US Army Corps of Engineers®

OAKLAND HARBOR TURNING BASINS WIDENING, CA

NAVIGATION STUDY

INTEGRATED FEASIBILITY REPORT & ENVIRONMENTAL ASSESSMENT

Appendix A04a

Air Quality General Conformity Memo

January

2024

Memorandum

date	March 22, 2023
to	Kelly Bayer and Krystle McBride; AECOM
cc	Justin Taschek; Port of Oakland
	Eric Jolliffe; U.S. Army Corps of Engineers
from	Tim Sturtz, Kurt Richman, and Jyothi Iyer; ESA
subject	Oakland Harbor Turning Basins Widening – General Conformity Analysis

The United States Army Corps of Engineers (USACE), as the federal lead agency, and the Port of Oakland (Port), as the non-federal sponsor, are conducting the Oakland Harbor Turning Basins Widening Navigation Study. The purpose of the study is to determine whether there is a technically feasible, economically justifiable, and environmentally acceptable recommendation for federal participation in a project that would improve marine navigation (the project) for the existing, constructed -50-Foot Oakland Harbor Navigation Project (the -50-Foot Project). As part of the -50-Foot Project Study, the existing federal navigation channel was designed for a ship with a capacity of 6,500 20-foot equivalent units, an overall length of 1,139 feet, a 140-foot beam, and a 48-foot draft. The vessels routinely calling on the harbor today are longer, wider, and deeper than the design vessel from that study.

The Section 216 Initial Appraisal Report[1] concluded that marine navigation inefficiencies in Oakland Harbor are caused by width limitations in the turning basins, not by depth limitations or landside capacity. The current fleet exceeds the maximum dimensions of the constructed -50-Foot Project; the resulting inefficiencies are projected to persist into the future because the average vessel size and frequency of larger vessels serving the Port are expected to increase.

The purpose of this memorandum is to assess, for use in National Environmental Policy Act (NEPA) documentation, the impact that air emissions related to project construction have on air quality in the region. This memorandum details the regulatory environment, the emission calculation methodologies, and summaries of the projected emissions for use in assessing general conformity applicability under NEPA.

Regulatory Environment

The regulatory framework for general conformity was promulgated by the United States Environmental Protection Agency (USEPA) in November of 1993 in 40 Code of Federal Regulations (CFR), Part 93, Subpart B, with final revised regulations published in April of 2010. General Conformity regulations apply to federal actions that occur in a nonattainment area—or in an area previously classified as nonattainment and operating under a maintenance program, if annual emission totals exceed applicability

[1] USACE. 2018. Oakland Harbor Navigation Project, Section 216 Initial Appraisal Report. March.

thresholds known as *de minimis* levels. USEPA first promulgated the General Conformity Rule to implement the conformity provision of Title I, Section 176(c)(1), of the *Clean Air Act,* and its 1990 amendments. The General Conformity Rule is designed to ensure that air emissions associated with federal actions do not contribute to air quality degradation or prevent achievement of state and federal air quality goals.[2] "General Conformity" refers to the process of evaluating federal plans, programs, and projects to determine and demonstrate that they meet the requirements of the *Clean Air Act* and the applicable State Implementation Plan (SIP). "Nonattainment" refers to an air basin that currently does not meet National Ambient Air Quality Standards (NAAQS) for regulated air pollutants, as further defined in the following section. The *de minimis* levels are established by the General Conformity Rule in Section 93.153, and the levels vary by severity of the nonattainment designation of the region. A region's nonattainment and severity are designated under Section 107 of the Clean Air Act and described in 40 CFR Part 81. Emissions used for comparison to *de minimis* levels include both direct and indirect emissions that are reasonably foreseeable, and those which the federal agency can control via the agency's continuing program responsibility.

Projects that are potentially subject to general conformity can follow a series of steps to determine the level of analysis that is required. The initial phase of this process includes an applicability analysis, as described in 40 CFR Part 93 Subpart B. This analysis requires a comparison of pollutant-specific annual emissions to their respective *de minimis* levels. If the applicability analysis demonstrates that general conformity does not apply to the project, then no additional analysis or documentation is required under the regulations.

If general conformity is applicable to the project, additional steps include a detailed evaluation for the applicable pollutants, as described in the regulations; publication of a draft general conformity determination; consideration of public comments; and publication of a final general conformity determination. The methodology of the assessment for the determination is described in detail in the regulations and is specific to the pollutant or pollutants that are identified as applicable.

Standards and Attainment Status

The Clean Air Act is the comprehensive federal law that regulates air emissions from stationary and mobile sources. Last amended in 1990, it requires USEPA to set NAAQS for six principal pollutants (termed "criteria" air pollutants) prevalent in the atmosphere and found to be harmful to public health and the environment. National standards have been established for six criteria air pollutants: ground-level ozone, carbon monoxide (CO), nitrogen dioxide, sulfur dioxide, respirable particulate matter (PM), and lead. For respirable PM, separate standards have been established for particulate matter less than 10 microns in diameter (PM_{10}) and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$). As discussed above and defined in the 1990 Clean Air Act amendments, USEPA classifies air basins (or portions thereof) as being in "attainment" or "nonattainment" for each criteria air pollutant, according to whether the NAAQS are currently being achieved. USEPA further classifies nonattainment areas according to the severity of pollution: marginal, moderate, serious, severe, and extreme. The current national ambient air quality standards for each pollutant, as well as the attainment status of the San Francisco Bay Area Air Basin (SFBAAB) with respect to these standards, is provided in **Table 1**.

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[2] Revisions to the General Conformity Rule are codified in 40 CFR Parts 51 and 93, Subpart W, *Revisions to the General Conformity Regulations*, Final Rule (April 2010). The General Conformity Rule applies to all federal actions except highway and transit programs. The latter must comply with the conformity requirements for Transportation Plans in 40 CFR Part 93, Subpart A.

Table 1: National Ambient Air Quality Standards and SFBAAB Attainment Status

Pollutant	Averaging Time	National Standard	SFBAAB Attainment Status (National)
Ozone	8-Hour	0.070 ppm	Nonattainment (Marginal)
Carbon Monoxide	8-Hour	9 ppm	Attainment (Maintenance)
	1-Hour	35 ppm	Attainment (Maintenance)
Nitrogen Dioxide	Annual Average	0.053 ppm	Attainment
	1-Hour	0.100 ppm	Unclassified
Sulfur Dioxide	Annual Average	0.030 ppm	Attainment
	24-Hour	0.14 ppm	Attainment
	1-Hour	0.075 ppm	Attainment
Particulate Matter (PM_{10})	24-Hour	150 $\mu g/m^3$	Unclassified
Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12.0 $\mu g/m^3$	Unclassified/Attainment
	24-Hour	35 $\mu g/m^3$	Nonattainment (Moderate)[1]
Lead	Calendar Quarter	1.5 $\mu g/m^3$	Attainment
	3-Month Rolling Average	0.15 $\mu g/m^3$	Unclassified

Notes:

1. On January 9, 2013, USEPA issued a final rule, determining that SFBAAB has attained the 24-hour $PM_{2.5}$ national standard. This USEPA rule suspends key SIP requirements as long as monitoring data continue to show that SFBAAB attains the standard. Despite this action, SFBAAB will continue to be designated as "nonattainment" for the national 24-hour $PM_{2.5}$ standard until BAAQMD submits a "redesignation request" and a "maintenance plan" to USEPA, and USEPA approves the proposed redesignation.

BAAQMD = Bay Area Air Quality Management District
$\mu g/m^3$ = micrograms per cubic meter
PM_{10} = particulate matter 10 microns in diameter or less
$PM_{2.5}$ = particulate matter 2.5 microns in diameter or less
ppm = parts per million
SFBAAB = San Francisco Bay Area Air Basin
SIP = State Implementation Plan
USEPA = United States Environmental Protection Agency

Source: USEPA, Nonattainment Areas for Criteria Pollutants, last updated on August 31, 2021. Available online at: https://www.epa.gov/green-book.

The Clean Air Act requires each state to prepare an air quality control plan (i.e., the SIP). The Clean Air Act amendments require states containing areas that violate the NAAQS to revise their SIPs by incorporating additional control measures to reduce air pollutants that are in violation of the standards. Thus, the SIP is a living document that is periodically updated to reflect the latest emissions inventories, planning documents, rules, and regulations of air basins, as reported by the agencies with jurisdiction over the air basins. USEPA has responsibility to review all SIPs to determine whether they meet federal requirements and will achieve air quality goals (i.e., attainment with the NAAQS) when implemented. If USEPA determines a SIP to be inadequate, it may prepare a Federal Implementation Plan for the nonattainment area and may impose additional control measures. Failure to submit an approvable SIP or to implement the plan within mandated timeframes can result in sanctions being applied to transportation funding and stationary air pollution sources in the air basin.

Applicable De Minimis Rates

SFBAAB is classified as being in nonattainment with respect to the federal national standards for ozone and $PM_{2.5}$. The severities of these nonattainment designations are marginal and moderate, respectively. Because ozone is a secondary pollutant formed through chemical reactions between nitrogen oxides (NO_X) and volatile organic compounds (VOC), *de minimis* thresholds for ozone nonattainment areas have been established for NO_X and VOC. For ozone nonattainment areas with a marginal classification, the *de*

minimis level for ozone precursors (NO_X and VOC) is 100 tons per year for each. Similarly, the *de minimis* level for a region designated as being in moderate nonattainment with respect to the $PM_{2.5}$ standard is 100 tons per year. SFBAAB is classified as an attainment area with respect to the federal CO standard, and the applicable maintenance *de minimis* threshold is 100 tons per year.

The General Conformity regulations state that "If an action would result in emissions originating in more than one nonattainment or maintenance area, the conformity must be evaluated for each area separately." Because on-road emissions associated with disposal hauling would occur during travel through the San Joaquin Valley Air Basin (SJVAB), these emissions have also been assessed but are tabulated separately.

SJVAB is classified as being in nonattainment with respect to the federal national standards for ozone and $PM_{2.5}$. The severities of the nonattainment designations are extreme and severe, respectively. For ozone nonattainment areas with an extreme classification, the *de minimis* level for ozone precursors (NO_X and VOC) is 10 tons per year. The *de minimis* level for a region designated as severe nonattainment for $PM_{2.5}$ is 70 tons per year. The SJVAB is classified as an attainment area with respect to the federal CO standard, and the applicable maintenance *de minimis* threshold is 100 tons per year.

As discussed above, the *de minimis* level is used as a metric to determine whether the general conformity regulations apply to a project. If the emissions from the project do not exceed the *de minimis* levels identified above, no further analysis is required.

Criteria Air Pollutant Emissions

The air emissions calculations are based on input information provided by USACE and the Port. Information provided to Environmental Science Associates (ESA) to date includes background project details; construction schedule and phasing; and proposed construction equipment lists, activity levels, and worker and construction truck trips by phase.. Construction equipment data have been aggregated to characterize the hours of activity by equipment and by year. Generally, for action alternatives involving expansion of both the Inner and Outer Harbor Turning Basins (Sub-Alternatives D-1 and D-2), the project schedule suggests that the Howard Terminal activity would be split between 2027 and 2028; the in-water activity by Schnitzer Steel would occur in 2028; Alameda-based activity would be split between 2028 and 2029; dredging activity for the Outer Harbor would mostly occur in 2028 and be completed in 2029; and dredging of Inner Harbor sediments would occur in 2029. For Alternative B, involving expansion of the Inner Harbor Turning Basin only, the schedule would be the same as described above minus the dredging activity for the Outer Harbor in 2028 and 2029. For Alternative C, involving expansion of the Outer Harbor Turning Basin only, dredging activity would be split between 2027 and 2028

Equipment Characterization and Activity

Using the data provided by the USACE, ESA aggregated the number of operating hours for each piece of equipment. The summary of activity hours by year, presented in **Table 2**, is applied to the emission factors derived from California Air Resources Board's (CARB) OFFROAD[3] model to derive emissions estimates.

[3] California Air Resources Board. 2022. MSEI – Documentation – Off-Road – Diesel Equipment. Available online at: https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-road.

Table 2. Equipment Operating Hours by Year

Equipment	Hours of Operation			
	2027	2028	2029	Total[1]
Backhoe/front loader	1,062	3,310	509	4,880
Barge ship/scow	798	14,038	8,828	23,664
Compressor	798	774	2,106	3,677
Concrete saw	446	1,902	0	2,348
Crane	1,413	9,197	5,861	16,471
Crane with clamshell	0	6,339	2,881	9,219
Diesel hammer (Delmag D30)	616	2,142	462	3,220
Dive vessel	798	620	2,137	3,555
Dozer	446	1,551	310	2,307
Drilling rig	0	222	312	534
Excavator	1,684	6,301	4,686	12,672
Generator	798	598	2,106	3,501
Torch	0	352	502	854
Tugboat	0	12,466	6,174	18,640
Towboat/pushboat	0	383	502	885
Vibratory hammer	798	1,173	1,947	3,917

Note:

1. Totals may not add up due to rounding.

Source: Table compiled by Environmental Science Associates in 2023.

The OFFROAD model provides emission factors for land-based construction equipment by horsepower and calendar year. Available horsepower data were used for reasonably assumed equipment to be used on the project, such as vibratory hammers, dozers, excavators, backhoes/front loaders, and generator sets. In the absence of reasonably assumed equipment-specific horsepower information for other construction equipment, California Emissions Estimator Model (CalEEMod) defaults were used. CalEEMod is an emissions estimation/evaluation model that was developed in collaboration with the air quality management districts of California. Horsepower and engine loads used for project construction equipment are shown in **Table 3**. Data presented are CalEEMod defaults, except where noted when specific horsepower was used for reasonably assumed equipment to be used for the project . The OFFROAD2017 emissions factors used are presented in **Table 4**.

Unlike the land-based construction emissions, the marine equipment specifications are largely based on equipment that have been identified as representative. **Tables 5 and 6** provide the specifications used for modeling the emissions from commercial harbor craft and dredge operations respectively.

The emission factors for the off-road equipment and the dredging equipment were taken from CARB's OFFROAD model, which accounts for project locality, fleet growth and scrappage, and regulatory programs that pertain to equipment activity and emission rates. The marine-based tugboats, dive boats, and barges were modeled using USEPA's most recent guidance document and the tier-based emission factors for harbor craft.[4] The emission factors for the engine tiers used in this analysis are presented in **Table 7**.

[4] Table H.7 of USEPA's Port Emission Inventory Guidance: Methodologies for Estimating Port-Related and Goods Movement Mobile Source Emission. September 2020.

Table 3. Horsepower and Engine Loads for Off-road Construction Equipment

Project Equipment	Equivalent Equipment in CalEEMod	Horsepower	Load Factor[1]
Backhoe/front loader[2]	Tractors/loaders/backhoes	286	0.37
Compressor[3]	Air compressors	78	0.48
Concrete saw[3]	Concrete/industrial saws	81	0.73
Crane[3]	Cranes	231	0.29
Crane with clamshell[3]	Cranes	231	0.29
Diesel hammer (Delmag D30)[2]	Other construction equipment	595	0.42
Dozer[2]	Rubber tired dozers	347	0.4
Drilling rig[3]	Bore/drill rigs	221	0.5
Excavator[2]	Excavators	411	0.38
Generator[2]	Generator sets	244	0.74
Torch[3]	Welders	46	0.45
Vibratory hammer[2]	Other construction equipment	595	0.42

Notes:

1. CalEEMod default load factors used for all equipment.
2. Reasonably assumed equipment to be used for the project with higher horsepower ratings than CalEEMod used.
3. CalEEMod default equipment horsepower used.

CalEEMod = California Emissions Estimator Model

Source: Table compiled by Environmental Science Associates in 2023.

Table 4. OFFROAD2017 Emission Factors for Off-Road Construction Equipment[1]

Project Equipment	VOC g/hp-hr	NO_X g/hp-hr	PM_{10} g/hp-hr	$PM_{2.5}$ g/hp-hr	CO g/hp-hr
Backhoe/front loader	0.136	1.181	0.047	0.043	1.195
Compressor	0.419	3.538	0.081	0.075	4.79
Concrete saw	0.39	3.43	0.071	0.065	4.291
Crane	0.203	2.251	0.094	0.086	1.446
Crane with clamshell	0.203	2.251	0.094	0.086	1.446
Diesel hammer (Delmag D30)	0.186	1.831	0.095	0.088	3.154
Dozer	0.298	3.091	0.135	0.125	2.656
Drilling rig	0.1	1.028	0.034	0.032	1.06
Excavator	0.097	0.62	0.022	0.02	1.041
Generator	0.273	3.286	0.066	0.06	3.704
Torch	0.378	3.466	0.079	0.073	4.461
Vibratory hammer	0.127	1.205	0.046	0.042	1.245

Notes:

1. Fleet average emissions factors presented are for the year 2027. Year 2028 and 2029 emission factors will be incrementally lower due to the turnover of equipment, which will result in the fleet including newer equipment that meets more stringent emission standards, and the retirement of older equipment from the fleet.

CO = carbon monoxide
g/hp-hr = grams per horsepower hour
NO_X = nitrogen oxides
PM_{10} = particulate matter 10 microns in diameter or less
$PM_{2.5}$ = particulate matter 2.5 microns in diameter or less
VOC = volatile organic compounds

Source: Table compiled by Environmental Science Associates in 2023.

Table 5. Harbor Craft Specifications

Name	Tier[1]	Propulsion Power (hp)	Auxiliary Power (hp)	Propulsion Load[6]	Auxiliary Load[6]
Ocean tug[2]	Tier 2[7]	4,000	382	0.5	0.43
Towboat/pushboat[3]	Tier 3[7]	800	187	0.68	0.43
Scow[4]	Tier 4	0	225	0	0.43
Work boat[5]	Tier 3[7]	622	464	0.45	0.43

Notes:

1. USEPA has adopted multiple tiers of emission standards for off-road equipment. Each increasing tier has more stringent emission standards than the previous. The tier of an equipment from zero to 4 can be considered to be the evolution of emission standards to gain increasing emission reductions.
2. The ocean tug is assumed to have installed power of 4,000 hp for propulsion, as discussed with the Port and USACE, and auxiliary power is taken from USEPA's port guidance documentation. These assumptions are consistent with the Port's Emission Inventory methodology.
3. Dredge tender specifications are modeled based on Dutra's Becky T. tug for both propulsion and auxiliary power.
4. Scows are assumed to have no propulsion power and installed auxiliary power of 225 hp, based on the specifications of SCOW 5 of Dutra's fleet.
5. Default USEPA workboat specifications are used for the dive vessel emissions.
6. Engine loads are taken from USEPA's port guidance documentation.
7. Amendments to California's Commercial Harbor Craft Regulation, section 2299.5, title 13, division 3, chapter 5.1; and section 93118.5, title 17, chapter 1, subchapter 7.5 of the California Code of Regulations went into effect on January 1, 2023. The amended Commercial Harbor Craft Regulation will reduce emissions from harbor craft operated near California's coast. Because these amendments were only recently approved (on December 30, 2022), they were not factored into this analysis. However, based on the requirements of this regulation, ocean tugs, towboats/ pushboats, and workboats used during construction could have higher tier classes than were assumed for this analysis (i.e., have cleaner engines).

hp = horsepower
Port = Port of Oakland
USACE = United States Army Corps of Engineers
USEPA = United States Environmental Protection Agency

Table 6. Representative Dredge Specifications

Name[1]	Engine	Model Year	Power (hp)	Engine Load
DB 24[2]	Main	2019	810	0.66
	Genset	2006	325	0.66
	Spud	2007	300	0.66
	Anchor	2007	300	0.66
DB Beaver[2]	Main	2019	755	0.66
	Aux1	2017	225	0.66
	Aux2	2016	225	0.66

Notes:

1. Engine specifications were provided by the Port and are used to characterize representative equipment specifications.
2. The representative vessels were modeled by assuming that each dredge completed half of the proposed dredging activity.

hp = horsepower
Port = Port of Oakland

Source: Table developed based on data provided to ESA by the Port and the USACE.

Table 7. USEPA Tier-Based Harbor Craft Emission Factors

Engine Tier	VOC (g/hp-hr)	NO_X (g/hp-hr)	PM_{10} (g/hp-hr)	$PM_{2.5}$ (g/hp-hr)
Tier 2	0.2204	4.2074	0.1104	0.1071
Tier 3	0.0931	3.5415	0.0619	0.0600
Tier 4	0.0931	0.9694	0.0224	0.0217

Notes:

g/hp-hr = grams per horsepower hour
NO_X = nitrogen oxides
PM_{10} = particulate matter 10 microns in diameter or less
$PM_{2.5}$ = particulate matter 2.5 microns in diameter or less
VOC = volatile organic compounds

Emission Calculation Methodology

As referenced above, the air quality analysis relied on emission factors, models, and tools developed by a variety of industry experts and agencies, including CARB, California Air Pollution Control Officers Association, the Bay Area Air Quality Management District (BAAQMD), and USEPA.

Existing Conditions and Project Baseline

The operational baseline is not expected to change because of this project; therefore, the air quality changes from the proposed action would be limited to the construction activities. Emissions from existing conditions include criteria air pollutant and precursor emissions, including VOC, NO_X, PM_{10}, and $PM_{2.5}$ from a variety of emissions sources in the area, such as existing Port-related operations (e.g., ocean-going vessels, commercial harbor craft, and cargo handling equipment). The project is not expected to induce cargo growth (shifts from other ports or new business) that would change the throughput of vessel cargo through the Port or induce a significant activity level modification in the turning basins. Therefore, the existing conditions and the post-construction conditions are not expected to differ as a direct effect of the project. Consequently, the primary focus of this assessment is on the construction activities.

Construction Emissions

Fugitive dust emissions are typically generated during construction phases by activities such as grading, excavation, bulldozing, and truck loading. Studies have shown that the application of best management practices (BMPs) at construction sites effectively controls fugitive dust. BAAQMD recommends that analyses focus on implementation of dust control measures rather than comparing estimated levels of fugitive dust to a quantitative significance threshold.[5] Therefore, implementation of these BMPs (BAAQMD mitigation measures) provide the basis for determining the significance of air quality impacts from fugitive dust emissions. Emissions summaries include both exhaust and fugitive emissions in the PM_{10} and $PM_{2.5}$ totals.

Mass average daily and annual exhaust emissions have been evaluated in a manner consistent with the methodology used by CalEEMod (version 2020.4.0.). Off-road land-based construction equipment emissions have been estimated using the emission factors from CARB's OFFROAD 2017 model; reasonably assumed equipment to be used for the project with higher horsepower ratings than CalEEMod was used for select equipment (see **Table 3**). However, the marine equipment (e.g., dredges, ocean tugs, and scows) was assessed according to USEPA's 2020 guidance document on estimating emissions from these source types.

The emission calculation for off-road land-based and marine construction equipment follows the methodology shown in Equation 1.

$$E = EF \; x \; HP \; x \; LF \; x \; A$$

(1)

Where:

EF = Emission Factor (grams per horsepower hour [g/hp-hr])
HP = Engine Power (horsepower [hp])
LF = Engine Load (unitless)

[5] BAAQMD, CEQA Air Quality Guidelines. May 2017.

The equation is applied separately for activity in each calendar year and by propulsion and auxiliary engines. This approach is consistent with the approach described in USEPA's port-related guidance.

On-road emissions from construction vehicles have been estimated using the emission factors from the EMission FACtors 2021 (EMFAC2021) model.[6] The emission calculation follows the methodology shown in Equation 2.

$$E = EF \; x \; A \; x \; D \qquad \textbf{(2)}$$

Where:

E = Emissions (grams [g])
EF = Emission factor (g per mile)
A = Number of vehicle trips
D = Trip length (miles per trip)

Emissions Summary

The emissions, with dredge equipment assumed to be fueled by diesel, were calculated per calendar year for use in comparing to the *de minimis* levels and for determining applicability of general conformity to the overall project. As part of this calculation, it is conservatively assumed that all sources are not exempt from general conformity (i.e., the federal agency can exert control on the emissions through its continuing program responsibility). The resulting estimated emissions, shown in **Table 8**, do not result in the emissions of ozone precursors or the emissions of $PM_{2.5}$ exceeding the corresponding *de minimis* levels for any calendar year. These results indicate that a conformity analysis is not required, and no general conformity determination will be produced.

Consideration was given to the use of electric dredge equipment, which would reduce the emissions shown in**Table 8.** and would remain under the *de minimis* levels as shown in **Table 9**. **Table 9** also includes mitigated emissions for off-road construction equipment that are commonly necessitated under the California Environmental Quality Act analysis required for the Port, the project's non-federal sponsor. Off-road equipment mitigation assumes the use of engines meeting USEPA and CARB Tier 4 Final standards in all construction equipment, to the extent such technology is available for equipment used for project construction.

Additionally, the estimated emissions that would result from haul truck travel through the SJVAB, shown in **Table 10**, do not result in the emissions of ozone precursors or $PM_{2.5}$ that exceed the corresponding *de minimis* levels for any calendar year. These results indicate that a conformity analysis is not required, and no general conformity determination will be produced.

[6] On November 15, 2022, USEPA approved the EMFAC2021 motor vehicle emissions factor model for use in California.

Table 8. Annual Emissions for Alternatives Using Diesel Dredges, with Comparison to *de minimis* Rates

Alternative	Construction Year	Tons per year				Fraction of *de minimis*[1] (%)			
		VOC	NO_X	$PM_{2.5}$[2]	CO	VOC	NO_X	$PM_{2.5}$[2]	CO
Alternative B – Inner Harbor Only	2027	0.28	3.32	0.41	2.75	0.3%	3.3%	0.4%	2.7%
	2028	0.99	14.42	1.11	8.21	1.0%	14.4%	1.1%	8.2%
	2029	1.97	24.94	0.91	11.17	2.0%	24.9%	0.9%	11.2%
	Alternative **B Total**[3]	**3.2**	**42.7**	**2.4**	**22.1**	—	—	—	—
Alternative C – Outer Harbor Only	2027	5.71	55.11	1.88	16.96	5.7%	55.1%	1.9%	17.0%
	2028	0.18	3.31	0.09	0.52	0.2%	3.3%	0.1%	0.5%
	Alternative **C Total**[3]	**5.9**	**58.4**	**2.0**	**17.5**	—	—	—	—
Alternative D-1 — Both Inner and Outer Harbor	2027	0.28	3.32	0.41	2.75	0.3%	3.3%	0.4%	2.7%
	2028	6.71	69.53	2.99	25.16	6.7%	69.5%	3.0%	25.2%
	2029	2.15	28.25	1.00	11.69	2.1%	28.2%	1.0%	11.7%
	Alternative **D-1 Total**[3]	**9.1**	**101.1**	**4.4**	**39.6**	—	—	—	—
***De Minimis* Thresholds**[4]		**100**	**100**	**100**	**100**	—	—	—	—

Notes:

1. SFBAAB is classified as a marginal nonattainment area with respect to the federal ozone standard, a moderate nonattainment area with respect to the $PM_{2.5}$ standard, and a maintenance area with respect to the federal CO standards. These designations correspond to *de minimis* levels of 100 tons per calendar year for each pollutant (VOC, NO_X, $PM_{2.5}$, and CO).
2. $PM_{2.5}$ values include both emissions from exhaust and fugitive sources.
3. Totals may not add up due to rounding.
4. *De minimis* thresholds apply per calendar year.

CO = carbon monoxide
NO_X = nitrogen oxides
$PM_{2.5}$ = particulate matter 2.5 microns in diameter or less
SFBAAB = San Francisco Bay Area Air Basin
VOC = volatile organic compounds

Source: Table compiled by Environmental Science Associates in 2023.

Table 9. Annual Emissions for Alternatives Using Electric Dredges, with Comparison to *de minimis* Rates

Alternative	Construction Year	Tons per year				Fraction of *de minimis*[1] (%)			
		VOC	NO_X	$PM_{2.5}$[2]	CO	VOC	NO_X	$PM_{2.5}$[2]	CO
Alternative B – Inner Harbor	2027	0.14	1.55	0.35	3.01	0.1%	1.5%	0.4%	3.0%
	2028	0.49	8.74	0.91	8.42	0.5%	8.7%	0.9%	8.4%
	2029	0.89	14.99	0.55	9.04	0.9%	15.0%	0.6%	9.0%
	Alternative **1 Total**[3]	**1.5**	**25.3**	**1.8**	**20.5**	—	—	—	—
Alternative C – Outer Harbor	2027	2.07	37.96	0.97	9.16	2.1%	38.0%	1.0%	9.2%
	2028	0.14	2.53	0.06	0.56	0.1%	2.5%	0.1%	0.6%
	Alternative **2 Total**[3]	**2.2**	**40.5**	**1.0**	**9.7**	—	—	—	—
Alternative D-2 – Inner and Outer Harbor	2027	0.14	1.55	0.35	3.01	0.1%	1.5%	0.4%	3.0%
	2028	2.56	46.69	1.87	17.58	2.6%	46.7%	1.9%	17.6%
	2029	1.03	17.51	0.62	9.6	1.0%	17.5%	0.6%	9.9%
	Alternative **3 Total**[3]	**3.7**	**65.7**	**2.8**	**30.2**	**—**	**—**	**—**	**—**
***De Minimis* Thresholds**[4]		**100**	**100**	**100**	**100**	**—**	**—**	**—**	**—**

Notes:

1. Alameda and San Francisco Counties are both considered to be marginal ozone nonattainment areas, moderate $PM_{2.5}$ nonattainment areas, and maintenance areas for CO. These designations correspond to *de minimis* rates of 100 tons per calendar year for each pollutant (VOC, NO_X, $PM_{2.5}$, and CO).
2. $PM_{2.5}$ values in table include both emissions from exhaust and fugitive sources.
3. Totals may not add up due to rounding.
4. *De minimis* thresholds apply per calendar year.

CO = carbon monoxide
NO_X = nitrogen oxides
$PM_{2.5}$ = particulate matter 2.5 microns in diameter or less
VOC = volatile organic compounds

Source: Table compiled by Environmental Science Associates in 2023.

Table 10. SJVAB Hauling Emissions Estimates by Calendar Year, with Comparison to *de minimis* Rates

Alternative	Construction Year	Tons per year				Fraction of *de minimis*[1] (%)			
		VOC	NO_X	$PM_{2.5}$	CO	VOC	NO_X	$PM_{2.5}$	CO
Alternative B – Inner Harbor	2027	0.0	0.0	0.0	0.0	0%	0%	0%	0%
	2028	0.004	0.540	0.020	0.022	0.04%	5.4%	0.03%	0.022%
	2029	0.001	0.084	0.003	0.003	0.01%	0.84%	0.004%	0.003%
	Alternative **1 Total**	**0.005**	**0.624**	**0.023**	**0.025**	—	—	—	—
Alternative C – Outer Harbor[2]	2027	0.0	0.0	0.0	0.0	0%	0%	0%	0%
	2028	0.0	0.0	0.0	0.0	0%	0%	0%	0%
	Alternative **2 Total**	**0.0**	**0.0**	**0.0**	**0.0**	—	—	—	—
Alternative D – Inner and Outer Harbor	2027	0.0	0.0	0.0	0.0	0%	0%	0%	0%
	2028	0.004	0.540	0.020	0.022	0.04%	5.4%	0.03%	0.022%
	2029	0.001	0.084	0.003	0.003	0.01%	0.84%	0.004%	0.003%
	Alternative **3 Total**	**0.005**	**0.624**	**0.023**	**0.025**	—	—	—	—
***De Minimis* Thresholds[3]**		**100**	**100**	**70**	**100**	—	—	—	—

Notes:

1. SJVAB is classified by USEPA as being in extreme nonattainment with respect to the federal ozone standard and serious nonattainment for the federal $PM_{2.5}$ standard. These designations correspond to *de minimis* levels of 100 tons per calendar year for VOC and NO_X, and 70 tons per calendar year for $PM_{2.5}$. Parts of Fresno, Kern, San Joaquin, and Stanislaus counties in the SJVAB are designated as maintenance areas with respect to the federal CO standard, which corresponds to a *de minimis* threshold of 100 tons per calendar year.
2. No haul trips through SJVAB would occur under Alternative C.
3. *De minimis* thresholds apply per calendar year.

CO = carbon monoxide
NO_X = nitrogen oxides
$PM_{2.5}$ = particulate matter 2.5 microns in diameter or less
USEPA = United States Environmental Protection Agency
SJVAB = San Joaquin Valley Air Basin
VOC = volatile organic compounds

Source: Table compiled by Environmental Science Associates in 2023.

Addendum

The Oakland Harbor Turning Basins Project has *de minimum* emissions under the federal CAA. In September 2022 the ASA(CW)determined the use of electric dredges is more appropriately classified as a mitigation measure not required by federal law. The ASA(CW) did support the use of electric dredges if the sponsor is willing to assume all additional costs, there will be no federal cost share.