0788	0.0058	0.1807	0.1729	0.4013	0.1019
Waterside Construction Part 1	Delivery Truck	0.3218	1.2528	2.0771	0.0054	0.1800	0.1722	0.3920	0.0994
Waterside Demolition Part 2	Haul Truck	0.3218	1.2507	2.0770	0.0054	0.1800	0.1722	0.3916	0.0993
Waterside Demolition Part 3	Haul Truck	0.3218	1.2593	2.0774	0.0055	0.1801	0.1723	0.3934	0.0998
Waterside Construction Part 2	Truck and Commute	0.4450	2.5691	2.1347	0.0088	0.1872	0.1791	0.4326	0.1102

**Construction Emissions Summary**

**Maximum Daily**

Phase	Start	End	Maximum Daily Emissions (lbs/day)									
			ROG	NOx	CO	SOx	PM10E	PM2.5E	PM10D	PM2.5D	PM10T	PM2.5T
Landside Demolition	4/1/2026	7/22/2026	0.7311	4.6511	6.6805	0.0138	0.3611	0.3388	0.3965	0.1006	0.7576	0.4395
Waterside Demolition Part 1	8/1/2026	11/21/2026	4.8784	68.1957	33.1323	0.0433	1.8472	1.7481	0.4013	0.1019	2.2485	1.8500
Waterside Construction Part 1	12/1/2026	3/23/2027	2.5441	27.4728	18.5233	0.0373	0.9603	0.9036	0.3920	0.0994	1.3524	1.0030
Waterside Demolition Part 2	4/1/2027	5/27/2027	4.8781	68.1480	33.1305	0.0430	1.8465	1.7475	0.3916	0.0993	2.2381	1.8468
Waterside Demolition Part 3	6/1/2027	7/27/2027	4.8781	68.1567	33.1308	0.0430	1.8466	1.7476	0.3934	0.0998	2.2400	1.8474
Waterside Construction Part 2	7/28/2027	8/23/2028	2.6673	28.7892	18.5808	0.0407	0.9675	0.9104	0.4326	0.1102	1.4001	1.0206

**Construction Emissions Detail**

*Exhaust Emission from Off-Road Equipment*

Construction Activities	Daily Emissions (lbs/day)					
	ROG	NOx	CO	SOx	PM10	PM2.5
Landside Demolition	0.4092	3.3766	4.6025	0.0082	0.1808	0.1663
Waterside Demolition	1.2646	15.4315	14.2195	0.0375	0.4977	0.4579
Waterside Construction	1.1727	9.4863	10.3323	0.0319	0.4066	0.3740

*Exhaust Emission from CHC*

Construction Activities	Daily Emissions (lbs/day)					
	VOC	NOx	CO	SOx	PM10	PM2.5
Waterside Demolition	3.2917	51.4659	16.8340	0.0000	1.1688	1.1174
Waterside Construction	1.0496	16.7337	6.1139	0.0000	0.3737	0.3573

*Exhaust Emission from Mobile*

Phase	Trip type	Daily Emissions (lbs/day)							
		ROG	NOx	CO	SOx	PM10E	PM2.5E	PM10D	PM2.5D
Landside Demolition	Haul Truck	0.0127	0.2267	0.0031	0.0009	0.0012	0.0012	0.0049	0.0016
Waterside Demolition Part 1	Haul Truck	0.0129	0.2505	0.0040	0.0011	0.0016	0.0015	0.0063	0.0020
Waterside Construction Part 1	Delivery Truck	0.0125	0.2050	0.0023	0.0007	0.0009	0.0009	0.0037	0.0012
Waterside Demolition Part 2	Haul Truck	0.0125	0.2028	0.0022	0.0007	0.0009	0.0009	0.0035	0.0011
Waterside Demolition Part 3	Haul Truck	0.0126	0.2115	0.0026	0.0008	0.0010	0.0010	0.0040	0.0013
Waterside Construction Part 2	Truck and Commute	0.1358	1.5213	0.0599	0.0041	0.0081	0.0078	0.0131	0.0042
Entire Construction	Commute - workers	0.3092	1.0478	2.0748	0.0047	0.1791	0.1713	0.0215	0.0065

On-Road Fugitive

Phase	Trip type	Emissions (lbs/day)	
		PM10D	PM2.5D
Landside Demolition	Haul Truck	0.0123	0.0031
Waterside Demolition Part 1	Haul Truck	0.0158	0.0039
Waterside Construction Part 1	Delivery Truck	0.0092	0.0023
Waterside Demolition Part 2	Haul Truck	0.0088	0.0022
Waterside Demolition Part 3	Haul Truck	0.0101	0.0025
Waterside Construction Part 2	Truck and commute	0.0403	0.0101
Entire Construction	Commute - workers	0.3577	0.0894

**Construction GHG Emission Summary**

Table X. Construction GHG Emission Summary

Construction Activities	CO2e (MT)
<b>GHG by Phase</b>	
Off-Road Land Equipment	29
Off-Road Water Equipment	1,221
Truck and Worker Commute	305
Project Total	1,556
<b>GHG by Year</b>	
2026	212
2027	704
2028	640
Project Total	1,556

**Construction GHG Emissions Detail**

Exhaust Emission from Off-Road Equipment

Construction Activities	CO2e (MT)
Landside Demolition	29
Waterside Demolition	65
Waterside Construction	462

Landside Demolition  
Waterside Demolition  
Waterside Construction

Exhaust Emission from CHC

Construction Activities	CO2e (MT)
Waterside Demolition	60
Waterside Construction	635

Exhaust Emission from mobile

Phase	Truck CO2e (MT)	Worker MT CO2e
Landside Demolition	4	19
Waterside Demolition Part 1	4	19
Waterside Construction Part 1	3	19
Waterside Demolition Part 2	1	9
Waterside Demolition Part 3	2	9
Waterside Construction Part 2	12	65
Electrical Upgrade	2	0.057908743
Worker	139	

GHGs by source by Phase

Phase	workdays	Off-Road Equip	CHC	Mobile	Total
Landside Demolition	80	29		22	51
Waterside Demolition Part 1	80	32	30	23	85
Waterside Construction Part 1	80	103	141	21	265
Waterside Demolition Part 2	40	16	15	11	42
Waterside Demolition Part 3	40	16	15	11	42
Waterside Construction Part 2	280	359	494	217	1,070

600 workday  
160 total workday\_ waterside demolition  
360 total workday\_ waterside construction

**Workday Phase Year Distribution**

Construction Phase	Phase Start	Phase End	Workdays	2026	2027	2028
Landside Demolition	4/1/2026	7/22/2026	80	81	0	0
Waterside Demolition Part 1	8/1/2026	11/21/2026	80	80	0	0
Waterside Construction Part 1	12/1/2026	3/23/2027	80	23	58	0
Waterside Demolition Part 2	4/1/2027	5/27/2027	40	0	41	0
Waterside Demolition Part 3	6/1/2027	7/27/2027	40	0	41	0
Waterside Construction Part 2	7/28/2027	8/23/2028	280	0	113	168

**Workday Percent Distribution**

Construction Phase	2026	2027	2028
Landside Demolition	100%		
Waterside Demolition Part 1	100%		
Waterside Construction Part 1	28%	72%	
Waterside Demolition Part 2		100%	
Waterside Demolition Part 3		100%	
Waterside Construction Part 2		40%	60%

**GHG Emission Distribution**

Construction Phase	2026	2027	2028
Landside Demolition	51		
Waterside Demolition Part 1	85		
Waterside Construction Part 1	75	190	
Waterside Demolition Part 2		42	
Waterside Demolition Part 3		42	
Waterside Construction Part 2		430	640
Yearly total	212	704	640

## Energy Consumption, Construction

**Table X. Project Energy Consumption Summary**

Source	Diesel (gallons)	Gasoline (gallons)
Off-Road Land Equipment	2,880	-
Off-Road Water Equipment	120,380	-
Trucks and Worker Commute	1,851	13,562
<b>Project Total</b>	<b>125,111</b>	<b>13,562</b>

### Off-Road Equipment Energy Consumption

Phase	Diesel (gallons)
Landside Demolition	2,880
Waterside Demolition	6,335
Waterside Construction	45,096

Note: Fuel consumption summarized over all equipment during phases. See sheet Off-Road Land Emissions for detailed equipment fuel consumption.

### CHC Energy Consumption

Phase	Diesel (gallons)
Waterside Demolition	6,076
Waterside Construction	62,874

Note: Fuel consumption calculation is in sheet CHC Emissions

### Mobile Energy Consumption

Source	Diesel (gallons)	Gasoline (gallons)
Trucks	1,851	-
Worker Commute	-	13,562

Note: Worker commute energy calculation is in sheet On-Road Exhaust.

## Fugitive Dust Emissions

### On-Road Dust Emissions

Phase	Vehicle Type	Total VMT		Paved Road VMT (mi)	Total Emissions (lbs)		Emissions (lbs/day)	
		(mi)	Workdays		PM10	PM2.5	PM10	PM2.5
Landside Demolition	Haul Truck	1,560	80	1,560	0.985	0.246	0.012	0.003
Waterside Demolition Part 1	Haul Truck	2,000	80	2,000	1.263	0.316	0.016	0.004
Waterside Construction Part 1	Delivery Truck	1,160	80	1,160	0.733	0.183	0.009	0.002
Waterside Demolition Part 2	Haul Truck	560	40	560	0.354	0.088	0.009	0.002
Waterside Demolition Part 3	Haul Truck	640	40	640	0.404	0.101	0.010	0.003
Waterside Construction Part 2	Delivery Truck	4,960	280	4,960	3.132	0.783	0.011	0.003
Entire Construction	Commute -	339,840	600	339,840	214.619	53.655	0.358	0.089

Assume default of 100% paved roads for worker, construction hauling, vendor trips in San Diego County (CalEEMod default Appendix G21)

### Emission Factors

PM10 EF (lbs/VMT)	
Paved Roads	Paved Roads, Corrected
6.6E-4	6.3E-4

Emission factor for travel on paved roads is estimated using Eq 3 and 3a on worksheet "Fugitive Dust EF".

For calculating EF from paved road, the average weight of all vehicles traveling the road is assumed to be 2.4 tons

### PM2.5 to PM10 Mass Emission Ratio used in Calculation

Fugitive Dust Source	PM2.5/PM10	Reference
Paved road	0.25	EPA. AP-42. Analysis of the Fine Fraction of Particulate Matter in Fugitive Dust, Final
Unpaved road	0.15	EPA. AP-42. Analysis of the Fine Fraction of Particulate Matter in Fugitive Dust, Final

## Fugitive Dust Emission Factors

### Travel on Paved Roads

$$E(\text{lbs/VMT})=(k)(sL)^{.91} (W)^{1.02}$$

Where:	<b>PM10</b>	<u>Unit</u>	<u>Source</u>
k= Particle Size Multiplier:	0.0022	lb/VMT	AP-42 Chapter 13.2.1, Table 13.2.1-1, PM10 emissions
sL= road surface silt loading	0.1	g/m <sup>2</sup>	Caleemod default
W= average weight of the vehicles traveling the road	2.4	tons	Statewide average vehicle weight in CA
PM10 Emission factor	0.00066	lbs/VMT	Public roads

### Correction for Natural Precipitation<sup>5</sup>

$$E(\text{ext})=E[(1-P/4N)]$$

Where:		<u>Unit</u>	<u>Source</u>
Eext = annual or other long-term average emission factor		dimensionless	
P=#days/yr with >=0.01 inch precipitation during	43	days	Western Regional Climate Center <a href="#">SAN DIEGO LINDBERGH FLD, CALIFORNIA</a>
N=# days in averaging period	365	days	
Corrected EF PM10	<b>0.00064</b>	lbs/VMT	Public roads

### Sources

EPA. AP 42, Fifth Edition, Volume I, Chapter 13: Miscellaneous Sources, 13.2.1 Paved Road, Eqn. 1

EPA. AP 42, Fifth Edition, Volume I, Chapter 13: Miscellaneous Sources, 13.2.1 Paved Road, Eqn. 2

**Offroad Equipment Emissions**

**Off-Road Land Equipment Emission**

Phase	Equipment	Modeled Equipment Name	#/day	Hours per day	Engine Tier	Workdays	HP	LD	HP Bin	Emission Factor (grams/hp-hr)									Emission (lbs/day)									Gallons/hp-hr	Diesel (gallons)	CO2 (MT)
										ROG	TOG	CO	NOx	CO2	PM10	PM2.5	SOx	ROG	TOG	CO	NOx	CO2	PM10	PM2.5	SOx					
Landside Demolition	Concrete/Industrial Saws	Concrete/Industrial Saws	1	8	na	80	33	0.73	50	0.3012	0.3644	3.15	2.5742	427.42	0.0621	0.0571	0.0054	0.13	0.1548	1.3384	1.0937	181.6	0.0264	0.0243	0.0023	0.0420	647	7		
Landside Demolition	Rubber Tired Dozers	Rubber Tired Dozers	1	1	na	80	367	0.4	600	0.1727	0.2055	1.3608	1.1545	454.78	0.0578	0.0532	0.0043	0.06	0.0665	0.4404	0.3736	147.19	0.0187	0.0172	0.0014	0.0446	524	5		
Landside Demolition	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	2	6	na	80	84	0.37	100	0.274	0.3261	3.4342	2.322	583.58	0.165	0.1518	0.0055	0.23	0.2681	2.8237	1.9093	479.84	0.1357	0.1248	0.0045	0.0573	1,709	17		
Waterside Demolition	American 5299 Crane (On	Cranes	1	8	Tier 3	50	168	0.29	175	0.2923	0.3478	3.4078	2.6743	653.18	0.1367	0.1258	0.0062	0.25	0.2989	2.9282	2.2979	561.26	0.1175	0.1081	0.0053	0.0641	1,249	13		
Waterside Demolition	Ape 775 HP Vibratory Piledriver HPU	Cranes	1	8	Tier 4	20	775	0.29	9999	0.1163	0.1384	0.9337	2.2518	509.46	0.0468	0.043	0.0048	0.46	0.5487	3.701	8.9261	2019.5	0.1853	0.1705	0.0191	0.0500	1,798	18		
Waterside Demolition	Byron Jackson Jet Pump	Rental Pump	1	8	Tier 4	35	200	0.2	300	0.0408	0.0486	0.3389	0.2017	164.56	0.0084	0.0077	0.0015	0.03	0.0343	0.2391	0.1423	116.09	0.0059	0.0054	0.0011	0.0162	181	2		
Waterside Demolition	American #250 Anchor Winch (on DB Palomar)	Other Material Handling Equ	1	8	Tier 4	55	173	0.4	175	0.2145	0.2553	3.0116	1.6654	519.81	0.0774	0.0712	0.0049	0.26	0.3116	3.6756	2.0326	634.42	0.0945	0.0869	0.006	0.0510	1,553	16		
Waterside Demolition	DB Palomar Skagit 2-Drum Waterfall Spud Winch	Other Material Handling Equ	1	8	Tier 3	55	173	0.4	175	0.2145	0.2553	3.0116	1.6654	519.81	0.0774	0.0712	0.0049	0.26	0.3116	3.6756	2.0326	634.42	0.0945	0.0869	0.006	0.0510	1,553	16		
Waterside Construction	Crane barge	Cranes	1	4	na	360	367	0.29	600	0.1439	0.1713	1.3323	1.1726	528.11	0.0503	0.0463	0.005	0.14	0.1608	1.2504	1.1005	495.66	0.0472	0.0434	0.0047	0.0518	7,943	81		
Waterside Construction	Pump	Rental Pump	1	4	na	360	200	0.2	300	0.0408	0.0486	0.3389	0.2017	164.56	0.0084	0.0077	0.0015	0.01	0.0171	0.1195	0.0712	58.046	0.003	0.0027	0.0005	0.0162	931	9		
Waterside Construction	Vibratory hammer	Cranes	1	4	na	360	630	0.29	750	0.1223	0.1456	1.0475	1.1055	514.51	0.0471	0.0433	0.0049	0.20	0.2346	1.6877	1.781	828.96	0.0758	0.0698	0.0079	0.0505	13,284	135		
Waterside Construction	Impact hammer (only for concrete support piles at	Cranes	1	4	na	360	367	0.29	600	0.1439	0.1713	1.3323	1.1726	528.11	0.0503	0.0463	0.005	0.14	0.1608	1.2504	1.1005	495.66	0.0472	0.0434	0.0047	0.0518	7,943	81		
Waterside Construction	Jetting hose	Bore/Drill Rigs	1	4	na	360	400	0.5	600	0.2079	0.2474	1.3584	1.5292	504.75	0.0686	0.0632	0.0048	0.37	0.4363	2.3959	2.6971	890.22	0.1211	0.1114	0.0084	0.0495	14,266	145		
Waterside Construction		Concrete Pump	1	4	na	360	11	0.74	100	0.2516	0.2994	3.5744	2.3508	622.79	0.1605	0.1477	0.0059	0.02	0.0215	0.2566	0.1687	44.706	0.0115	0.0106	0.0004	0.0611	716	7		

Notes: Emission factors were derived from either OFFROAD Emission Inventory or from CalEEMod default diesel emission factor (sheet OFFROAD EF). Load factors were from CalEEMod default for diesel equipment (Sheet Default HP LF). Horsepower not provided were determined using equipment models used in similar projects, as follows:

**Vibratory Hammer**

Vibratory Hammer APE Model 200	
HP	<b>630</b>

Vibratory Hammer APE model 200-6 uses Caterpillar CAT Engine C18 ACERT Tier III Certified

**Impact Hammer Horsepower Calculation**

Equipment Model	Delmag - D46-32	Delmag D36-32
Max energy per blow (ft-lb)	122435	90720
Blows per min	44	45
Energy (ft-lbs/min)	5387140	4037040
HP	<b>163</b>	122

1 HP = 33,000 ft-lbs/min

Equipment specs from Delmag Diesel Pile Hammers Specs for specified models

Total Energy per Minute=Energy per Blow×Blows per Minute

HP Bin  
0  
25  
50  
75  
100  
175  
300  
600  
750  
9999

## Construction Equipment Details

### Land Demolition

Offroad Equipment Category	Equipment	Modeled Equipment	Fuel	Number Per Day	Hours Per Day Per Equipment	Engine Tier	Workdays	HP	Load factor	Equip Hours
Construction	Concrete/Industrial Saws	Concrete/Industrial Saws	Diesel	1	8	na	80	33	0.73	640
Construction	Rubber Tired Dozers	Rubber Tired Dozers	Diesel	1	1	na	80	367	0.4	80
Construction	Tractors/Loaders/Backhoes	Tractors/Loaders/Backhoes	Diesel	2	6	na	80	84	0.37	480

Equipment number and hours are based on CalEEMod default for demolition project size < 1 acre

Equipment HPs and Load factors are CalEEMod default.

### Waterside Demolition Equipment

Offroad Equipment Category	Equipment Type	Modeled Equipment	Fuel	Quantity	Hours of Use/Day	Engine Tier or Engine Year	Workdays	HP	Load Factor	Equip Hours
Construction	American 5299 Crane (On Flexifloat Spud Barge)	Cranes	Diesel	1	8	Tier 3	50	168	0.29	400
Construction	Ape 775 HP Vibratory Piledriver HPU	Cranes	Diesel	1	8	Tier 4	20	775	0.29	160
Construction	Byron Jackson Jet Pump	Rental Pump	Diesel	1	8	Tier 4	35	200	0.20	280
CHC	Derrick Barge DB Palomar	None								
Construction	American #250 Anchor Winch (on DB Palomar)	Other Material Handling Equipment	Diesel	1	8	Tier 4	55	173	0.40	440
Construction	DB Palomar Skagit 2-Drum Waterfall Spud Winch	Other Material Handling Equipment	Diesel	1	8	Tier 3	55	173	0.40	440
CHC	DB Palomar Main Engine	AE - Barge-Other	Diesel	1	8	Tier 3	55	600		440
CHC	DB Palomar Genset	AE - Barge-Other	Diesel	1	8	Tier 3	55	300		440
CHC	Killeen – Harbor Tug	None	No engine	1	8		2			16
CHC	Killeen Rear Genset - Harbor Tug	ME - Tugboat-Push/Tow	Diesel	1	8	Tier 3	2	803		16
CHC	Killeen Forward Genset - Harbor Tug	ME - Tugboat-Push/Tow	Diesel	1	8	Tier 3	2	803		16
CHC	Survey Boat	ME - Work Boat	Diesel	N/A		Tier 3 - BACT		230		
CHC	Push Boat Jeanie R	ME - Work Boat	Diesel	1	4		40			160
CHC	Push Boat Jeanie R -Main Engine	ME - Work Boat	Diesel	1	4	Tier 4	40	234		160
CHC	Push Boat Jeanie R – Main Engine	ME - Work Boat	Diesel	1	4	Tier 4	40	234		160

Note: Both anchor winches and spud winches are used to lift and position heavy loads, similar to hoisting equipment in material handling, and thus modeled as Other Material Handling Equipment

### Waterside Construction Equipment

Note: Equipment is based on Triton Response 110824.docx and email, need to update based on other similar project

Offroad Equipment Category	Equipment	Modeled Equipment	Fuel	Number of Equipment	Hours per day	Engine Tier	Workdays	HP	Load Factor	Notes	Equip Hours
Construction	Crane barge	Cranes	Diesel	1	4	na	360	367	0.29		1440
Construction	Pump	Rental Pump	Diesel	1	4	na	360	200	0.20		1440
Construction	Vibratory hammer	Cranes	Diesel	1	4	na	360	630	0.29	1	1440
Construction	Impact hammer (only for concrete support piles at Pier 4)	Cranes	Diesel	1	4	na	360	367	0.29	2	1440
Construction	Jetting hose	Bore/Drill Rigs	Diesel	1	4	na	360	400	0.5	3	1440
Construction		Concrete Pump	Diesel	1	4	na	360	11	0.74	4	1440
On-Road	Delivery truck		Diesel	1	8	na	360	na			2880
CHC	Barge	None	No Engine	1	8	na	360	0			2880
CHC	Tug	ME - Tugboat-Push/Tow	Diesel	1	8	na	360	803			2880

#### Notes

Vibratory hammer is modeled as drilling rig. Horsepower is of Vibratory Hammer APE model 200-6 that uses Caterpillar CAT Engine C18 ACERT Tier III Certified, from a similar project (MGBW)

Impact hammer is modeled as cranes because impact hammers often use a crane-like structure for the hammer mechanism

Jet hose/Jet piling/jet grouting piles involves injecting a high-pressure jet of water, air, or grout into the ground to break up and mix the existing soil, forming a cemented column or pile in place. It has drilling, high-pressure jet injection, soil mixing and grouting, and pile formation process. Thus, it is modeled as a drill rig (typically 100-400 HP) and a concrete pump (50-300 HP), assuming grout injection is involved.

**OFFROAD Emission Inventory**

Model Output: OFFROAD2021 (v1.1.0) Emissions Inventory

Region Type: Statewide

Region: California

Calendar Year: 2026

Scenario: All Adopted Rules - Exhaust

Vehicle Classification: OFFROAD2021 Equipment Types

Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Region		Calendar Year	Vehicle Category	Model Year	Horsepower Bin	Fuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd	PM2.5_tpd	SOx_tpd	NH3_tpd	Fuel Consumption	Total_Acivity_hp	Total_Population	Horsepower_Hrs	Emission Factor (g/hp-hr)										Gallons per Horsepower-hr	Offroad Equipment Short Name
																					ROG	TOG	CO	NOx	CO2	PM10	PM2.5	SOx	er-hour			
Statewide Total:	2026	Construction and Mining - Bore/Drill Rigs	Aggregat	100	Diesel	0.00186	0.00225	0.00268	0.02389	0.01889	3.95282	0.00142	0.0013	3.7E-05	0	128448	51747.5	101.015	2272054	0.3282735	0.391	3.482	2.753	576.0726	0.206288	0.189785	0.005457	0.057	Bore/Drill Rigs			
Statewide Total:	2026	Construction and Mining - Bore/Drill Rigs	Aggregat	175	Diesel	0.00998	0.01208	0.01437	0.16396	0.08729	28.0088	0.00408	0.00375	0.00027	0	910152	260001	400.299	1.8E+07	0.2197591	0.262	2.984	1.589	509.731	0.074175	0.068241	0.004829	0.050	Bore/Drill Rigs			
Statewide Total:	2026	Construction and Mining - Bore/Drill Rigs	Aggregat	300	Diesel	0.01204	0.01457	0.01733	0.07716	0.11474	33.363	0.00504	0.00464	0.00032	0	1084137	192576	313.202	2.2E+07	0.2215741	0.264	1.174	1.745	507.5305	0.076714	0.070577	0.004808	0.050	Bore/Drill Rigs			
Statewide Total:	2026	Construction and Mining - Bore/Drill Rigs	Aggregat	50	Diesel	0.00131	0.00158	0.00189	0.01128	0.00924	1.32807	0.00046	0.00043	1.3E-05	0	43155.9	38749.2	82	769535	0.6819579	0.812	4.852	3.977	571.4542	0.199582	0.183616	0.005413	0.056	Bore/Drill Rigs			
Statewide Total:	2026	Construction and Mining - Bore/Drill Rigs	Aggregat	600	Diesel	0.01633	0.01976	0.02352	0.12916	0.14539	47.9896	0.00653	0.006	0.00045	0	1559430	155035	269.112	3.1E+07	0.207863	0.247	1.358	1.529	504.7455	0.068645	0.063154	0.004781	0.050	Bore/Drill Rigs			
Statewide Total:	2026	Construction and Mining - Bore/Drill Rigs	Aggregat	75	Diesel	0.00236	0.00286	0.0034	0.03084	0.02931	5.12917	0.00089	0.00082	4.9E-05	0	166673	92779.9	191.015	2952194	0.3206511	0.382	3.459	3.287	575.2956	0.099987	0.091988	0.00545	0.056	Bore/Drill Rigs			
Statewide Total:	2026	Construction and Mining - Bore/Drill Rigs	Aggregat	750	Diesel	0.00588	0.00712	0.00847	0.03862	0.05267	19.8099	0.00226	0.00208	0.00019	0	643725	39567.7	70.0234	1.3E+07	0.1823054	0.217	0.989	1.349	507.4024	0.057958	0.053322	0.004807	0.050	Bore/Drill Rigs			
Statewide Total:	2026	Construction and Mining - Bore/Drill Rigs	Aggregat	9999	Diesel	0.00192	0.00233	0.00277	0.01236	0.03163	6.56553	0.00069	0.00064	6.2E-05	0	213348	9918.84	17	4229323	0.182304	0.217	0.967	2.476	514.0287	0.054188	0.049853	0.004869	0.050	Bore/Drill Rigs			
Statewide Total:	2026	Construction and Mining - Concrete Pump	Aggregat	100	Diesel	4.5E-05	5.4E-05	6.5E-05	0.00077	0.00051	0.13424	3.5E-05	3.2E-05	1.3E-06	0	4362.3	2148.93	4.00456	71374.4	0.2516186	0.299	3.574	2.351	622.7912	0.160506	0.147666	0.0059	0.061	Concrete Pump			
Statewide Total:	2026	Construction and Mining - Concrete Pump	Aggregat	175	Diesel	0.0006	0.00073	0.00086	0.01299	0.00391	2.14381	0.00014	0.00013	2E-05	0	69663.5	25576.2	32	1380981	0.1738867	0.207	3.115	0.937	514.0287	0.033868	0.031158	0.004869	0.050	Concrete Pump			
Statewide Total:	2026	Construction and Mining - Concrete Pump	Aggregat	300	Diesel	0.00021	0.00026	0.00031	0.00187	0.00078	0.86006	4.7E-05	4.4E-05	8.1E-06	0	27947.8	7434.3	12	554026	0.1546465	0.184	1.119	0.464	514.0287	0.028367	0.026098	0.004869	0.050	Concrete Pump			
Statewide Total:	2026	Construction and Mining - Concrete Pump	Aggregat	50	Diesel	9E-06	1.1E-05	1.3E-05	8.1E-05	7E-05	0.01178	2.2E-06	2E-06	1.1E-07	0	382.948	387.106	1	6828.55	0.5307058	0.632	3.944	3.401	571.4542	0.105796	0.097333	0.005413	0.056	Concrete Pump			
Statewide Total:	2026	Construction and Mining - Concrete Pump	Aggregat	600	Diesel	0.00062	0.00075	0.00089	0.00382	0.00773	2.02661	0.00024	0.00022	1.9E-05	0	65855	9382.51	18	1305483	0.1902552	0.226	0.969	1.961	514.0287	0.059848	0.05506	0.004869	0.050	Concrete Pump			
Statewide Total:	2026	Construction and Mining - Concrete Pump	Aggregat	75	Diesel	7.2E-05	8.8E-05	0.0001	0.00086	0.00083	0.14153	2.6E-05	2.4E-05	1.3E-06	0	4599.03	3454.66	7	82007.7	0.3536442	0.421	3.484	3.333	571.4542	0.104866	0.096477	0.005413	0.056	Concrete Pump			
Statewide Total:	2026	Construction and Mining - Cranes	Aggregat	100	Diesel	0.00086	0.00104	0.00124	0.00987	0.00886	1.93523	0.00062	0.00057	1.8E-05	0	62885.6	29282.4	151.196	72674.2	0.4758928	0.566	4.496	4.038	881.7404	0.28052	0.258079	0.008353	0.087	Cranes			
Statewide Total:	2026	Construction and Mining - Cranes	Aggregat	175	Diesel	0.0055	0.00666	0.00792	0.07763	0.06092	14.8798	0.00311	0.00286	0.00014	0	483523	178938	679.924	7543222	0.2922763	0.348	3.408	2.674	653.1759	0.136685	0.125751	0.006187	0.064	Cranes			
Statewide Total:	2026	Construction and Mining - Cranes	Aggregat	25	Diesel	3.4E-05	4.1E-05	4.9E-05	0.00041	0.00027	0.09825	1.7E-05	1.6E-05	9.3E-07	0	3192.61	328.317	2	2070.86	6.5705901	7.82	65.64	42.64	15709.59	2.707179	2.490604	0.148814	1.542	Cranes			
Statewide Total:	2026	Construction and Mining - Cranes	Aggregat	300	Diesel	0.01283	0.01552	0.01847	0.11385	0.12935	45.4736	0.00632	0.00581	0.00043	0	1477672	389933	1529.2	7.7E+07	0.1903813	0.227	1.396	1.586	557.6822	0.077502	0.071302	0.005283	0.055	Cranes			
Statewide Total:	2026	Construction and Mining - Cranes	Aggregat	50	Diesel	0.00012	0.00015	0.00018	0.00101	0.00081	0.18755	4E-05	3.7E-05	1.8E-06	0	6094.62	5103.87	26.0246	59218	0.8314545	0.989	5.671	4.523	1048.728	0.223917	0.206004	0.009934	0.103	Cranes			
Statewide Total:	2026	Construction and Mining - Cranes	Aggregat	600	Diesel	0.01401	0.01695	0.02018	0.15695	0.13814	62.2142	0.00593	0.00545	0.00059	0	2021660	322222	1222.02	3.9E+07	0.143924	0.171	1.332	1.173	528.1137	0.050319	0.046294	0.005003	0.052	Cranes			
Statewide Total:	2026	Construction and Mining - Cranes	Aggregat	75	Diesel	0.00045	0.00054	0.00064	0.00401	0.00491	0.78845	0.00028	0.00026	7.5E-06	0	25620.8	14101.4	77.0484	250814	0.713729	0.849	5.297	6.48	1040.904	0.375662	0.345609	0.00986	0.102	Cranes			
Statewide Total:	2026	Construction and Mining - Cranes	Aggregat	750	Diesel	0.00189	0.00228	0.00272	0.01956	0.02064	9.6077	0.00088	0.00081	9.1E-05	0	312204	33200.2	141.044	6183186	0.1223435	0.146	1.047	1.105	514.5125	0.047061	0.043296	0.004874	0.050	Cranes			
Statewide Total:	2026	Construction and Mining - Cranes	Aggregat	9999	Diesel	0.00061	0.00074	0.00088	0.00593	0.01431	3.23779	0.0003	0.00027	3.1E-05	0	105212	8015.71	33.0197	2104383	0.116317	0.138	0.934	2.252	509.4624	0.046755	0.043014	0.004874	0.050	Cranes			
Statewide Total:	2026	Construction and Mining - Misc - Concrete/Industrial Saws	Aggregat	50	Diesel	0.00076	0.00091	0.0011	0.00951	0.00777	1.29003	0.00019	0.00017	1.6E-05	1E-05	41960.4	30284.1	51.74	999374	0.3011772	0.364	3.15	2.574	427.4246	0.062114	0.057145	0.00542	0.042	Concrete/Industrial Saws			
Statewide Total:	2026	Construction and Mining - Rubber Tired Dozers	Aggregat	100	Diesel	0.00072	0.00087	0.00104	0.00833	0.00683	1.42649	0.00056	0.00052	1.4E-05	0	46354.1	22168.1	50.0356	768619	0.3751214	0.446	3.588	2.942	614.5355	0.241955	0.222598	0.005821	0.060	Rubber Tired Dozers			
Statewide Total:	2026	Construction and Mining - Rubber Tired Dozers	Aggregat	175	Diesel	0.00183	0.00221	0.00264	0.02597	0.01772	4.32876	0.00086	0.00079	4.1E-05	0	140664	48590	83.037	2773570	0.2644031	0.315	3.1	2.116	516.7882	0.102607	0.094398	0.004895	0.051	Rubber Tired Dozers			
Statewide Total:	2026	Construction and Mining - Rubber Tired Dozers	Aggregat	300	Diesel	0.00181	0.00219	0.0026	0.01367	0.01367	5.37487	0.00072	0.00067	5.1E-05	0	174657	38213.7	67.0561	3480044	0.2080399	0.248	1.301	1.3	511.4133	0.068885	0.063374	0.004845	0.050	Rubber Tired Dozers			
Statewide Total:	2026	Construction and Mining - Rubber Tired Dozers	Aggregat	50	Diesel	0.00014	0.00017	0.0002	0.00184	0.00122	0.39745	4.1E-05	3.7E-05	3.8E-06	0	12915.2	6928.05	18.0687	107774	0.5133032	0.611	5.648	3.741	1221.119	0.125111	0.115102	0.011567	0.120	Rubber Tired Dozers			
Statewide Total:	2026	Construction and Mining - Rubber Tired Dozers	Aggregat	600	Diesel	0.00891	0.01078	0.01283	0.08496	0.07208	28.3921	0.00361	0.00332	0.00027	0	922607	132585	244.926	2.1E+07	0.1727045	0.206	1.361	1.155	454.7831	0.057778	0.053156	0.004308	0.045	Rubber Tired Dozers			
Statewide Total:	2026	Construction and Mining - Rubber Tired Dozers	Aggregat	75	Diesel	0.00035	0.00043	0.00051	0.00398	0.00432	0.7287	0.00017	0.00016	6.9E-06	0	23679.4	13963.1	30.0514	345173	0.4108554	0.489	3.821	4.141	699.041	0.163551	0.150467	0.006622	0.069	Rubber Tired Dozers			
Statewide Total:	2026	Construction and Mining - Rubber Tired Dozers	Aggregat	750	Diesel	0.00021	0.00025	0.0003	0.0018	0.00134	0.85309	6.9E-05	6.3E-05	8.1E-06	0	27721.3	2570.04	5.0127	686933	0.1198826	0.143	0.865	0.647	411.2144	0.033198	0.030543	0.003895	0.040	Rubber Tired Dozers			
Statewide Total:	2026	Construction and Mining - Rubber Tired Dozers	Aggregat	9999	Diesel	0.00059	0.00072	0.00085	0.00485	0.01251	2.39746	0.00031	0.00029	2.3E-05	0	77905.9	2953.5	5	1544336	0.1537619	0.183	1.04	2.682	514.0287	0.066841	0.061494						

### Emission Factors based on VMT, Trip, and Idle/Diurnal

Vehicle Category	Fuel	VMT-based (g/mile)											Trip-based (g/trip)											Idle/diurnal-based (g/vehicle/day)												
		ROG	NOx	PM10	PM2.5	SOx	CO	CO2	CH4	N2O	ROG	NOx	PM10	PM2.5	SOx	CO	CO2	CH4	N2O	ROG	NOx	PM10	PM2.5	SOx	C	CO2	CH4	N2O								
HHDT	Diesel	0.02	1.82	0.03	0.03	0.11	0.036	0.01	0.07	1578	0	0.25	0	2.94	0	0	0	0	0	0	0	0	0	0	0	5.46	64.5	0.03	0.03	0	0	0.12	0	###	0.25	1.95
LDA	Gasoline	0.01	0.03	0	0	0.02	0.005	0	0.67	285	0	0	0	0.23	0	0	0	0	0	2.76	66.66	0.06	0.03	1.38	0	0	0	0	0	0	0	0	0	0	0	
LDA	Diesel	0.03	0.15	0.01	0.01	0.02	0.005	0	0.52	250	0	0.04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
LDA	Electricity	0	0	0	0	0.01	0.004	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
LDA	Plug-in Hybrid	0	0	0	0	0.01	0.003	0	0.23	143	0	0	0	0.11	0	0	0	0	0	1.27	62.84	0.04	0.02	0.45	0	0	0	0	0	0	0	0	0	0	0	
LDT1	Gasoline	0.04	0.14	0	0	0.02	0.005	0	1.55	349	0.01	0.01	0	0.4	0	0	0	0	0	5.32	85.89	0.11	0.04	3.15	0	0	0	0	0	0	0	0	0	0	0	
LDT1	Diesel	0.34	1.52	0.28	0.27	0.02	0.006	0	1.89	449	0.02	0.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
LDT1	Electricity	0	0	0	0	0.01	0.004	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
LDT1	Plug-in Hybrid	0	0	0	0	0.01	0.003	0	0.21	129	0	0	0	0.11	0	0	0	0	0	1.27	66.44	0.04	0.02	0.28	0	0	0	0	0	0	0	0	0	0	0	0
LDT2	Gasoline	0.01	0.06	0	0	0.02	0.005	0	0.8	352	0	0.01	0	0.3	0	0	0	0	0	3.2	83.22	0.07	0.04	1.43	0	0	0	0	0	0	0	0	0	0	0	
LDT2	Diesel	0.03	0.05	0.01	0	0.02	0.005	0	0.26	326	0	0.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
LDT2	Electricity	0	0	0	0	0.01	0.004	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
LDT2	Plug-in Hybrid	0	0	0	0	0.01	0.003	0	0.22	135	0	0	0	0.11	0	0	0	0	0	1.27	72.55	0.04	0.02	0.31	0	0	0	0	0	0	0	0	0	0	0	0
Worker Fleet	EMFAC default	0.18	0.81	0.14	0.14	0.02	0.005	0	1.31	384	0.01	0.06	0	0.33	0	0	0	0	0	4.15	80.42	0.09	0.04	2.27	0	0	0	0	0	0	0	0	0	0	0	

Notes:

Assume Worker Fleet = 25/50/25 percent mix of light duty autos, light duty truck class 1, and light duty truck class 2

#### EMFAC Emission Types Used to Estimate Onroad Emission Rates

Pollutant	VMT-based	Trip-based (g/trip)	Idle/Diurnal-based
TOG, ROG	RUNEX	STREX, HOTSOAK, RUNLOSS	IDLEX, DIURN
Gases	RUNEX	STREX	IDLEX
PM - Exhaust	RUNEX	STREX	IDLEX
PM - Dust	PMTW, PMBW		

Acronyms:

RUNEX	Running exhaust	g/mile
PMBW	PM brake wear	g/mile
PMTW	PM tire wear	g/mile
STREX	Start exhaust	g/trip
HOTSOAK	Hot Soak evaporative	g/trip
RUNLOSS	Running Loss evaporative	g/trip
IDLEX	Idle exhaust	g/vehicle/day
DIURN	Diurnal Loss evaporative	g/vehicle/day

**Mobile Trip Exhaust Emissions**

Phase	Vehicle	Modeled Vehicle Type	One-way Trips per day per vehicle	Total Work Days	Number of Vehicles	Total Trucks	Total One-way Trips	One-way Trip Length (mi)	Total VMT	Fuel	Emission (lbs/day)											Emission (MT)		Gallons		
											ROG	NOx	PM10E	PM2.5E	PM10D	PM2.5D	SOx	CO	CO2	CH4	N2O	CO2e	Diesel	Gasoline		
Landside Demolition	Haul Truck	HHDT	2	80	1	39	78	20	1,560	Diesel	0.013	0.227	0.001	0.001	0.005	0.002	0.001	0.003	95.127	0.001	0.015	3.6	258		Landside Demolition	
Waterside Demolition Part 1	Haul Truck	HHDT	2	80	1	50	100	20	2,000	Diesel	0.013	0.251	0.002	0.002	0.006	0.002	0.001	0.004	114.255	0.001	0.018	4.3	330		Waterside Demolition	
Waterside Construction Part 1	Delivery Truck	HHDT	2	80	1	29	58	20	1,160	Diesel	0.013	0.205	0.001	0.001	0.004	0.001	0.001	0.002	77.738	0.001	0.012	3.0	192		Waterside Construction	
Waterside Demolition Part 2	Haul Truck	HHDT	2	40	1	14	28	20	560	Diesel	0.013	0.203	0.001	0.001	0.004	0.001	0.001	0.002	75.999	0.001	0.012	1.4	93		Waterside Demolition	
Waterside Demolition Part 3	Haul Truck	HHDT	2	40	1	16	32	20	640	Diesel	0.013	0.212	0.001	0.001	0.004	0.001	0.001	0.003	82.955	0.001	0.013	1.6	106		Waterside Demolition	
Waterside Construction Part 2	Delivery Truck	HHDT	2	280	1	124	248	20	4,960	Diesel	0.013	0.219	0.001	0.001	0.004	0.001	0.001	0.003	88.917	0.001	0.014	11.8	820		Waterside Construction	
Entire Construction	Commute - workers	Worker Fleet	3	600	16	-	28,800	11.8	339,840	Gasoline	0.309	1.048	0.179	0.171	0.022	0.007	0.005	2.075	487.404	0.021	0.076	139.0	13,556	split evenly		

Notes: Truck trips are from sheet "Truck Trips"

trips per worker per day 3

Trip lengths used CalEEMod default values for San Diego County

11.8 miles/trip for residential home-work trips

20 miles/trip for hauling trip length . Applied to delivery trucks as well.

Particulate Matter Dust emission from vehicle break wear and tire wear only.

GWP used for quantifying CO2e, source: IPCC Fifth Assessment Report (Avg)

CO2	1
CH4	25
N2O	298

The calculation is based on the following emission rates:

**On-Road Emission Rates**

Fleet Type	Fuel Type	VMT-Based Emission Rate (g/mi)											Trip-Based Emission Rate (g/trip)											Idle/Diurnal-Based Emission Rate (g/vehicle/day)												
		ROG	NOx	PM10_Ex	PM2.5_Ex	PM10_D	PM2.5_D	SOx	CO	CO2	CH4	N2O	ROG	NOx	PM10_Ex	PM2.5_Ex	PM10_D	PM2.5_D	SOx	CO	CO2	CH4	N2O	ROG	NOx	PM10_Ex	PM2.5_Ex	PM10_D	PM2.5_D	SOx	CO	CO2	CH4	N2O		
HHDT	Diesel	1.6E-2	1.8E+0	2.7E-2	2.6E-2	1.1E-1	3.6E-2	1.5E-2	7.3E-2	1.6E+3	7.3E-4	2.5E-1	0.0E+0	2.9E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	5.5E+0	6.4E+1	3.3E-2	3.1E-2	0.0E+0	0.0E+0	1.2E-1	0.0E+0	#####	2.5E-1	#####
Worker Fleet	EMFAC default mix	1.8E-1	8.1E-1	1.4E-1	1.4E-1	1.7E-2	5.2E-3	3.7E-3	1.3E+0	3.8E+2	9.2E-3	5.8E-2	0.0E+0	3.3E-1	2.5E-3	2.3E-3	0.0E+0	0.0E+0	8.0E-4	4.1E+0	8.0E+1	8.8E-2	3.6E-2	2.3E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	3.6E-3	#####	0.0E+0	#####

Note:

Emission type -specific emission rates are calculated using EMFAC 2021 (sheet EMFAC EF).

	gallons/mi		kWh/mi
	Diesel	Gasoline	Electricity
HHDT	0.165224		
LDA	0.024634	0.03396521	386
LDT1	0.04418	0.04177287	386
LDT2	0.032109	0.04204771	386
Worker Fleet	0.03988967		

Use CalEEMod default for worker fleet composition, and default EMFAC fleet composition.

Fleet	EMFAC vehicle population			EMFAC default mix			Fleet Composition
	Diesel	Gasoline	Electricity	Diesel	Gasoline	Electricity	
LDA	4,624	1,154,345	79,089	0.004	0.93	0.06	25%
LDT1	47	120,690	362	0.0004	1.00	0.00	50%
LDT2	2,137	558,134	4,915	0.004	0.99	0.01	25%

Based on EMFAC default data, >90% vehicles use gasoline across LDA, LDT1, and LDT2. Thus, all worker vehicles are assumed t

## Construction Phases and Truck Trips

### Construction Phase and Truck Trips Compiled

Phase #	Construction Phase	Duration	Workdays	Phase Start	Phase End	# of Trucks	On-way Truck Trips	Description of Activities
1	Landside Demolition	4 months	80	4/1/2026	7/22/2026	39	78	Demolish Building E and the hazardous materials storage shed
2	Waterside Demolition Part 1	4 months	80	8/1/2026	11/21/2026	50	100	Demolition of Piers 5, 7, and 8.
3	Waterside Construction Part 1	4 months	80	12/1/2026	3/23/2027	29	58	Construction of Pier 5
4	Waterside Demolition Part 2	2 months	40	4/1/2027	5/27/2027	14	28	Demolition of Pier 6.
5	Waterside Demolition Part 3	16 months	40	6/1/2027	7/27/2027	16	32	Demolition of Pier 4.
6	Waterside Construction Part 2		280	7/28/2027	8/23/2028	124	248	Construction of Piers 4, 6, 7, and 8, and wave attenuator

Notes: Total Workdays 600 days Construction activity 7a - 7p M-F  
Waterside Demolition 160 days  
Waterside Construction 360 days

Construction phase and schedule is based on Table 2-8 PD. The original provided schedule has water demolition and construction lumped as one phase. For analysis purpose, they are separated into phase 5 and 6. Phase 5 (Demolition of Pier 4) is assumed to take 40 days, the same duration for Pier 6 demolition. Haul truck and delivery truck trips are estimated in the following tables. During Landside Demo (Phase 1), there would be two weekly haul trips (loads, so 4 trips)

### Landside Demolition Haul Truck Estimation

Structures	Structure Size to be Demolished (sf)	Volume of Demolition Debris (cy)	# of Trucks
Building E	20,170	498	36
Hazardous Materials Storage Shed	200	5	1
Hazardous Materials Storage Shed	-	25	2
<b>Total</b>	<b>20,370</b>	<b>528</b>	<b>39</b>

25 cy of soil associated with the demo of the storage shed

Assume 14 cy per truck load  
Demolition data Provided, PD Table 2-1

**Waterside Demolition Haul Truck Estimation**

Phase	Volume of Material Imported	Volume of Material Exported	Unit	Total Trucks During this Phase*	
Waterside Demolition		Wood (will be recycled)	200 Tons	15	
Waterside Demolition		Concrete	900 Tons	45	
Waterside Demolition		Steel	250 Tons	20	
<b>Total</b>				<b>80</b>	

Source: Port of San Diego - Driscoll's Wharf Equipment - 11-20-2024.pdf

\*Debris will be removed from the Driscoll site via barge, transported to R. E. Staite's Waterfront facility at 2145 East Belt Street for off loading / processing and trucking to permitted disposal sites. The boat

**Water Construction Delivery Trucks Estimation**

Pier	Area (sqft) of Pier to be removed	Demo Proportion	# Demolition Trucks Allocated	Proposed Pier Coverage (sqft)	Construction Proportion	# Construction Delivery Trucks Allocated
4	3,553	0.20	16	3,717	0.11	17
5	4,510	0.25	20	6,603	0.19	29
6	3,149	0.17	14	3,281	0.10	15
7	3,934	0.22	17	6,158	0.18	27
8	2,890	0.16	13	6,028	0.18	27
Main Walk				8,541	0.25	38
Total	18,036	1	80	34,328	1	153

Note:

sqft per Truck 225

Demo pier SQFT are provided (PD Table 2-2 and 2-3)

Construction pier SQFT are provided (PD Table 2-4 and Table 2-5)

Truck trips are allocated using estimated Pier SQFT

Total # of truck trips during construction is estimated assuming the delivery trucks having similar load capacity as haul trucks.

Small number discrepancy due to rounding error

### EMFAC 2021 (On-Road) Emission Rates Output

Region Type: Sub-Area

Region: San Diego (SD)

Calendar Year: 2026

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Units: miles/day for CVMT and EVMT, trips/day for Trips, kWh/day for Energy Consumption, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	Energy Consumption	SOx _TO TEX	NH3_ RUNE X	Fuel		
														Consumption	Gallon s per mile	KWh per mile
San Diego (SD)	2026	HHDT	Aggregate	Aggregate	Gasoline	5.9232158	471.7979	471.8	0	118.5	0	0	2E-05	0.121	0.257	0
San Diego (SD)	2026	HHDT	Aggregate	Aggregate	Diesel	15402.403	1900421	2E+06	0	2E+05	0	0	0.451	314	0.165	0
San Diego (SD)	2026	HHDT	Aggregate	Aggregate	Electricity	177.65522	20129.29	0	20129.3	2366	37104.199	0	0	0	0	1843
San Diego (SD)	2026	LDA	Aggregate	Aggregate	Gasoline	1154344.5	46405189	5E+07	0	5E+06	0	0.1	1.872	1576	0.034	0
San Diego (SD)	2026	LDA	Aggregate	Aggregate	Diesel	4624.0904	137704.5	1E+05	0	19454	0	0	5E-04	3.392	0.025	0
San Diego (SD)	2026	LDA	Aggregate	Aggregate	Electricity	79088.749	3959769	0	3959769	4E+05	1528797.6	0	0	0	0	386.1
San Diego (SD)	2026	LDA	Aggregate	Aggregate	Plug-in H	37511.098	1771766	8E+05	934044	2E+05	282109.06	0	0.037	30.54	0.036	302
San Diego (SD)	2026	LDT1	Aggregate	Aggregate	Gasoline	120689.67	4165596	4E+06	0	5E+05	0	0	0.169	174	0.042	0
San Diego (SD)	2026	LDT1	Aggregate	Aggregate	Diesel	47.210227	661.8267	661.8	0	130.1	0	0	2E-06	0.029	0.044	0
San Diego (SD)	2026	LDT1	Aggregate	Aggregate	Electricity	362.24285	17688.21	0	17688.2	1769	6829.1089	0	0	0	0	386.1
San Diego (SD)	2026	LDT1	Aggregate	Aggregate	Plug-in H	253.16162	13025.07	5545	7479.76	1047	2259.1102	0	3E-04	0.203	0.037	302
San Diego (SD)	2026	LDT2	Aggregate	Aggregate	Gasoline	558133.64	22684895	2E+07	0	3E+06	0	0.1	0.932	953.8	0.042	0
San Diego (SD)	2026	LDT2	Aggregate	Aggregate	Diesel	2137.242	89302.38	89302	0	10104	0	0	3E-04	2.867	0.032	0
San Diego (SD)	2026	LDT2	Aggregate	Aggregate	Electricity	4914.9869	184923.9	0	184924	24925	71395.894	0	0	0	0	386.1
San Diego (SD)	2026	LDT2	Aggregate	Aggregate	Plug-in H	5389.5737	264862	1E+05	146795	22286	44336.484	0	0.005	4.334	0.037	302
San Diego (SD)	2026	MHDT	Aggregate	Aggregate	Gasoline	3363.9172	196488.8	2E+05	0	67305	0	0	0.01	40.47	0.206	0
San Diego (SD)	2026	MHDT	Aggregate	Aggregate	Diesel	18054.212	755338.8	8E+05	0	2E+05	0	0	0.176	88.44	0.117	0
San Diego (SD)	2026	MHDT	Aggregate	Aggregate	Electricity	297.61914	16818.97	0	16819	3837	18557.364	0	0	0	0	1103

**Commercial Harbor Craft Emissions**

Construction Phase	Equipment Type	Modeled Equipment	Fuel	Quantity	Hours of Use/Day	Workdays	HP	Equipment Total Hours	lbs/day (or gallons)												
									VOC	NOX	CO	PM10	PM2.5	SO2	CO2	Fuel	CH4	N2O	MTCO2e/total		
Waterside Demolition	Derrick Barge DB Palomar	None	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waterside Demolition	DB Palomar Main Engine	AE - Barge-Other	Diesel	1	8	55	600	440	0.33972	6.25285	1.81706	0.17107	0.16354	0	974.92756	2502	0.64387	0.01704943	24.72368585		
Waterside Demolition	DB Palomar Genset	AE - Barge-Other	Diesel	1	8	55	300	440	0.18716	3.87068	0.99456	0.07687	0.07349	0	629.570037	1615.69	0.41578	0.01100985	15.96558808		
Waterside Demolition	Killeen – Harbor Tug	None	No engine	1	8	2	0	16	0	0	0	0	0	0	0	0	0	0	0	0	
Waterside Demolition	Killeen Rear Genset - Harbor Tug	ME - Tugboat-Push/Tow	Diesel	1	8	2	803	16	1.04963	16.7337	6.11391	0.3737	0.35726	0	3827.30543	349.299	2.47195	0.06545658	3.528140126		
Waterside Demolition	Killeen Forward Genset - Harbor Tug	ME - Tugboat-Push/Tow	Diesel	1	8	2	803	16	1.04963	16.7337	6.11391	0.3737	0.35726	0	3827.30543	349.299	2.47195	0.06545658	3.528140126		
Waterside Demolition	Survey Boat	ME - Work Boat	Diesel	N/A	0	0	230		0	0	0	0	0	0	0	0	0	0	0	0	
Waterside Demolition	Push Boat Jeanie R	ME - Work Boat	Diesel	1	4	40	0	160	0	0	0	0	0	0	0	0	0	0	0	0	
Waterside Demolition	Push Boat Jeanie R -Main Engine	ME - Work Boat	Diesel	1	4	40	234	160	0.33276	3.9375	0.89727	0.08675	0.08294	0	331.82112	629.818	0.22286	0.0059012	6.121554761		
Waterside Demolition	Push Boat Jeanie R – Main Engine	ME - Work Boat	Diesel	1	4	40	234	160	0.33276	3.9375	0.89727	0.08675	0.08294	0	331.82112	629.818	0.22286	0.0059012	6.121554761		
Waterside Construction	Barge	None	No Engine	1	8	360	0	2880	0	0	0	0	0	0	0	0	0	0	0	0	
Waterside Construction	Tug	ME - Tugboat-Push/Tow	Diesel	1	8	360	803	2880	1.04963	16.7337	6.11391	0.3737	0.35726	0	3827.30543	62873.9	2.47195	0.06545658	635.0652226		

**Summary by Phase**

Phase	lbs/day (or gallons/day)										MT CO2e per day	MT CO2e total
	VOC	NOX	CO	PM10	PM2.5	SO2	CO2	Diesel	CH4	N2O		
Waterside Demolition	3.29	51.47	16.83	1.17	1.12	0.00	9,923	6,076	6.45	0.17	5	59.99
Waterside Construction	1.05	16.73	6.11	0.37	0.36	0.00	3,827	62,874	2.47	0.07	2	635.07

**CHC Emission Rate Calculation**

**1. CARB OFFROAD OUTPUT**

Model Output: OFFROAD2021 (v1.1.0.) Emissions Inventory

Region Type: Statewide

Region: California

Calendar Year: 2026

Scenario: All Adopted Rules - Exhaust

Vehicle Classification: Off-Road Web Query Equipment Types

Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Region	Calendar Year	Vehicle Category	Model Year	Horsepower	Fuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd	PM2.5_tpd	SOx_tpd	NH3_tpd	Fuel Consum	Total_Ac tivity_hp	Total_Popula r_Hours_h	Horsepower
Statewide	2026	Commercial Harbor Craft - AE - Barge-Other	Aggregate	100	Diesel	4E-05	5E-05	6E-05	0.0002	0.001	0.1528	2E-05	2E-05	0	0	5203.06	3268.54	16.4	92018.49
Statewide	2026	Commercial Harbor Craft - AE - Barge-Other	Aggregate	175	Diesel	0.0002	0.0003	0.0004	0.0017	0.0058	0.9748	0.0001	0.0001	0	0	33203.7	13234.7	51.2	600698.84
Statewide	2026	Commercial Harbor Craft - AE - Barge-Other	Aggregate	300	Diesel	0.0007	0.0008	0.0009	0.0042	0.0163	2.6553	0.0003	0.0003	0	0	90444.5	24630.7	56.6	1668936.6
Statewide	2026	Commercial Harbor Craft - AE - Barge-Other	Aggregate	50	Diesel	2E-05	2E-05	3E-05	0.0001	0.0004	0.0576	1E-05	1E-05	0	0	1960.38	2951.54	10.8	30595.452
Statewide	2026	Commercial Harbor Craft - AE - Barge-Other	Aggregate	600	Diesel	0.0007	0.0009	0.0011	0.0047	0.0163	2.5347	0.0004	0.0004	0	0	86339.2	15183.6	23.8	1591326.9
Statewide	2026	Commercial Harbor Craft - AE - Barge-Other	Aggregate	75	Diesel	2E-05	3E-05	3E-05	0.0001	0.0005	0.0811	1E-05	1E-05	0	0	2762.08	2438.86	4.4	48672.893
Statewide	2026	Commercial Harbor Craft - AE - Barge-Other	Aggregate	9999	Diesel	0.0004	0.0005	0.0005	0.0016	0.0072	1.0444	1E-04	9E-05	0	0	35576.4	2615.09	6.6	681083.48
Statewide	2026	Commercial Harbor Craft - AE - Tugboat-Push/Tow	Aggregate	100	Diesel	0.0024	0.0029	0.0035	0.008	0.0442	3.6797	0.001	0.001	0	0	122188	64424.7	42	2160897.3
Statewide	2026	Commercial Harbor Craft - AE - Tugboat-Push/Tow	Aggregate	175	Diesel	0.004	0.0048	0.0057	0.0155	0.0778	7.4935	0.0012	0.0012	0	0	248438	96313.3	72.17	4393900.8
Statewide	2026	Commercial Harbor Craft - AE - Tugboat-Push/Tow	Aggregate	300	Diesel	0.0012	0.0014	0.0017	0.0046	0.0232	2.1678	0.0006	0.0005	0	0	72656.1	17666.4	13.71	1341126.4
Statewide	2026	Commercial Harbor Craft - AE - Tugboat-Push/Tow	Aggregate	50	Diesel	0.0012	0.0015	0.0017	0.0041	0.0184	1.6031	0.0006	0.0006	0	0	53311	56829.4	42.46	831819.38
Statewide	2026	Commercial Harbor Craft - AE - Tugboat-Push/Tow	Aggregate	600	Diesel	2E-05	3E-05	3E-05	9E-05	0.0005	0.0436	2E-05	2E-05	0	0	1486.78	235.469	1.542	27443.885
Statewide	2026	Commercial Harbor Craft - AE - Tugboat-Push/Tow	Aggregate	75	Diesel	0.0011	0.0014	0.0017	0.0038	0.0209	1.7393	0.0005	0.0004	0	0	57682.6	45674.4	32.75	1020120.3
Statewide	2026	Commercial Harbor Craft - AE - Work Boat	Aggregate	100	Diesel	0.0005	0.0006	0.0007	0.0017	0.0063	0.5687	0.0003	0.0003	0	0	19700.8	11649.2	16.27	338606.3
Statewide	2026	Commercial Harbor Craft - AE - Work Boat	Aggregate	175	Diesel	0.0011	0.0013	0.0015	0.0055	0.0178	1.8903	0.0005	0.0005	0	0	65478	25446.2	35.54	1172522.7
Statewide	2026	Commercial Harbor Craft - AE - Work Boat	Aggregate	300	Diesel	0.0031	0.0037	0.0045	0.0153	0.0476	4.8721	0.0015	0.0014	0	0	168767	43066.1	60.16	3111928
Statewide	2026	Commercial Harbor Craft - AE - Work Boat	Aggregate	50	Diesel	0.0005	0.0006	0.0007	0.0022	0.0063	0.6374	0.0003	0.0003	0	0	22078.2	32897.4	45.95	348043.43
Statewide	2026	Commercial Harbor Craft - AE - Work Boat	Aggregate	600	Diesel	0.0031	0.0038	0.0045	0.0138	0.0423	4.1269	0.0014	0.0013	0	0	142955	22387.8	31.27	2636570
Statewide	2026	Commercial Harbor Craft - AE - Work Boat	Aggregate	75	Diesel	0.0007	0.0008	0.001	0.0024	0.0073	0.6691	0.0003	0.0003	0	0	23176.5	21720.6	30.34	405999.96
Statewide	2026	Commercial Harbor Craft - AE - Work Boat	Aggregate	9999	Diesel	0.0018	0.0022	0.0026	0.0063	0.0162	2.6015	0.0007	0.0006	0	0	90103.2	4344.11	6.068	1754637.6
Statewide	2026	Commercial Harbor Craft - ME - Tugboat-Push/Tow	Aggregate	100	Diesel	1E-05	2E-05	2E-05	5E-05	0.0003	0.0241	1E-05	1E-05	0	0	819.126	471.447	3.083	14486.611
Statewide	2026	Commercial Harbor Craft - ME - Tugboat-Push/Tow	Aggregate	175	Diesel	0.0001	0.0001	0.0002	0.0003	0.0027	0.235	6E-05	5E-05	0	0	8002.53	2793.62	9.708	141534.88
Statewide	2026	Commercial Harbor Craft - ME - Tugboat-Push/Tow	Aggregate	300	Diesel	0.0021	0.0026	0.0031	0.0056	0.0448	3.6526	0.0009	0.0008	0	0	123496	28023	32.21	2279550.8
Statewide	2026	Commercial Harbor Craft - ME - Tugboat-Push/Tow	Aggregate	50	Diesel	5E-06	5E-06	7E-06	2E-05	6E-05	0.0055	9E-07	9E-07	0	0	181.66	235.723	1.542	2834.337
Statewide	2026	Commercial Harbor Craft - ME - Tugboat-Push/Tow	Aggregate	600	Diesel	0.0177	0.0214	0.0255	0.0431	0.342	26.022	0.0042	0.004	0	0	866112	111296	90.92	15987152
Statewide	2026	Commercial Harbor Craft - ME - Tugboat-Push/Tow	Aggregate	9999	Diesel	0.017	0.0205	0.0245	0.1197	0.3276	74.925	0.0073	0.007	0	0	2495889	114327	96.21	49094459
Statewide	2026	Commercial Harbor Craft - ME - Work Boat	Aggregate	175	Diesel	0.0025	0.0031	0.0036	0.0086	0.0407	3.4283	0.0008	0.0008	0	0	118756	48108.9	75.29	2129624.2
Statewide	2026	Commercial Harbor Craft - ME - Work Boat	Aggregate	300	Diesel	0.0086	0.0104	0.0124	0.028	0.123	10.368	0.0027	0.0026	0	0	359140	91236.5	142.8	6625171.8
Statewide	2026	Commercial Harbor Craft - ME - Work Boat	Aggregate	50	Diesel	4E-05	5E-05	6E-05	0.0002	0.0006	0.058	3E-05	2E-05	0	0	2008.29	1960.34	3.068	31334.15
Statewide	2026	Commercial Harbor Craft - ME - Work Boat	Aggregate	600	Diesel	0.0329	0.0398	0.0474	0.1101	0.5581	47.15	0.0108	0.0103	0	0	1633271	229087	352.4	30124952
Statewide	2026	Commercial Harbor Craft - ME - Work Boat	Aggregate	75	Diesel	0.0001	0.0001	0.0002	0.0004	0.0015	0.1363	7E-05	6E-05	0	0	4721.86	3920.69	6.136	80293.762
Statewide	2026	Commercial Harbor Craft - ME - Work Boat	Aggregate	9999	Diesel	0.0243	0.0294	0.035	0.1047	0.3134	40.393	0.0093	0.0088	0	0	1399216	57997.5	78.5	27019376

CHC Emission Rate Calculation

2. CALCULATION OF HOURLY EMISSIONS BY TYPE BY BIN

equation:  
daily tons x 365 x 2000

equation:  
annual lbs / annual hours

ROG = VOC  
PM10e = DPM

CHC short name	lbs per year								Hours	lbs of pollutant (or gallons of fuel) per hour								Row (QA)
	VOC	NOX	CO	PM10	PM2.5	SO2	CO2	Fuel (gpy)		VOC	NOX	CO	PM10	PM2.5	SO2	CO2	Fuel	
AE - Barge-Other	36	732	164	17	16	0	111,508	5,203	3269	0.01	0.2	0.1	0.005	0.0	0.0	34.1	1.6	1
AE - Barge-Other	216	4,206	1,212	106	101	0	711,598	33,204	13235	0.02	0.3	0.1	0.008	0.0	0.0	53.8	2.5	2
AE - Barge-Other	576	11,917	3,062	237	226	0	1,938,341	90,444	24631	0.02	0.5	0.1	0.010	0.0	0.0	78.7	3.7	3
AE - Barge-Other	16	277	74	9	8	0	42,013	1,960	2952	0.01	0.1	0.0	0.003	0.0	0.0	14.2	0.7	4
AE - Barge-Other	645	11,868	3,449	325	310	0	1,850,360	86,339	15184	0.04	0.8	0.2	0.021	0.0	0.0	121.9	5.7	5
AE - Barge-Other	20	397	88	10	9	0	59,195	2,762	2439	0.01	0.16	0.04	0.004	0.00	0.00	24.27	1.13	6
AE - Barge-Other	331	5,264	1,175	71	68	0	762,448	35,576	2615	0.13	2.01	0.45	0.027	0.03	0.00	291.56	13.60	7
AE - Tugboat-Push/Tow	2,146	32,254	5,811	745	712	0	2,686,153	122,188	64425	0.03	0.50	0.09	0.012	0.01	0.00	41.69	1.90	8
AE - Tugboat-Push/Tow	3,504	56,772	11,306	908	868	0	5,470,220	248,438	96313	0.04	0.59	0.12	0.009	0.01	0.00	56.80	2.58	9
AE - Tugboat-Push/Tow	1,028	16,961	3,368	418	399	0	1,582,497	72,656	17666	0.06	0.96	0.19	0.024	0.02	0.00	89.58	4.11	10
AE - Tugboat-Push/Tow	1,065	13,466	3,016	420	402	0	1,170,252	53,311	56829	0.02	0.24	0.05	0.007	0.01	0.00	20.59	0.94	11
AE - Tugboat-Push/Tow	19	329	65	12	11	0	31,864	1,487	235	0.08	1.40	0.28	0.050	0.05	0.00	135.32	6.31	12
AE - Tugboat-Push/Tow	1,015	15,244	2,747	334	320	0	1,269,701	57,683	45674	0.02	0.33	0.06	0.007	0.01	0.00	27.80	1.26	13
AE - Work Boat	409	4,570	1,233	192	184	0	415,176	19,701	11649	0.04	0.39	0.11	0.017	0.02	0.00	35.64	1.69	14
AE - Work Boat	944	12,970	3,982	382	365	0	1,379,890	65,478	25446	0.04	0.51	0.16	0.015	0.01	0.00	54.23	2.57	15
AE - Work Boat	2,736	34,748	11,170	1,089	1,041	0	3,556,604	168,767	43066	0.06	0.81	0.26	0.025	0.02	0.00	82.58	3.92	16
AE - Work Boat	403	4,633	1,574	199	191	0	465,278	22,078	32897	0.01	0.14	0.05	0.006	0.01	0.00	14.14	0.67	17
AE - Work Boat	2,756	30,880	10,050	1,014	969	0	3,012,643	142,955	22388	0.12	1.38	0.45	0.045	0.04	0.00	134.57	6.39	18
AE - Work Boat	590	5,359	1,758	237	226	0	488,424	23,177	21721	0.03	0.25	0.08	0.011	0.01	0.00	22.49	1.07	19
AE - Work Boat	1,587	11,793	4,584	478	457	0	1,899,118	90,103	4344	0.37	2.71	1.06	0.110	0.11	0.00	437.17	20.74	20
ME - Tugboat-Push/Tow	13	205	37	10	9	0	17,596	819	471	0.03	0.44	0.08	0.021	0.02	0.00	37.32	1.74	21
ME - Tugboat-Push/Tow	108	1,942	239	42	40	0	171,549	8,003	2794	0.04	0.70	0.09	0.015	0.01	0.00	61.41	2.86	22
ME - Tugboat-Push/Tow	1,889	32,715	4,053	622	595	0	2,666,404	123,496	28023	0.07	1.17	0.14	0.022	0.02	0.00	95.15	4.41	23
ME - Tugboat-Push/Tow	4	47	11	1	1	0	4,040	182	236	0.02	0.20	0.05	0.003	0.00	0.00	17.14	0.77	24
ME - Tugboat-Push/Tow	15,625	249,639	31,459	3,084	2,948	0	18,996,215	866,112	111296	0.14	2.24	0.28	0.028	0.03	0.00	170.68	7.78	25
ME - Tugboat-Push/Tow	15,000	239,138	87,373	5,340	5,105	0	54,695,361	2,495,889	114327	0.13	2.09	0.76	0.047	0.04	0.00	478.41	21.83	26
ME - Work Boat	2,227	29,697	6,242	610	583	0	2,502,669	118,756	48109	0.05	0.62	0.13	0.013	0.01	0.00	52.02	2.47	27
ME - Work Boat	7,590	89,811	20,466	1,979	1,892	0	7,568,546	359,140	91236	0.08	0.98	0.22	0.022	0.02	0.00	82.96	3.94	28
ME - Work Boat	36	418	135	18	18	0	42,323	2,008	1960	0.02	0.21	0.07	0.009	0.01	0.00	21.59	1.02	29
ME - Work Boat	29,064	407,442	80,366	7,887	7,540	0	34,419,706	1,633,271	229087	0.13	1.78	0.35	0.034	0.03	0.00	150.25	7.13	30
ME - Work Boat	94	1,098	280	48	46	0	99,509	4,722	3921	0.02	0.28	0.07	0.012	0.01	0.00	25.38	1.20	31
ME - Work Boat	21,495	228,752	76,451	6,753	6,455	0	29,487,250	1,399,216	57998	0.37	3.94	1.32	0.116	0.11	0.00	508.42	24.13	32



**Electrical Upgrade**

Electrical upgrade occurs at Phase Waterside Construction Part 2. It includes trenching and conduit installation.

**On-Road Emissions**

Vehicle	Modeled Vehicle Type	Total Work Days	Number of Vehicles	Total One-way Trips	One-way Trip Length (mi)	Total VMT	Fuel	Emission (lbs/day)										Emission (MT)	Gallons			
								ROG	NOx	PM10E	PM2.5E	PM10D	PM2.5D	SOx	CO	CO2	CH4		N2O	CO2e	Diesel	Gasoline
Haul Truck	HHDT	10	8	16	20	320	Diesel	0.097347	1.276207	0.002492	0.002384	0.008059	0.002572	0.003123	0.005135	329.7595	0.004522	0.051954	1.567	53		
Commute - workers	Worker Fleet	10	4	12	11.80	142	Gasoline	0.025783	0.026195	0.004478	0.004284	0.000538	0.000163	0.000118	0.051898	12.18511	0.000521	0.001908	0.058		6	
Note: Electrical upgrade takes 2-3 weeks, and the following on-road vehicle sum								0.12313	1.302402	0.00697	0.006668	0.008597	0.002735	0.00324	0.057033	341.9447	0.005042	0.053862	1.624	53	6	
Haul trucks								3 for concrete asphalt demolition														
Deliver trucks								5 = 3 trucks for material + 2 trucks for gears														
Worker vehicles								4														
Worker one-way								3														

**Off-Road Emissions**

Equipment	Modeled Equipment	#/day	Hours/day	Engine Tier	Workdays	HP	LD	HP Bin	Emission Factor (grams/hp-hr)						Emission (lbs/day)						Gallons/h p-hr	Diesel (gallons)	CO2e (MT)				
									ROG	TOG	CO	NOx	CO2	PM10	PM2.5	SOx	ROG	TOG	CO	NOx				CO2	PM10	PM2.5	SOx
Asphalt/Concrete Cutter	Concrete/Industrial Saws	1	8	na	10	33	0.73	50	0.301177	0.364424	3.150046	2.57422	427.4246	0.062114	0.057145	0.00542	0.127963	0.154836	1.338	1.094	181.6	0.026	0.024	0.002	0.0420	3	1
Forklift	Forklifts	1	8	na	10	82	0.2	100	0.239426	0.284937	3.429491	2.166739	593.3846	0.15579	0.143327	0.005621	0.069254	0.082417	0.992	0.627	171.64	0.045	0.041	0.002	0.0582	5	1
Mini Excavator	Excavators	1	8	na	10	36	0.38	50	0.452238	0.5382	4.316172	3.509419	575.3161	0.12139	0.111679	0.00545	0.109114	0.129854	1.041	0.847	138.81	0.029	0.027	0.001	0.0565	5	1
sum																	0.30633	0.36711	3.37	2.567	492.05	0.101	0.093	0.005	13	2	

**On-Road Fugitive Dust Emissions**

Vehicle Type	Total VMT (mi)	Workdays	Paved Road VMT (mi)	Total Emissions (lbs)		Emissions	
				PM10	PM2.5	PM10	PM2.5
Delivery Truck	320	10	320	0.202	0.051	0.020	0.005
Commute - workers	142	10	142	0.089	0.022	0.009	0.002
sum				0.291	0.073	0.029	0.007

Assume default of 100% paved roads for worker, construction hauling, vendor trips in San Diego County (CalEEMod default Appendix G21)

## Default Horsepower and Load Factor for Construction Equipment

Sources: CalEEMod 2022 Appendix G Table 12

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Equipment	Fuel	Default Horsepower	Load Factor
Bore/Drill Rigs	Diesel	83	0.50
Concrete/Industrial Saws	Diesel	33	0.73
Cranes	Diesel	367	0.29
Excavators	Diesel	36	0.38
Forklifts	Diesel	82	0.20
Other Material Handling Equipment	Diesel	93	0.40
Pumps	Diesel	11	0.74
Rubber Tired Dozers	Diesel	367	0.40
Tractors/Loaders/Backhoes	Diesel	84	0.37

### Constants and Conversions

Variable	Value
grams_per_lb	453.59
grams_per_MT	1000000
grams_per_ton	907185
lbs_per_MT	2204.62
lbs_per_ton	2000
cm3_per_cy	764555

# **Calculation Sheets**

## **Remediation**

**Site Remediation Emission Summary**

*Remediation Activities*

**Table X. Maximum Daily Emission (lbs/day)**

Source	Daily Emissions (lbs/day)					
	ROG	NOx	CO	SOx	PM10	PM2.5
Off-Road Equipment	0.3	2.2	2.5	0.0	0.1	0.1
CHC	1.0	15.4	4.9	0.0	0.4	0.3
On-Road Vehicle	0.2	3.6	1.4	0.0	0.9	0.3
<b>Maximum Daily</b>	<b>1</b>	<b>21</b>	<b>9</b>	<b>0</b>	<b>1</b>	<b>1</b>
<b>Significance Threshold</b>	<b>75</b>	<b>250</b>	<b>550</b>	<b>250</b>	<b>100</b>	<b>55</b>
<b>Exceed Threshold?</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>

**On-Road Vehicle Emission Details**

*Exhaust Emission from Mobile*

Trip type	Daily Emissions (lbs/day)							
	ROG	NOx	CO	SOx	PM10E	PM2.5E	PM10D	PM2.5D
Haul Truck	0.0227	1.4808	0.0496	0.0104	0.0186	0.0178	0.0778	0.0248
Delivery Truck	0.0222	1.4159	0.0472	0.0099	0.0177	0.0169	0.0740	0.0236
Commute - workers	0.1682	0.6549	1.2967	0.0029	0.1119	0.1071	0.0135	0.0041
Total	0.2131	3.5516	1.3935	0.0233	0.1482	0.1418	0.1653	0.0525

*On-Road Fugitive*

Trip type	Emissions (lbs/day)	
	PM10D	PM2.5D
Haul Truck	0.1951	0.0488
Delivery Truck	0.1857	0.0464
Commute - workers	0.2236	0.0559
Total	0.6	0.2

## Remediation GHG Emission Summary

Table X. Construction GHG Emission Summary

Construction Activities	CO2e (MT)		
GHG by Phase		project	total
Off-Road Land Equipment	9	29	38
Off-Road Water Equipment	27	1,221	1,248
Truck and Worker Commute	93	305	399
Remediation Total	129	1,556	1,685
GHG by Year			
Total	129		

Overlap with Project Construction	project	site remediation	total with overlap
2026	212	129	341
2027	704	129	833
2028	640	129	769
Project Total	1,556		

## Energy Consumption, Site Remediation

Table X. Project Energy Consumption for Site Remediation

Source	Diesel (gallons)	Gasoline (gallons)
Off-Road Land Equipment	883	-
Off-Road Water Equipment	2,680	-
Trucks and Worker Commute	7,970	1,130
<b>Project Total</b>	<b>11,533</b>	<b>1,130</b>

## Fugitive Dust Emissions

### On-Road Dust Emissions

Phase	Vehicle Type	Total VMT		Paved Road VMT (mi)	Total Emissions (lbs)		Emissions (lbs/day)	
		(mi)	Workdays		PM10	PM2.5	PM10	PM2.5
Waterside Demolition Part 1	Haul Truck	24,720	80	24,720	15.611	3.903	0.195	0.049
Waterside Demolition Part 1	Delivery Truck	23,520	80	23,520	14.854	3.713	0.186	0.046
Waterside Demolition Part 1	Commute - workers	28,320	80	28,320	17.885	4.471	0.224	0.056

Assume default of 100% paved roads for worker, construction hauling, vendor trips in San Diego County (CalEEMod default Appendix G21)

### Emission Factors

PM10 EF (lbs/VMT)
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Paved Roads	Paved Roads, Corrected
6.6E-4	6.3E-4

Emission factor for travel on paved roads is estimated using Eq 3 and 3a on worksheet "Fugitive Dust EF".

For calculating EF from paved road, the average weight of all vehicles traveling the road is assumed to be 2.4 tons

### PM2.5 to PM10 Mass Emission Ratio used in Calculation

Fugitive Dust Source	PM2.5/PM10	Reference
Paved road	0.25	EPA. AP-42. Analysis of the Fine Fraction of Particulate Matter in Fugitive Dust, Final
Unpaved road	0.15	EPA. AP-42. Analysis of the Fine Fraction of Particulate Matter in Fugitive Dust, Final

## Fugitive Dust Emission Factors

### Travel on Paved Roads

$$E(\text{lbs/VMT})=(k)(sL)^{.91} (W)^{1.02}$$

Where:	<b>PM10</b>	<u>Unit</u>	<u>Source</u>
k= Particle Size Multiplier:	0.0022	lb/VMT	AP-42 Chapter 13.2.1, Table 13.2.1-1, PM10 emissions
sL= road surface silt loading	0.1	g/m <sup>2</sup>	Caleemod default
W= average weight of the vehicles traveling the road	2.4	tons	Statewide average vehicle weight in CA
PM10 Emission factor	0.00066	lbs/VMT	Public roads

### Correction for Natural Precipitation<sup>5</sup>

$$E(\text{ext})=E[(1-P/4N)]$$

Where:		<u>Unit</u>	<u>Source</u>
Eext = annual or other long-term average emission factor		dimensionless	
P=#days/yr with >=0.01 inch precipitation during	43	days	Western Regional Climate Center <a href="#">SAN DIEGO LINDBERGH FLD, CALIFORNIA</a>
N=# days in averaging period	365	days	
Corrected EF PM10	<b>0.00064</b>	lbs/VMT	Public roads

### Sources

EPA. AP 42, Fifth Edition, Volume I, Chapter 13: Miscellaneous Sources, 13.2.1 Paved Road, Eqn. 1

EPA. AP 42, Fifth Edition, Volume I, Chapter 13: Miscellaneous Sources, 13.2.1 Paved Road, Eqn. 2

**Mobile Trip Exhaust Emissions**

Phase	Vehicle	Modeled Vehicle Type	One-way Trips per day	Total Work Days	Number of Vehicles	Total One-way Trips	One-way Trip Length (mi)	Total VMT	Fuel	Emission (lbs/day)											Emission (MT)		Gallons	
										ROG	NOx	PM10E	PM2.5 E	PM10D	PM2.5 D	SOx	CO	CO2	CH4	N2O	CO2e	Diesel	Gasoline	
Waterside Demolition Part 1	Haul Truck	HHDT	15.45	80	1	1,236	20	24,720	Diesel	2.3E-2	1.4808	0.0186	0.0178	0.0778	0.0248	0.0104	0.0496	1102	0.0011	0.1736	41.9	4,084	Waterside Demolition	
Waterside Demolition Part 1	Delivery Truck	HHDT	14.7	80	1	1,176	20	23,520	Diesel	0.0222	1.4159	0.0177	0.0169	0.074	0.0236	0.0099	0.0472	1049.8	0.001	0.1654	39.9	3,886	Waterside Demolition	
Waterside Demolition Part 1	Commute - workers	Worker Fleet	6	80	5	2,400	12	28,320	Misc.	1.7E-1	6.5E-1	1.1E-1	1.1E-1	1.3E-2	4.1E-3	2.9E-3	1.3E+0	3.0E+2	1.3E-2	4.8E-2	11.6	1,130	Waterside Demoliton	
Notes:										0.2	3.6	0.1	0.1	0.2	0.1	0.0	1.4	2456.4	0.0	0.4	93.3	7970.4	1129.7	

Truck trips are from sheet "Truck Trips"  
 Assume remediation requires 5 additional workers.  
 trips per worker per day 3  
 Trip lengths used CalEEMod default values for San Diego County  
 20 miles/trip for hauling to Otay Landfill  
 20 miles/trip for vendor trip length  
 11.8 miles/trip for residential home-work trips  
 Particulate Matter Dust emission from vehicle break wear and tire wear only.  
 GWP used for quantifying CO2e, source: IPCC Fifth Assessment Report (Avg)

CO2	1
CH4	25
N2O	298

The calculation is based on the following emission rates:

**On-Road Emission Rates**

Fleet Type	Fuel Type	VMT-Based Emission Rate (g/mi)											Trip-Based Emission Rate (g/trip)											Idle/Diurnal-Based Emission Rate (g/vehicle/day)												
		ROG	NOx	PM10 Ex	PM2.5 Ex	PM10 D	PM2.5 D	SOx	CO	CO2	CH4	N2O	ROG	NOx	PM10 Ex	PM2.5 Ex	PM10 D	PM2.5 D	SOx	CO	CO2	CH4	N2O	ROG	NOx	PM10 Ex	PM2.5 Ex	PM10 D	PM2.5 D	SOx	CO	CO2	CH4	N2O		
HHDT	Diesel	1.6E-2	1.8E+0	2.7E-2	2.6E-2	1.1E-1	3.6E-2	1.5E-2	7.3E-2	1.6E+3	7.3E-4	2.5E-1	0.0E+0	2.9E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	5.5E+0	#####	3.3E-2	3.1E-2	0.0E+0	0.0E+0	1.2E-1	0.0E+0	#####	2.5E-1	#####	
LDA	Gasoline	8.7E-3	3.4E-2	1.6E-3	1.4E-3	1.5E-2	4.5E-3	2.8E-3	6.7E-1	2.8E+2	2.4E-3	4.2E-3	0.0E+0	2.3E-1	2.0E-3	1.9E-3	0.0E+0	0.0E+0	0.0E+0	6.6E-4	2.8E+0	6.7E+1	6.2E-2	3.1E-2	1.4E+0	#####	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	3.1E-3	#####	0.0E+0	#####
Worker Fleet	EMFAC default mix	1.8E-1	8.1E-1	1.4E-1	1.4E-1	1.7E-2	5.2E-3	3.7E-3	1.3E+0	3.8E+2	9.2E-3	5.8E-2	0.0E+0	3.3E-1	2.5E-3	2.3E-3	0.0E+0	0.0E+0	8.0E-4	4.1E+0	8.0E+1	8.8E-2	3.6E-2	2.3E+0	#####	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	0.0E+0	3.6E-3	#####	0.0E+0	#####	

Note:  
 Emission type -specific emission rates are calculated using EMFAC 2021 (sheet EMFAC EF).

	gallons/mi	kWh/mi	
	Diesel	Gasoline	Electricity
HHDT	0.16522		
LDA	0.02463	0.03397	386
LDT1	0.04418	0.04177	386
LDT2	0.03211	0.04205	386
Worker Fleet	0.03989		

Use CalEEMod default for worker fleet composition, and default EMFAC fleet composition.

Fleet	EMFAC vehicle population			EMFAC default mix			Fleet
	Diesel	Gasoline	Electricity	Diesel	Gasoline	Electricity	
LDA	4,624	#####	79,089	0.00	0.93	0.06	25%
LDT1	47	120,690	362	0.00	1.00	0.00	50%
LDT2	2,137	558,134	4,915	0.00	0.99	0.01	25%

Based on EMFAC default data, >90% vehicles use gasoline across LDA, LDT1, and LDT2. Thus, all worker vehicles are assumed to use gasoline.

### Emission Factors based on VMT, Trip, and Idle/Diurnal

Vehicle Category	Fuel	VMT-based (g/mile)											Trip-based (g/trip)											Idle/diurnal-based (g/vehicle/day)										
		ROG	NOx	PM10	PM2.5	SOx	CO	CO2	CH4	N2O	ROG	NOx	PM10	PM2.5	PM10	PM2.5	SOx	CO	CO2	CH4	N2O	ROG	NOx	PM10	PM2.5	PM10	PM2.5	SOx	C	CO2	CH4	N2O		
HHDT	Diesel	0.02	1.82	0.03	0.03	0.11	0.036	0.01	0.07	1578	0	0.25	0	0	0	0	0	0	0	0	0	5.46	64.5	0.03	0.03	0	0	0.12	0	###	0.25	1.95		
LDA	Gasoline	0.01	0.03	0	0	0.02	0.005	0	0.67	285	0	0	0	0	0	0	0	2.76	66.66	0.06	0.03	1.38	0	0	0	0	0	0	0	0	0			
LDA	Diesel	0.03	0.15	0.01	0.01	0.02	0.005	0	0.52	250	0	0.04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
LDA	Electricity	0	0	0	0	0.01	0.004	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
LDA	Plug-in Hybrid	0	0	0	0	0.01	0.003	0	0.23	143	0	0	0	0	0	0	0	1.27	62.84	0.04	0.02	0.45	0	0	0	0	0	0	0	0	0			
LDT1	Gasoline	0.04	0.14	0	0	0.02	0.005	0	1.55	349	0.01	0.01	0	0	0	0	0	5.32	85.89	0.11	0.04	3.15	0	0	0	0	0	0	0	0	0			
LDT1	Diesel	0.34	1.52	0.28	0.27	0.02	0.006	0	1.89	449	0.02	0.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
LDT1	Electricity	0	0	0	0	0.01	0.004	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
LDT1	Plug-in Hybrid	0	0	0	0	0.01	0.003	0	0.21	129	0	0	0	0	0	0	0	1.27	66.44	0.04	0.02	0.28	0	0	0	0	0	0	0	0	0			
LDT2	Gasoline	0.01	0.06	0	0	0.02	0.005	0	0.8	352	0	0.01	0	0	0	0	0	3.2	83.22	0.07	0.04	1.43	0	0	0	0	0	0	0	0	0			
LDT2	Diesel	0.03	0.05	0.01	0	0.02	0.005	0	0.26	326	0	0.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
LDT2	Electricity	0	0	0	0	0.01	0.004	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
LDT2	Plug-in Hybrid	0	0	0	0	0.01	0.003	0	0.22	135	0	0	0	0	0	0	0	1.27	72.55	0.04	0.02	0.31	0	0	0	0	0	0	0	0	0			
Worker Fleet	EMFAC default	0.18	0.81	0.14	0.14	0.02	0.005	0	1.31	384	0.01	0.06	0	0	0	0	0	4.15	80.42	0.09	0.04	2.27	0	0	0	0	0	0	0	0	0			

Notes:

Assume Worker Fleet = 25/50/25 percent mix of light duty autos, light duty truck class 1, and light duty truck class 2

#### EMFAC Emission Types Used to Estimate Onroad Emission Rates

Pollutant	VMT-based	Trip-based (g/trip)	Idle/Diurnal-based
TOG, ROG	RUNEX	STREX, HOTSOAK, RUNLOSS	IDLEX, DIURN
Gases	RUNEX	STREX	IDLEX
PM - Exhaust	RUNEX	STREX	IDLEX
PM - Dust	PMTW, PMBW		

Acronyms:

RUNEX	Running exhaust	g/mile
PMBW	PM brake wear	g/mile
PMTW	PM tire wear	g/mile
STREX	Start exhaust	g/trip
HOTSOAK	Hot Soak evaporative	g/trip
RUNLOSS	Running Loss evaporative	g/trip
IDLEX	Idle exhaust	g/vehicle/day
DIURN	Diurnal Loss evaporative	g/vehicle/day

### EMFAC 2021 (On-Road) Emission Rates Output

Region Type: Sub-Area

Region: San Diego (SD)

Calendar Year: 2026

Season: Annual

Vehicle Classification: EMFAC2007 Categories

Units: miles/day for CVMT and EVMT, trips/day for Trips, kWh/day for Energy Consumption, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	Calendar Year	Vehicle Category	Model	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	Energy Consumption	SOx _TO TEX	NH3_ RUNE X	Fuel		
														Consumption	Gallon s per mile	KWh per mile
San Diego (SD)	2026	HHDT	Aggregate	Aggregate	Gasoline	5.9232158	471.7979	471.8	0	118.5	0	0	2E-05	0.121	0.257	0
San Diego (SD)	2026	HHDT	Aggregate	Aggregate	Diesel	15402.403	1900421	2E+06	0	2E+05	0	0	0.451	314	0.165	0
San Diego (SD)	2026	HHDT	Aggregate	Aggregate	Electricity	177.65522	20129.29	0	20129.3	2366	37104.199	0	0	0	0	1843
San Diego (SD)	2026	LDA	Aggregate	Aggregate	Gasoline	1154344.5	46405189	5E+07	0	5E+06	0	0.1	1.872	1576	0.034	0
San Diego (SD)	2026	LDA	Aggregate	Aggregate	Diesel	4624.0904	137704.5	1E+05	0	19454	0	0	5E-04	3.392	0.025	0
San Diego (SD)	2026	LDA	Aggregate	Aggregate	Electricity	79088.749	3959769	0	3959769	4E+05	1528797.6	0	0	0	0	386.1
San Diego (SD)	2026	LDA	Aggregate	Aggregate	Plug-in H	37511.098	1771766	8E+05	934044	2E+05	282109.06	0	0.037	30.54	0.036	302
San Diego (SD)	2026	LDT1	Aggregate	Aggregate	Gasoline	120689.67	4165596	4E+06	0	5E+05	0	0	0.169	174	0.042	0
San Diego (SD)	2026	LDT1	Aggregate	Aggregate	Diesel	47.210227	661.8267	661.8	0	130.1	0	0	2E-06	0.029	0.044	0
San Diego (SD)	2026	LDT1	Aggregate	Aggregate	Electricity	362.24285	17688.21	0	17688.2	1769	6829.1089	0	0	0	0	386.1
San Diego (SD)	2026	LDT1	Aggregate	Aggregate	Plug-in H	253.16162	13025.07	5545	7479.76	1047	2259.1102	0	3E-04	0.203	0.037	302
San Diego (SD)	2026	LDT2	Aggregate	Aggregate	Gasoline	558133.64	22684895	2E+07	0	3E+06	0	0.1	0.932	953.8	0.042	0
San Diego (SD)	2026	LDT2	Aggregate	Aggregate	Diesel	2137.242	89302.38	89302	0	10104	0	0	3E-04	2.867	0.032	0
San Diego (SD)	2026	LDT2	Aggregate	Aggregate	Electricity	4914.9869	184923.9	0	184924	24925	71395.894	0	0	0	0	386.1
San Diego (SD)	2026	LDT2	Aggregate	Aggregate	Plug-in H	5389.5737	264862	1E+05	146795	22286	44336.484	0	0.005	4.334	0.037	302
San Diego (SD)	2026	MHDT	Aggregate	Aggregate	Gasoline	3363.9172	196488.8	2E+05	0	67305	0	0	0.01	40.47	0.206	0
San Diego (SD)	2026	MHDT	Aggregate	Aggregate	Diesel	18054.212	755338.8	8E+05	0	2E+05	0	0	0.176	88.44	0.117	0
San Diego (SD)	2026	MHDT	Aggregate	Aggregate	Electricity	297.61914	16818.97	0	16819	3837	18557.364	0	0	0	0	1103

Site Remediation Truck Trips

Phase #	Construction Phase	Duration	Workdays	Phase Start	Phase End	On-way Truck Trips	Description of Activities
2	Waterside Demolition Part 1	4 months	80	8/1/2026	11/21/2026	1,236	Haul dredged material to Otay Landfill
2	Waterside Demolition Part 1	4 months	80	8/1/2026	11/21/2026	1,176	Deliver replacement sand

Site Remediation Trucks

CY dredged 8,235.45  
 tons per CY, wet 1.5  
 total weight 12353.175  
 tons per truck 20  
 dredge = 618 if assume 20 tons/truck  
 sand = 588 if assume 14 CY/truck

Component	New Proposed Improvements	Existing Improvements to be Demolished
Total SQF of Area	111,179	107,082
Cubic Yards of Dredge Material (2ft Dredge)	8,235.45	7,932.02
Cubic Yards of Sand Placement (2ft Placement)	8,235.45	7,932.02

**Land Equipment Emissions**

**Off-Road Land Equipment Emission**

Phase	Equipment	Equipment Name	#/day	Hours per day	Engine Tier	Workdays	HP	LD	HP Bin	Emission Factor (grams/hp-hr)									Emission (lbs/day)									Gallons /hp-hr	Diesel (gallons)	CO2e (MT)
										ROG	TOG	CO	NOx	CO2	PM10	PM2.5	SOx	ROG	TOG	CO	NOx	CO2	PM10	PM2.5	SOx					
Waterside Demolition Part 1	Cranes	Cranes	1	8	na	20	367	0.3	600	0.14	0.17	1.33	1.17	528	0.05	0.05	0.01	0.27	0.32	2.5	2.2	991	0.09	0.09	0.01	0.0518	883	9		

Notes: Emission factors were derived from either OFFROAD Emission Inventory or from CalEEMod default diesel emission factor (sheet OFFROAD EF). Load factors were from CalEEMod default for diesel equipment (Sheet Default H

**OFFROAD Emission Inventory**

Model Output: OFFROAD2021 (v1.1.0) Emissions Inventory

Region Type: Statewide

Region: California

Calendar Year: 2026

Scenario: All Adopted Rules - Exhaust

Vehicle Classification: OFFROAD2021 Equipment Types

Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Region		Calendar Year	Vehicle Category	Model Year	Horsepower	Fuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd	PM2.5_tpd	SOx_tpd	NH3_tpd	Fuel_Consumption	Total_Activity	Total_Population	Horsepower_hhp	ROG	TOG	CO	NOx	CO2	PM10	PM2.5	SOx	Gallons_per_Horsepower	Offroad Equipment Short Name
Statewide Total:	2026	Construction and Mining - Bore/Drill Rigs	Aggregat	100	Diesel	0.00186	0.00225	0.00268	0.02389	0.01889	3.95282	0.00142	0.0013	3.7E-05	0	128448	51747.5	101.015	2272054	0.3282735	0.391	3.482	2.753	576.0726	0.206288	0.189785	0.005457	0.057	Bore/Drill Rigs	
Statewide Total:	2026	Construction and Mining - Bore/Drill Rigs	Aggregat	175	Diesel	0.00998	0.01208	0.01437	0.16396	0.08729	28.0088	0.00408	0.00375	0.00027	0	910152	260001	400.299	1.8E+07	0.2197591	0.262	2.984	1.589	509.731	0.074175	0.068241	0.004829	0.050	Bore/Drill Rigs	
Statewide Total:	2026	Construction and Mining - Bore/Drill Rigs	Aggregat	300	Diesel	0.01204	0.01457	0.01733	0.07716	0.11474	33.363	0.00504	0.00464	0.00032	0	1084137	192576	313.202	2.2E+07	0.2215741	0.264	1.174	1.745	507.5305	0.076714	0.070577	0.004808	0.050	Bore/Drill Rigs	
Statewide Total:	2026	Construction and Mining - Bore/Drill Rigs	Aggregat	50	Diesel	0.00131	0.00158	0.00189	0.01128	0.00924	1.32807	0.00046	0.00043	1.3E-05	0	43155.9	38749.2	82	769535	0.6819579	0.812	4.852	3.977	571.4542	0.199582	0.183616	0.005413	0.056	Bore/Drill Rigs	
Statewide Total:	2026	Construction and Mining - Bore/Drill Rigs	Aggregat	600	Diesel	0.01633	0.01976	0.02352	0.12916	0.14539	47.9896	0.00653	0.006	0.00045	0	1559430	155035	269.112	3.1E+07	0.207863	0.247	1.358	1.529	504.7455	0.068645	0.063154	0.004781	0.050	Bore/Drill Rigs	
Statewide Total:	2026	Construction and Mining - Bore/Drill Rigs	Aggregat	75	Diesel	0.00236	0.00286	0.0034	0.03084	0.02931	5.12917	0.00089	0.00082	4.9E-05	0	166673	92779.9	191.015	2952194	0.3206511	0.382	3.459	3.287	575.2956	0.099987	0.091988	0.00545	0.056	Bore/Drill Rigs	
Statewide Total:	2026	Construction and Mining - Bore/Drill Rigs	Aggregat	750	Diesel	0.00588	0.00712	0.00847	0.03862	0.05267	19.8099	0.00226	0.00208	0.00019	0	643725	39567.7	70.0234	1.3E+07	0.1823054	0.217	0.989	1.349	507.4024	0.057958	0.053322	0.004807	0.050	Bore/Drill Rigs	
Statewide Total:	2026	Construction and Mining - Bore/Drill Rigs	Aggregat	9999	Diesel	0.00192	0.00233	0.00277	0.01236	0.03163	6.56553	0.00069	0.00064	6.2E-05	0	213348	9918.84	17	4229323	0.182304	0.217	0.967	2.476	514.0287	0.054188	0.049853	0.004869	0.050	Bore/Drill Rigs	
Statewide Total:	2026	Construction and Mining - Concrete Pump	Aggregat	100	Diesel	4.5E-05	5.4E-05	6.5E-05	0.00077	0.00051	0.13424	3.5E-05	3.2E-05	1.3E-06	0	4362.3	2148.93	4.00456	71374.4	0.2516186	0.299	3.574	2.351	622.7912	0.160506	0.147666	0.0059	0.061	Concrete Pump	
Statewide Total:	2026	Construction and Mining - Concrete Pump	Aggregat	175	Diesel	0.0006	0.00073	0.00086	0.01299	0.00391	2.14381	0.00014	0.00013	2E-05	0	69663.5	25576.2	32	1380981	0.1738867	0.207	3.115	0.937	514.0287	0.033868	0.031158	0.004869	0.050	Concrete Pump	
Statewide Total:	2026	Construction and Mining - Concrete Pump	Aggregat	300	Diesel	0.00021	0.00026	0.00031	0.00187	0.00078	0.86006	4.7E-05	4.4E-05	8.1E-06	0	27947.8	7434.3	12	554026	0.1546465	0.184	1.119	0.464	514.0287	0.028367	0.026098	0.004869	0.050	Concrete Pump	
Statewide Total:	2026	Construction and Mining - Concrete Pump	Aggregat	50	Diesel	9E-06	1.1E-05	1.3E-05	8.1E-05	7E-05	0.01178	2.2E-06	2E-06	1.1E-07	0	382.948	387.106	1	6828.55	0.5307058	0.632	3.944	3.401	571.4542	0.105796	0.097333	0.005413	0.056	Concrete Pump	
Statewide Total:	2026	Construction and Mining - Concrete Pump	Aggregat	600	Diesel	0.00062	0.00075	0.00089	0.00382	0.00773	2.02661	0.00024	0.00022	1.9E-05	0	65855	9382.51	18	1305483	0.1902552	0.226	0.969	1.961	514.0287	0.059848	0.05506	0.004869	0.050	Concrete Pump	
Statewide Total:	2026	Construction and Mining - Concrete Pump	Aggregat	75	Diesel	7.2E-05	8.8E-05	0.0001	0.00086	0.00083	0.14153	2.6E-05	2.4E-05	1.3E-06	0	4599.03	3454.66	7	82007.7	0.3536442	0.421	3.484	3.333	571.4542	0.104866	0.096477	0.005413	0.056	Concrete Pump	
Statewide Total:	2026	Construction and Mining - Cranes	Aggregat	100	Diesel	0.00086	0.00104	0.00124	0.00987	0.00886	1.93523	0.00062	0.00057	1.8E-05	0	62885.6	29282.4	151.196	726742	0.4758928	0.566	4.496	4.038	881.7404	0.28052	0.258079	0.008353	0.087	Cranes	
Statewide Total:	2026	Construction and Mining - Cranes	Aggregat	175	Diesel	0.0055	0.00666	0.00792	0.07763	0.06092	14.8798	0.00311	0.00286	0.00014	0	483523	178938	679.924	7543222	0.2922763	0.348	3.408	2.674	653.1759	0.136685	0.125751	0.006187	0.064	Cranes	
Statewide Total:	2026	Construction and Mining - Cranes	Aggregat	25	Diesel	3.4E-05	4.1E-05	4.9E-05	0.00041	0.00027	0.09825	1.7E-05	1.6E-05	9.3E-07	0	3192.61	328.317	2	2070.86	0.65705901	7.82	65.64	42.64	15709.59	2.707179	2.490604	0.148814	1.542	Cranes	
Statewide Total:	2026	Construction and Mining - Cranes	Aggregat	300	Diesel	0.01283	0.01552	0.01847	0.11385	0.12935	45.4736	0.00632	0.00581	0.00043	0	1477672	389933	1529.2	2.7E+07	0.1903813	0.227	1.396	1.586	557.6822	0.077502	0.071302	0.005283	0.055	Cranes	
Statewide Total:	2026	Construction and Mining - Cranes	Aggregat	50	Diesel	0.00012	0.00015	0.00018	0.00101	0.00081	0.18755	4E-05	3.7E-05	1.8E-06	0	6094.62	5103.87	26.0246	59218	0.8314545	0.989	5.671	4.523	1048.728	0.223917	0.206004	0.009934	0.103	Cranes	
Statewide Total:	2026	Construction and Mining - Cranes	Aggregat	600	Diesel	0.01401	0.01695	0.02018	0.15695	0.13814	62.2142	0.00593	0.00545	0.00059	0	2021660	322222	1222.02	3.9E+07	0.143924	0.171	1.332	1.173	528.1137	0.050319	0.046294	0.005003	0.052	Cranes	
Statewide Total:	2026	Construction and Mining - Cranes	Aggregat	75	Diesel	0.00045	0.00054	0.00064	0.00401	0.00491	0.78845	0.00028	0.00026	7.5E-06	0	25620.8	14101.4	77.0484	250814	0.713729	0.849	5.297	6.48	1040.904	0.375662	0.345609	0.00986	0.102	Cranes	
Statewide Total:	2026	Construction and Mining - Cranes	Aggregat	750	Diesel	0.00189	0.00228	0.00272	0.01956	0.02064	9.6077	0.00088	0.00081	9.1E-05	0	312204	33200.2	141.044	6183186	0.1223435	0.146	1.047	1.105	514.5125	0.047061	0.043296	0.004874	0.050	Cranes	
Statewide Total:	2026	Construction and Mining - Cranes	Aggregat	9999	Diesel	0.00061	0.00074	0.00088	0.00593	0.01431	3.23779	0.0003	0.00027	3.1E-05	0	105212	8015.71	33.0197	2104383	0.116317	0.138	0.934	2.252	509.4624	0.046755	0.043014	0.004826	0.050	Cranes	
Statewide Total:	2026	Construction and Mining - Misc - Concrete/Industrial Saws	Aggregat	50	Diesel	0.00076	0.00091	0.0011	0.00951	0.00777	1.29003	0.00019	0.00017	1.6E-05	1E-05	41960.4	30284.1	51.74	999374	0.3011772	0.364	3.15	2.574	427.4246	0.062114	0.057145	0.00542	0.042	Concrete/Industrial Saws	
Statewide Total:	2026	Construction and Mining - Rubber Tired Dozers	Aggregat	100	Diesel	0.00072	0.00087	0.00104	0.00833	0.00683	1.42649	0.00056	0.00052	1.4E-05	0	46354.1	22168.1	50.0356	768619	0.3751214	0.446	3.588	2.942	614.5355	0.241955	0.222598	0.005821	0.060	Rubber Tired Dozers	
Statewide Total:	2026	Construction and Mining - Rubber Tired Dozers	Aggregat	175	Diesel	0.00183	0.00221	0.00264	0.02597	0.01727	4.32876	0.00086	0.00079	4.1E-05	0	140664	48590	83.037	2773570	0.2644031	0.315	3.1	2.116	516.7882	0.102607	0.094398	0.004895	0.051	Rubber Tired Dozers	
Statewide Total:	2026	Construction and Mining - Rubber Tired Dozers	Aggregat	300	Diesel	0.00181	0.00219	0.0026	0.01367	0.01367	5.37487	0.00072	0.00067	5.1E-05	0	174657	38213.7	67.0561	3480044	0.2080399	0.248	1.301	1.3	511.4133	0.068885	0.063374	0.004845	0.050	Rubber Tired Dozers	
Statewide Total:	2026	Construction and Mining - Rubber Tired Dozers	Aggregat	50	Diesel	0.00014	0.00017	0.0002	0.00184	0.00122	0.39745	4.1E-05	3.7E-05	3.8E-06	0	12915.2	6928.05	18.0687	107774	0.5133032	0.611	5.648	3.741	1221.119	0.125111	0.115102	0.011567	0.120	Rubber Tired Dozers	
Statewide Total:	2026	Construction and Mining - Rubber Tired Dozers	Aggregat	600	Diesel	0.00891	0.01078	0.01283	0.08496	0.07208	28.3921	0.00361	0.00332	0.00027	0	922607	132585	244.926	2.1E+07	0.1727045	0.206	1.361	1.155	454.7831	0.057778	0.053156	0.004308	0.045	Rubber Tired Dozers	
Statewide Total:	2026	Construction and Mining - Rubber Tired Dozers	Aggregat	75	Diesel	0.00035	0.00043	0.00051	0.00398	0.00432	0.7287	0.00017	0.00016	6.9E-06	0	23679.4	13963.1	30.0514	345173	0.4108554	0.489	3.821	4.141	699.041	0.163551	0.150467	0.006622	0.069	Rubber Tired Dozers	
Statewide Total:	2026	Construction and Mining - Rubber Tired Dozers	Aggregat	750	Diesel	0.00021	0.00025	0.0003	0.0018	0.00134	0.85309	6.9E-05	6.3E-05	8.1E-06	0	27721.3	2570.04	5.0127	686933	0.1198826	0.143	0.865	0.647	411.2144	0.033198	0.030543	0.003895	0.040	Rubber Tired Dozers	
Statewide Total:	2026	Construction and Mining - Rubber Tired Dozers	Aggregat	9999	Diesel	0.00059	0.00072	0.00085	0.00485	0.01251	2.39746	0.00031	0.00029	2.3E-05	0	77905.9	2953.5	5	1544376	0.1537619	0.183	1.04	2.682	514.0287	0.066841	0.061494	0.004869	0.050	Rubber Tired Dozers	
Statewide Total:	2026	Construction and Mining - Tractors/Loaders/Backhoes	Aggregat	100	Diesel	0.13457	0.16283	0.19378																						

## Default Horsepower and Load Factor for Construction Equipment

Sources: CalEEMod 2022 Appendix G Table 12

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Equipment	Fuel	Default Horsepower	Load Factor
Cranes	Diesel	367	0.29

**Commercial Harbor Craft Emissions**

Construction Phase	Equipment	Modeled Equipment	Fuel	Quantity	Hours of Use/Day		Workdays	HP	Equipment Total Hours	lbs/day of pollutant or gallons of fuel										
										VOC	NOX	CO	PM10	PM2.5	SO2	CO2	Fuel	CH4	N2O	MTCO2e/total
Water Demolition Part 1	American 5299 Crane (On Flexifloat Spud Barge)	AE - Barge-Other	Diesel	1	8		20	168	160	0.13041	2.54221	0.73277	0.0641	0.06128	0	430.14	401.413	0.28408	0.00752	3.96659582
Water Demolition Part 1	DB Palomar Main Engine	AE - Barge-Other	Diesel	1	2		20	600	40	0.08493	1.56321	0.45427	0.04277	0.04088	0	243.732	227.454	0.16097	0.00426	2.2476078
Water Demolition Part 1	DB Palomar Genset	AE - Barge-Other	Diesel	1	2		20	300	40	0.04679	0.96767	0.24864	0.01922	0.01837	0	157.393	146.881	0.10395	0.00275	1.4514171
Water Demolition Part 1	Killeen Rear Genset - Harbor Tug	ME - Tugboat-Push/Tow	Diesel	1	2		20	803	40	0.26241	4.18342	1.52848	0.09342	0.08931	0	956.826	873.249	0.61799	0.01636	8.82035031
Water Demolition Part 1	Killeen Forward Genset - Harbor Tug	ME - Tugboat-Push/Tow	Diesel	1	2		20	803	40	0.26241	4.18342	1.52848	0.09342	0.08931	0	956.826	873.249	0.61799	0.01636	8.82035031
Water Demolition Part 1	Survey Boat	ME - Work Boat	Diesel	1	2		20	230	40	0.16638	1.96875	0.44864	0.04338	0.04147	0	165.911	157.455	0.11143	0.00295	1.53038869

**Summary by Phase**

Phase	lbs/day (or gallons/day)										CO2e MT
	VOC	NOX	CO	PM10	PM2.5	SO2	CO2	Diesel	CH4	N2O	
Water Demolition Part 1	0.95	15.41	4.94	0.36	0.34	0.00	#####	2679.70	1.90	0.05	27

**CHC Emission Rate Calculation**

**1. CARB OFFROAD OUTPUT**

Model Output: OFFROAD2021 (v1.1.0.) Emissions Inventory

Region Type: Statewide

Region: California

Calendar Year: 2026

Scenario: All Adopted Rules - Exhaust

Vehicle Classification: Off-Road Web Query Equipment Types

Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Region	Calendar	Vehicle Category	Model Year	Horsepower	Fuel	HC_tpd	ROG_tpd	TOG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd	PM2.5_tpd	SOx_tpd	NH3_tpd	Fuel Consum	Total_Ac	Total_Popula	Horsepower_Hours_h
Statewide	2026	Commercial Harbor Craft - AE - Barge-Other	Aggregate	100	Diesel	4E-05	5E-05	6E-05	0.0002	0.001	0.1528	2E-05	2E-05	0	0	5203.06	3268.54	16.4	92018.49
Statewide	2026	Commercial Harbor Craft - AE - Barge-Other	Aggregate	175	Diesel	0.0002	0.0003	0.0004	0.0017	0.0058	0.9748	0.0001	0.0001	0	0	33203.7	13234.7	51.2	600698.84
Statewide	2026	Commercial Harbor Craft - AE - Barge-Other	Aggregate	300	Diesel	0.0007	0.0008	0.0009	0.0042	0.0163	2.6553	0.0003	0.0003	0	0	90444.5	24630.7	56.6	1668936.6
Statewide	2026	Commercial Harbor Craft - AE - Barge-Other	Aggregate	50	Diesel	2E-05	2E-05	3E-05	0.0001	0.0004	0.0576	1E-05	1E-05	0	0	1960.38	2951.54	10.8	30595.452
Statewide	2026	Commercial Harbor Craft - AE - Barge-Other	Aggregate	600	Diesel	0.0007	0.0009	0.0011	0.0047	0.0163	2.5347	0.0004	0.0004	0	0	86339.2	15183.6	23.8	1591326.9
Statewide	2026	Commercial Harbor Craft - AE - Barge-Other	Aggregate	75	Diesel	2E-05	3E-05	3E-05	0.0001	0.0005	0.0811	1E-05	1E-05	0	0	2762.08	2438.86	4.4	48672.893
Statewide	2026	Commercial Harbor Craft - AE - Barge-Other	Aggregate	9999	Diesel	0.0004	0.0005	0.0005	0.0016	0.0072	1.0444	1E-04	9E-05	0	0	35576.4	2615.09	6.6	681083.48
Statewide	2026	Commercial Harbor Craft - AE - Tugboat-Push/Tow	Aggregate	100	Diesel	0.0024	0.0029	0.0035	0.008	0.0442	3.6797	0.001	0.001	0	0	122188	64424.7	42	2160897.3
Statewide	2026	Commercial Harbor Craft - AE - Tugboat-Push/Tow	Aggregate	175	Diesel	0.004	0.0048	0.0057	0.0155	0.0778	7.4935	0.0012	0.0012	0	0	248438	96313.3	72.17	4393900.8
Statewide	2026	Commercial Harbor Craft - AE - Tugboat-Push/Tow	Aggregate	300	Diesel	0.0012	0.0014	0.0017	0.0046	0.0232	2.1678	0.0006	0.0005	0	0	72656.1	17666.4	13.71	1341126.4
Statewide	2026	Commercial Harbor Craft - AE - Tugboat-Push/Tow	Aggregate	50	Diesel	0.0012	0.0015	0.0017	0.0041	0.0184	1.6031	0.0006	0.0006	0	0	53311	56829.4	42.46	831819.38
Statewide	2026	Commercial Harbor Craft - AE - Tugboat-Push/Tow	Aggregate	600	Diesel	2E-05	3E-05	3E-05	9E-05	0.0005	0.0436	2E-05	2E-05	0	0	1486.78	235.469	1.542	27443.885
Statewide	2026	Commercial Harbor Craft - AE - Tugboat-Push/Tow	Aggregate	75	Diesel	0.0011	0.0014	0.0017	0.0038	0.0209	1.7393	0.0005	0.0004	0	0	57682.6	45674.4	32.75	1020120.3
Statewide	2026	Commercial Harbor Craft - AE - Work Boat	Aggregate	100	Diesel	0.0005	0.0006	0.0007	0.0017	0.0063	0.5687	0.0003	0.0003	0	0	19700.8	11649.2	16.27	338606.3
Statewide	2026	Commercial Harbor Craft - AE - Work Boat	Aggregate	175	Diesel	0.0011	0.0013	0.0015	0.0055	0.0178	1.8903	0.0005	0.0005	0	0	65478	25446.2	35.54	1172522.7
Statewide	2026	Commercial Harbor Craft - AE - Work Boat	Aggregate	300	Diesel	0.0031	0.0037	0.0045	0.0153	0.0476	4.8721	0.0015	0.0014	0	0	168767	43066.1	60.16	3111928
Statewide	2026	Commercial Harbor Craft - AE - Work Boat	Aggregate	50	Diesel	0.0005	0.0006	0.0007	0.0022	0.0063	0.6374	0.0003	0.0003	0	0	22078.2	32897.4	45.95	348043.43
Statewide	2026	Commercial Harbor Craft - AE - Work Boat	Aggregate	600	Diesel	0.0031	0.0038	0.0045	0.0138	0.0423	4.1269	0.0014	0.0013	0	0	142955	22387.8	31.27	2636570
Statewide	2026	Commercial Harbor Craft - AE - Work Boat	Aggregate	75	Diesel	0.0007	0.0008	0.001	0.0024	0.0073	0.6691	0.0003	0.0003	0	0	23176.5	21720.6	30.34	405999.96
Statewide	2026	Commercial Harbor Craft - AE - Work Boat	Aggregate	9999	Diesel	0.0018	0.0022	0.0026	0.0063	0.0162	2.6015	0.0007	0.0006	0	0	90103.2	4344.11	6.068	1754637.6
Statewide	2026	Commercial Harbor Craft - ME - Tugboat-Push/Tow	Aggregate	100	Diesel	1E-05	2E-05	2E-05	5E-05	0.0003	0.0241	1E-05	1E-05	0	0	819.126	471.447	3.083	14486.611
Statewide	2026	Commercial Harbor Craft - ME - Tugboat-Push/Tow	Aggregate	175	Diesel	0.0001	0.0001	0.0002	0.0003	0.0027	0.235	6E-05	5E-05	0	0	8002.53	2793.62	9.708	141534.88
Statewide	2026	Commercial Harbor Craft - ME - Tugboat-Push/Tow	Aggregate	300	Diesel	0.0021	0.0026	0.0031	0.0056	0.0448	3.6526	0.0009	0.0008	0	0	123496	28023	32.21	2279550.8
Statewide	2026	Commercial Harbor Craft - ME - Tugboat-Push/Tow	Aggregate	50	Diesel	5E-06	5E-06	7E-06	2E-05	6E-05	0.0055	9E-07	9E-07	0	0	181.66	235.723	1.542	2834.337
Statewide	2026	Commercial Harbor Craft - ME - Tugboat-Push/Tow	Aggregate	600	Diesel	0.0177	0.0214	0.0255	0.0431	0.342	26.022	0.0042	0.004	0	0	866112	111296	90.92	15987152
Statewide	2026	Commercial Harbor Craft - ME - Tugboat-Push/Tow	Aggregate	9999	Diesel	0.017	0.0205	0.0245	0.1197	0.3276	74.925	0.0073	0.007	0	0	2495889	114327	96.21	49094459
Statewide	2026	Commercial Harbor Craft - ME - Work Boat	Aggregate	175	Diesel	0.0025	0.0031	0.0036	0.0086	0.0407	3.4283	0.0008	0.0008	0	0	118756	48108.9	75.29	2129624.2
Statewide	2026	Commercial Harbor Craft - ME - Work Boat	Aggregate	300	Diesel	0.0086	0.0104	0.0124	0.028	0.123	10.368	0.0027	0.0026	0	0	359140	91236.5	142.8	6625171.8
Statewide	2026	Commercial Harbor Craft - ME - Work Boat	Aggregate	50	Diesel	4E-05	5E-05	6E-05	0.0002	0.0006	0.058	3E-05	2E-05	0	0	2008.29	1960.34	3.068	31334.15
Statewide	2026	Commercial Harbor Craft - ME - Work Boat	Aggregate	600	Diesel	0.0329	0.0398	0.0474	0.1101	0.5581	47.15	0.0108	0.0103	0	0	1633271	229087	352.4	30124952
Statewide	2026	Commercial Harbor Craft - ME - Work Boat	Aggregate	75	Diesel	0.0001	0.0001	0.0002	0.0004	0.0015	0.1363	7E-05	6E-05	0	0	4721.86	3920.69	6.136	80293.762
Statewide	2026	Commercial Harbor Craft - ME - Work Boat	Aggregate	9999	Diesel	0.0243	0.0294	0.035	0.1047	0.3134	40.393	0.0093	0.0088	0	0	1399216	57997.5	78.5	27019376

CHC Emission Rate Calculation

2. CALCULATION OF HOURLY EMISSIONS BY TYPE BY BIN

equation:  
daily tons x 365 x 2000

equation:  
annual lbs / annual hours

ROG = VOC  
PM10e = DPM

CHC short name	lbs per year								Hours	lbs/hr of pollutant or gallons/hr of fuel								Row (QA)
	VOC	NOX	CO	PM10	PM2.5	SO2	CO2	Fuel (gpy)		VOC	NOX	CO	PM10	PM2.5	SO2	CO2	Fuel	
AE - Barge-Other	36	732	164	17	16	0	111,508	5,203	3269	0.01	0.2	0.1	0.005	0.0	0.0	34.1	1.6	1
AE - Barge-Other	216	4,206	1,212	106	101	0	711,598	33,204	13235	0.02	0.3	0.1	0.008	0.0	0.0	53.8	2.5	2
AE - Barge-Other	576	11,917	3,062	237	226	0	1,938,341	90,444	24631	0.02	0.5	0.1	0.010	0.0	0.0	78.7	3.7	3
AE - Barge-Other	16	277	74	9	8	0	42,013	1,960	2952	0.01	0.1	0.0	0.003	0.0	0.0	14.2	0.7	4
AE - Barge-Other	645	11,868	3,449	325	310	0	1,850,360	86,339	15184	0.04	0.8	0.2	0.021	0.0	0.0	121.9	5.7	5
AE - Barge-Other	20	397	88	10	9	0	59,195	2,762	2439	0.01	0.16	0.04	0.004	0.00	0.00	24.27	1.13	6
AE - Barge-Other	331	5,264	1,175	71	68	0	762,448	35,576	2615	0.13	2.01	0.45	0.027	0.03	0.00	291.56	13.60	7
AE - Tugboat-Push/Tow	2,146	32,254	5,811	745	712	0	2,686,153	122,188	64425	0.03	0.50	0.09	0.012	0.01	0.00	41.69	1.90	8
AE - Tugboat-Push/Tow	3,504	56,772	11,306	908	868	0	5,470,220	248,438	96313	0.04	0.59	0.12	0.009	0.01	0.00	56.80	2.58	9
AE - Tugboat-Push/Tow	1,028	16,961	3,368	418	399	0	1,582,497	72,656	17666	0.06	0.96	0.19	0.024	0.02	0.00	89.58	4.11	10
AE - Tugboat-Push/Tow	1,065	13,466	3,016	420	402	0	1,170,252	53,311	56829	0.02	0.24	0.05	0.007	0.01	0.00	20.59	0.94	11
AE - Tugboat-Push/Tow	19	329	65	12	11	0	31,864	1,487	235	0.08	1.40	0.28	0.050	0.05	0.00	135.32	6.31	12
AE - Tugboat-Push/Tow	1,015	15,244	2,747	334	320	0	1,269,701	57,683	45674	0.02	0.33	0.06	0.007	0.01	0.00	27.80	1.26	13
AE - Work Boat	409	4,570	1,233	192	184	0	415,176	19,701	11649	0.04	0.39	0.11	0.017	0.02	0.00	35.64	1.69	14
AE - Work Boat	944	12,970	3,982	382	365	0	1,379,890	65,478	25446	0.04	0.51	0.16	0.015	0.01	0.00	54.23	2.57	15
AE - Work Boat	2,736	34,748	11,170	1,089	1,041	0	3,556,604	168,767	43066	0.06	0.81	0.26	0.025	0.02	0.00	82.58	3.92	16
AE - Work Boat	403	4,633	1,574	199	191	0	465,278	22,078	32897	0.01	0.14	0.05	0.006	0.01	0.00	14.14	0.67	17
AE - Work Boat	2,756	30,880	10,050	1,014	969	0	3,012,643	142,955	22388	0.12	1.38	0.45	0.045	0.04	0.00	134.57	6.39	18
AE - Work Boat	590	5,359	1,758	237	226	0	488,424	23,177	21721	0.03	0.25	0.08	0.011	0.01	0.00	22.49	1.07	19
AE - Work Boat	1,587	11,793	4,584	478	457	0	1,899,118	90,103	4344	0.37	2.71	1.06	0.110	0.11	0.00	437.17	20.74	20
ME - Tugboat-Push/Tow	13	205	37	10	9	0	17,596	819	471	0.03	0.44	0.08	0.021	0.02	0.00	37.32	1.74	21
ME - Tugboat-Push/Tow	108	1,942	239	42	40	0	171,549	8,003	2794	0.04	0.70	0.09	0.015	0.01	0.00	61.41	2.86	22
ME - Tugboat-Push/Tow	1,889	32,715	4,053	622	595	0	2,666,404	123,496	28023	0.07	1.17	0.14	0.022	0.02	0.00	95.15	4.41	23
ME - Tugboat-Push/Tow	4	47	11	1	1	0	4,040	182	236	0.02	0.20	0.05	0.003	0.00	0.00	17.14	0.77	24
ME - Tugboat-Push/Tow	15,625	249,639	31,459	3,084	2,948	0	18,996,215	866,112	111296	0.14	2.24	0.28	0.028	0.03	0.00	170.68	7.78	25
ME - Tugboat-Push/Tow	15,000	239,138	87,373	5,340	5,105	0	54,695,361	2,495,889	114327	0.13	2.09	0.76	0.047	0.04	0.00	478.41	21.83	26
ME - Work Boat	2,227	29,697	6,242	610	583	0	2,502,669	118,756	48109	0.05	0.62	0.13	0.013	0.01	0.00	52.02	2.47	27
ME - Work Boat	7,590	89,811	20,466	1,979	1,892	0	7,568,546	359,140	91236	0.08	0.98	0.22	0.022	0.02	0.00	82.96	3.94	28
ME - Work Boat	36	418	135	18	18	0	42,323	2,008	1960	0.02	0.21	0.07	0.009	0.01	0.00	21.59	1.02	29
ME - Work Boat	29,064	407,442	80,366	7,887	7,540	0	34,419,706	1,633,271	229087	0.13	1.78	0.35	0.034	0.03	0.00	150.25	7.13	30
ME - Work Boat	94	1,098	280	48	46	0	99,509	4,722	3921	0.02	0.28	0.07	0.012	0.01	0.00	25.38	1.20	31
ME - Work Boat	21,495	228,752	76,451	6,753	6,455	0	29,487,250	1,399,216	57998	0.37	3.94	1.32	0.116	0.11	0.00	508.42	24.13	32



## Site Remediation Off-Road Equipment

Phase: Water Demolition Part 1

Vehicle	Equipment	Offroad Equipment Category	Modeled Equipment	Fuel	Number Per Day	Hours Per Day	Engine Tier	Workdays	HP	Load factor
Barge w/ Crane	Cranes	Construction	Cranes	Diesel	1	8	na	20	367	0.29
	American 5299 Crane (On Flexifloat Spud Barge)	CHC	AE - Barge-Other	Diesel	1	8	Tier 3	20	168	
Flat Deck Barge	DB Palomar Main Engine	CHC	AE - Barge-Other	Diesel	1	2	Tier 3	20	600	
	DB Palomar Genset	CHC	AE - Barge-Other	Diesel	1	2	Tier 3	20	300	
Tugboat	Killeen Rear Genset - Harbor Tug	CHC	ME - Tugboat-Push/Tow	Diesel	1	2	Tier 3	20	803	
	Killeen Forward Genset - Harbor Tug	CHC	ME - Tugboat-Push/Tow	Diesel	1	2	Tier 3	20	803	
Workboat	Survey Boat	CHC	ME - Work Boat	Diesel	1	2	Tier 3 - BACT	20	230	

Notes:

Crane HP and Load factor are CalEEMod default.

Horsepower and types of other CHC equipment for the remediation are derived from clients equipment list.

Equipment activities are estimated as follows:

### Remediation material and quantity

Dredged Material	8,235.45	CY
Replacement Sand	8,235.45	CY
<b>Total CY</b>	<b>16,470.9</b>	<b>CY</b>

### Remediation Equipment Activities

Equipment	Qty. (CY)	CY per Equip-hours	# equip	Hours/day	Equip hours	Estimated Workdays
Derrick Barge+Crane	16,470.90	104.17	1	8	158	20
Workboat	16,470.90	416.67	1	2	40	20
Flat Deck Barge	16,470.90	416.67	1	2	40	20
Tugboat	16,470.90	416.67	1	2	40	20

CY per hours is based on dredging activity as shown below:

Reference: Cal Maritime Waterfront Master Plan FEIR Calculations

Phase	Dredging CY	Equip	# equip	workdays	Hr/day	Equipment hours	CY per equip hours
Phase 2-1	40,000	Derrick Barge+Crane	1	48	8	384	104.166667
Phase 2-1	40,000	Workboat	1	48	2	96	416.67
Phase 2-1	40,000	Flat Deck Barge	1	48	2	96	416.67
Phase 2-1	40,000	Tugboat	1	48	2	96	416.67