APPENDIX B

Air Quality Analysis Methodology and Results

APPENDIX B AIR QUALITY ANALYSIS METHODS AND RESULTS

This appendix discusses the approach and methods used to assess construction and operational emissions associated with the RTI Infrastructure, Inc. Grover Beach Subsea Fiber Optic Cables Project (Project). The analysis evaluates daily, quarterly, and yearly emissions generated by terrestrial equipment and vehicles and marine activities within 3 nautical miles (nm) of the shore. The equipment considered in this appendix is more conservative than the one listed in the MND to allow flexibility and to analyze all possible equipment scenarios that may be available to carry out the Project. The work schelude is estimated to start in Summer 2020. Even if the work schedule changes beyond Summer 2020, it would not change the number of working days (Tables B-1 and B-2), equipment (Tables B3, B-4, and B-6), or emissions (Tables B-7 to B-20). The modeling is conservative because it is based on 2020 emission factors. There will be no overlap of phases. Emissions analyzed include criteria pollutants of ozone precursors (reactive organic gases [ROG] and nitrogen oxides [NOx]), carbon monoxide (CO), particulate matter (PM10 and PM2.5), and sulfur dioxide (SO_2) and greenhouse gases (GHG) of carbon dioxide (CO_2), methane (CH_4), and nitrous oxides (N_2O).

As discussed in Section 3.3., *Air Quality* of the Initial Study/Mitigated Negative Declaration (IS/MND) for the Project, the criteria pollutant impact analysis is limited to emissions generated within 3 nautical miles (nm) from the U.S. coastline. This is consistent with the jurisdiction of the California State Lands Commission (CSLC) under the California Environmental Quality Act (CEQA).

As discussed in Section 3.8, *Greenhouse Gases* of the IS/MND the GHG impact analysis extends to 24 nm from the U.S. coastline. While this distance goes beyond the area typically analyzed in CEQA documents (3 nm), the CSLC has elected to analyze emissions conservatively to 24 nm for consistency with the State's GHG emissions inventory and reduction planning goals.

Data and assumptions for the two analyses (3 nm and 24 nm) are included in the following sections and labeled as such, where applicable. Criteria pollutant emissions within 24 nm from the U.S. coastline are included for informational purposes at the end of this appendix.

B.1 CONSTRUCTION

Construction of the proposed Project requires both terrestrial (i.e., on land) and marine activities. Terrestrial activities include landing pipe installation, underground conduit installation, cable pulling, and upgrading (all from the inside) the existing cable landing station (CLS) facility. These activities would generate criteria pollutant and GHG emissions from off-road equipment (e.g., backhoes) and vehicles used for employee commuting and hauling. Fugitive dust and ROG also would be generated by earthmoving (e.g., minor grading) and paving, respectively. Marine activities include laying and burying the cables. Vessels used to support these activities include main lay vessels, support vessels, workboats, patrol boats, and tugboats.

The following sections summarize the methods used to assess each of the terrestrial and marine emission sources. An overview of the construction schedule also is provided.

B.1.1 Schedule

Each of the cables would be installed in four separate phases. Construction on the first cable is expected to begin in Summer 2020. Even if the work schedule changes beyond Summer 2020, it would not change the number of working days (Tables B-1 and B-2). Updates to the existing CLS facility would occur during this first phase, extending the duration of Phase 1 to 165 working days. Installation of the remaining three cables would require no more than 34 working days per year. Table B-1 summarizes the construction schedule assumed in the emissions modeling for terrestrial and marine construction within 3 nm from the U.S. coastline. Table B-2 summarizes the construction schedule for marine activities between 3 and 24 nm from the U.S. coastline.

Table B-1. Schedule for Terrestrial and Marine Construction within 3 Nautical Miles from the U.S. Coastline

Phase and Description[a]		Start Date	End Date	Working Days
Phase 1				
1-1	Terrestrial lading pipe installation	5/1/2020	7/24/2020	84
1-2	Landing pipes – marine	4/1/2020	4/29/2020	28
1-3	Ocean ground bed and landing manhole	4/29/2020	5/13/2020	14
1-4	Terrestrial cable pulling	7/24/2020	7/29/2020	5
1-5	Cable landing station facility (construction and testing)	5/1/2020	8/29/2020	120
1-6	Pre-lay grapnel run	8/30/2020	8/31/2020	1
1-7	Marine cable landing	9/4/2020	9/5/2020	1
1-8	Marine cable lay	9/6/2020	9/7/2020	1
1-9	Marine cable burial (diver-assisted)	9/8/2020	9/10/2020	2
1-10	Marine cable burial (ROV-assisted)	9/11/2020	9/13/2020	2
1-11	Worker/delivery	4/1/2020	9/13/2020	165
Phase 2				
2-1	Ocean ground bed installation	8/1/2021	8/6/2021	5
2-2	Terrestrial cable pulling	8/7/2021	8/14/2021	7
2-3	Cable landing station facility (construction and testing)	8/15/2021	8/20/2021	5
2-4	Pre-lay grapnel run	8/21/2021	8/22/2021	1
2-5	Marine cable landing	8/26/2021	8/27/2021	1
2-6	Marine cable lay	8/28/2021	8/29/2021	1
2-7	Marine cable burial (diver-assisted)	8/30/2021	9/1/2021	2

Phase and Description[a]		Start Date	End Date	Working Days
2-8	Marine cable burial (ROV-assisted)	9/2/2021	9/4/2021	2
2-9	Worker/delivery	8/1/2021	9/4/2021	34
Phase 3				
3-1	Ocean ground bed installation	9/1/2023	9/6/2023	5
3-2	Terrestrial cable pulling	9/7/2023	9/14/2023	7
3-3	Cable landing station facility (construction and testing)	9/15/2023	9/20/2023	5
3-4	Pre-lay grapnel run	9/21/2023	9/22/2023	1
3-5	Marine cable landing	9/26/2023	9/27/2023	1
3-6	Marine cable lay	9/28/2023	9/29/2023	1
3-7	Marine cable burial (diver-assisted)	9/30/2023	10/2/2023	2
3-8	Marine cable burial (ROV-assisted)	10/3/2023	10/5/2023	2
3-9	Worker/delivery	9/1/2023	10/5/2023	34
Phase 4				
4-1	Ocean ground bed installation	10/1/2025	10/6/2025	5
4-2	Terrestrial cable pulling	10/7/2025	10/14/2025	7
4-3	Cable landing station facility (construction and testing)	10/15/2025	10/20/2025	5
4-4	Pre-lay grapnel run	10/21/2025	10/22/2025	1
4-5	Marine cable landing	10/26/2025	10/27/2025	1
4-6	Marine cable lay	10/28/2025	10/29/2025	1
4-7	Marine cable burial (diver-assisted)	10/30/2025	11/1/2025	2
4-8	Marine cable burial (ROV-assisted)	11/2/2025	11/4/2025	2
4-9	Worker/delivery	10/1/2025	11/4/2025	34

Source: Bergfalk pers. comm.

ROV = remotely operated vehicle.

[a] The numeric codes shown in the first column are used to identify the construction phases in later tables. The first digit corresponds to the phase and the second digit the subphase. For example, 1-1 refers to Phase 1, Subphase 1, terrestrial landing pipe installation.

Table B-2. Schedule for Marine Construction between 3 and 24 Nautical Miles from the U.S. Coastline

Phase and Description[a]		Start Date	End Date	Working Days
Phase 1				
1-6	Pre-lay grapnel run	9/1/2020	9/3/2020	2
1-8	Marine cable lay	9/8/2020	9/16/2020	6
1-10	Marine cable burial (ROV-assisted)	9/14/2020	9/19/2020	4
Phase 2				
2-4	Pre-lay grapnel run	8/23/2021	8/25/2021	2
2-6	Marine cable lay	8/30/2021	9/7/2021	6
2-8	Marine cable burial (ROV-assisted)	9/5/2021	9/10/2021	4

Phase and Description[a]		Start Date	End Date	Working Days
Phase 3				
3-4	Pre-lay grapnel run	9/23/2023	9/25/2023	2
3-6	Marine cable lay	9/30/2023	10/8/2023	6
3-8	Marine cable burial (ROV-assisted)	10/6/2023	10/11/2023	4
Phase 4				
4-4	Pre-lay grapnel run	10/23/2025	10/25/2025	2
4-6	Marine cable lay	10/30/2025	11/7/2025	6
4-8	Marine cable burial (ROV-assisted)	11/5/2025	11/10/2025	4

Source: Bergfalk pers. comm.

ROV = remotely operated vehicle

[a] The numeric codes shown in the first column are used to identify the construction phases in later tables. The first digit corresponds to the phase, and the second digit to the subphase. For example, 1-1 refers to Phase 1, Subphase 1, terrestrial landing pipe installation.

B.1.2 Models and Methods for Emissions Quantification

Criteria pollutant and GHG emissions generated by the proposed Project's construction were assessed using standard and accepted models and tools. Combustion exhaust, fugitive dust (PM10 and PM2.5), and fugitive off-gassing (ROG) were estimated using a combination of emission factors and methodologies from CalEEMod, Version 2016.3.2; the California Air Resources Board's (CARB) EMFAC2017 model and marine vessel guidance; and the United States Environmental Protection Agency's (EPA) *AP-42 Compilation of Air Pollutant Emission Factors* (AP-42) (EPA 2006) based on Project-specific construction data (e.g., schedule, equipment, and truck volumes). The following sections describe the quantification approach for each of the primary emission sources.

B.1.2.1 Off-Road Equipment

Emission factors for off-road construction equipment (e.g., loaders, graders, and bulldozers) were obtained from the CalEEMod (Version 2016.3.2) User's Guide appendix, which provides values per unit of activity (in grams per horsepower-hour) (Trinity Consultants 2017).[1] See Project-specific calculations, quantification method, and emission factors at the end of this appendix. Pollutants were estimated by multiplying the CalEEMod emission factors by the equipment inventory shown in Table B-3. Model defaults were assumed for equipment horsepower (hp) and load factors, except for drill rig used during terrestrial boring. This equipment was assumed to use a 600-hp engine. All off-road equipment would be used for terrestrial construction (i.e., on land).

[1] CalEEMod does not include emission factors for N_2O. Emissions of N_2O were determined by scaling CO_2 emissions by the ratio of N_2O/CO_2 (0.000025) emissions expected per gallon of diesel fuel according to the Climate Registry (2018).

Table B-3. Off-Road Equipment Inventory for Terrestrial Construction

Phase[a]	Equipment	#/Day	Hours/Day	Horsepower
1-1	Concrete/industrial saws	1	2	81
1-1	Tractors/loaders/backhoes	1	8	97
1-1	Rollers	1	2	80
1-1	Plate compactors	1	1	8
1-2	Bore/drill rigs	1	10	600
1-2	Excavators	1	2	158
1-2	Welders	1	8	46
1-2	Generator sets	1	10	84
1-3	Tractors/loaders/backhoes	1	8	97
1-3	Bore/drill rigs	1	4	221
1-3	Plate compactors	1	1	8
2-1	Tractors/loaders/backhoes	1	8	97
2-1	Bore/drill rigs	1	4	221
2-1	Plate compactors	1	1	8
3-1	Tractors/loaders/backhoes	1	8	97
3-1	Bore/drill rigs	1	4	221
3-1	Plate compactors	1	1	8
4-1	Tractors/loaders/backhoes	1	8	97
4-1	Bore/drill rigs	1	4	221
4-1	Plate compactors	1	1	8
1-7	Tractors/loaders/backhoes	1	4	97
1-7	Other general industrial equipment	1	8	88
1-7	Cranes	1	2	231
1-7	Generator sets	1	4	84
2-5	Tractors/loaders/backhoes	1	4	97
2-5	Other general industrial equipment	1	8	88
2-5	Cranes	1	2	231
2-5	Generator sets	1	4	84
3-5	Tractors/loaders/backhoes	1	4	97
3-5	Other general industrial equipment	1	8	88
3-5	Cranes	1	2	231
3-5	Generator sets	1	4	84
4-5	Tractors/loaders/backhoes	1	4	97
4-5	Other general industrial equipment	1	8	88
4-5	Cranes	1	2	231
4-5	Generator sets	1	4	84

Source: Bergfalk pers. comm.
[a] Refer to Table B-1 for phase descriptions.

B.1.2.2 On-Road Vehicles

On-road vehicles include vehicles used for material and equipment hauling, employee commuting, and onsite crew and material movement. Exhaust emissions from on-road vehicles were estimated using the EMFAC2017 emissions model. Emission factors for delivery and tractor trailer trucks are based on aggregated-speed emission rates for EMFAC's T7 Single and T7 Tractor vehicle categories, respectively. Emission factors for employee commute vehicles are based on a weighted average for all vehicle speeds for EMFAC's Lighty-Duty Automobile/Lighty Duty Truck vehicle categories. One-way employee commute trip lengths were conservatively assumed to be 50 miles. Offsite pick-up trucks required for crew movement and fuel delivery trucks were modeled using EMFAC's Light-Duty Truck and T6 Instate Heavy vehicle categories, respectively.

Emission factors for on-site trucks were based on 5 miles per hour (mph) emission rates. On-site dump trucks were modeled using EMFAC's T7 Single vehicle category, whereas on-site asphalt and equipment trucks were modeled using EMFAC's T6 Instate Heavy vehicle category. On-site cable pulling trucks were modeled using EMFAC's T6 Utility vehicle category.

Fugitive re-entrained road dust emissions for all vehicle types were estimated using EPA's AP-42, Sections 13.2.1 and 13.2.2 (EPA 2006, 2011).

Table B-4 summarizes the on-road vehicle inventory assumed in the emissions modeling. All on-road vehicles would be used for terrestrial construction (i.e., on land).

Table B-4. On-Road Vehicle Inventory for Terrestrial Construction

Phase[a]	Vehicle	Vehicles/Day	Trips/Day	Miles/Day
1-1	Pickup truck	1	2	10
1-1	Dump truck	1	2	20
1-1	Asphalt truck	1	2	10
1-2	Pickup truck	1	2	15
1-2	Tractor trailer	1	2	20
1-3	One ton truck	1	2	10
1-3	Pickup truck	1	2	15
1-3	Delivery truck	1	2	10
1-3	Dump truck	1	2	10
2-1	One ton truck	1	2	10
2-1	Pickup truck	1	2	15
2-1	Delivery truck	1	2	10
2-1	Dump truck	1	2	10
3-1	One ton truck	1	2	10
3-1	Pickup truck	1	2	15
3-1	Delivery truck	1	2	10

Phase[a]	Vehicle	Vehicles/Day	Trips/Day	Miles/Day
3-1	Dump truck	1	2	10
4-1	One ton truck	1	2	10
4-1	Pickup truck	1	2	15
4-1	Delivery truck	1	2	10
4-1	Dump truck	1	2	10
1-4	Cable-pulling truck	1	2	40
1-4	Pickup truck with reel	1	2	20
1-4	Equipment truck	1	2	15
2-2	Cable-pulling truck	1	2	40
2-2	Pickup truck with reel	1	2	20
2-2	Equipment truck	1	2	15
3-2	Cable-pulling truck	1	2	40
3-2	Pickup truck with reel	1	2	20
3-2	Equipment truck	1	2	15
4-2	Cable-pulling truck	1	2	40
4-2	Pickup truck with reel	1	2	20
4-2	Equipment truck	1	2	15
1-11	Tractor trailer	2	5	500
2-9	Tractor trailer	2	5	500
3-9	Tractor trailer	2	5	500
4-9	Tractor trailer	2	5	500
1-11	Fuel and misc delivery	1	1	100
2-9	Fuel and misc delivery	1	1	100
3-9	Fuel and misc delivery	1	1	100
4-9	Fuel and misc delivery	1	1	100
1-5	Equipment truck	1	2	15
1-7	Pickup truck	1	2	15
2-5	Pickup truck	1	2	15
3-5	Pickup truck	1	2	15
4-5	Pickup truck	1	2	15
1-11	Employee vehicle	10	10	1,000
2-9	Employee vehicle	10	10	1,000
3-9	Employee vehicle	10	10	1,000
4-9	Employee vehicle	10	10	1,000

Source: Bergfalk pers. comm.

[a] Refer to Table B-1 for phase descriptions.

B.1.2.3 Earthmoving and Paving

Fugitive dust emissions from earth movement (i.e., site grading, excavation, and truck loading) were quantified using emission factors from the CalEEMod User's Guide (Trinity

Consultants 2017). Grading acres and cut-and-fill quantities were provided by the Project applicant (Brungardt pers. comm.).

Fugitive ROG emissions associated with paving were calculated using activity data (e.g., square feet paved) provided by the Project applicant and the CalEEMod default emission factor of 2.62 pounds of ROG per acre paved (Brungardt pers. comm.; Trinity Consultants 2017).

Table B-5 summarizes the earthmoving and paving quantities assumed in the emissions modeling. All earthmoving and paving would occur during terrestrial construction (i.e., on land).

Table B-5. Earthmoving and Paving Quantities for Terrestrial Construction

Phase[a]	Grading (acres/day)	Cut/Fill (cubic yards/day)	Paving (square feet/day)
1-1	0.07	44	0.003
1-2	0.09	0	0
1-3	0	14	0
2-1	0	14	0
3-1	0	14	0
4-1	0	14	0

Source: Bergfalk pers. comm.
[a] Refer to Table B-1 for phase descriptions.

B.1.2.4 Marine Vessels

Marine vessels used during construction include main lay vessels, support vessels, workboats, patrol boats, and tugboats. Criteria pollutant emissions from marine vessels were quantified using CARB's (2010a) *Updates on the Emissions Inventory for Commercial Harbor Craft Operating in California* (Harbor Craft Methodology) and several other sources. Emissions per vessel were determined using the equation below.

$$E = P \times LF \times A \times EF$$

Where E = *Emissions (grams)*
P = *Maximum Continuous Rating Power (horsepower)*
LF = *Load Factor (percent of vessel's total power)*
A = *Activity (hours)*
EF = *Emission Factor (grams per horsepower-hour [g/hp-hr])*

Emissions were calculated separately for propulsion and auxiliary engines for each vessel. The following section describes the vessels, engine horsepower assumptions, load factors, and emission factors used in the calculations. Activity hours were provided by the Project applicant and are summarized in Table B-6 (Brungardt pers. comm.).

Table B-6. Marine Vessel Inventory

Phase[a]	Vessel[2]	Hours per Day
U.S. Coastline to 3 Nautical Miles (air quality impact analysis)		
1-2	Work boat	6
1-2	Tug boat	5
1-2	Patrol boat	6
1-6	Main lay vessel (laying)	24
1-7	Main lay vessel (transit)	10
1-8	Main lay vessel (laying)	24
1-9	Support vessel	24
1-10	Main lay vessel (laying)	24
2-4	Main lay vessel (laying)	24
2-5	Main lay vessel (transit)	10
2-6	Main lay vessel (laying)	24
2-7	Support vessel	24
2-8	Main lay vessel (laying)	24
3-4	Main lay vessel (laying)	24
3-5	Main lay vessel (transit)	10
3-6	Main lay vessel (laying)	24
3-7	Support vessel	24
3-8	Main lay vessel (laying)	24
4-4	Main lay vessel (laying)	24
4-5	Main lay vessel (transit)	10
4-6	Main lay vessel (laying)	24
4-7	Support vessel	24
4-8	Main lay vessel (laying)	24
3 to 24 Nautical Miles (greenhouse gas impact analysis)		
1-6	Main lay vessel (laying)	20
1-6	Main lay vessel (transit)	4
1-6	Support vessel	12
1-8	Main lay vessel (laying)	20
1-8	Main lay vessel (transit)	4
1-10	Main lay vessel (laying)	20
1-10	Main lay vessel (transit)	4
2-4	Main lay vessel (laying)	20
2-4	Main lay vessel (transit)	4
2-4	Support vessel	12
2-6	Main lay vessel (laying)	20

[2] A variety of vessels is used because it is unknown exactly what vessels will be used. In order to provide the most conservative air quality analysis, assumptions are made as to the type of support vessel(s) that may be needed. Using a mix of vessels provides a more realistic analysis.

Phase[a]	Vessel[2]	Hours per Day
2-6	Main lay vessel (transit)	4
2-8	Main lay vessel (laying)	20
2-8	Main lay vessel (transit)	4
3-4	Main lay vessel (laying)	20
3-4	Main lay vessel (transit)	4
3-4	Support vessel	12
3-6	Main lay vessel (laying)	20
3-6	Main lay vessel (transit)	4
3-8	Main lay vessel (laying)	20
3-8	Main lay vessel (transit)	4
4-4	Main lay vessel (laying)	20
4-4	Main lay vessel (transit)	4
4-4	Support vessel	12
4-6	Main lay vessel (laying)	20
4-6	Main lay vessel (transit)	4
4-8	Main lay vessel (laying)	20
4-8	Main lay vessel (transit)	4

Source: Bergfalk pers. comm.
[a] Refer to Table B-1 for phase descriptions.

Main Lay Vessel

The main lay vessel is modelled after the Ile de Batz (IMO # 9247041). It is a DPS-2 classed cable lay and multi-purpose offshore support vessel and used by Alcatel-Lucent for cable laying (CBS n.d.). This vessel will be laying the cable on the ocean. It will pull the cable plow that will be installing the cable to a depth of 3.3 feet (1 meter) below the ocean floor. It will come to the end of the landing pipe (about 3,600 feet offshore) and feed the marine cable into the landing pipe, then will continue offshore with the cable and across the ocean.

The main lay vessel is a diesel-electric vessel powered by four 5,873-hp Mak 9M32 Category 3 diesel engines (IHS Markit n.d.). All four engines are connected to generators. Propulsion is driven by two 5,368-hp electric motors. Under CARB harbor craft guidance, the main lay vessel is considered an ocean-going vessel (OGV) because it is longer than 400 feet. The vessel was built in 2001.

The main lay vessel will operate in two modes during construction. The first is “transit” back and forth to the construction site. Transit occurs at 12 knots. The second is during “cable laying” when the vessel is travelling at 8 knots and laying cable.

Propulsion load factors for the two modes were calculated using the propeller law equation below (Starcrest Consulting Group 2017). This load factor was applied to the two electric motors used for propulsion.

$$Propulsion\ Load\ Factor = (actual\ speed/maximum\ speed)^3$$

As the vessel has a maximum speed of 16.4 knots, the transit propulsion load factor is 0.39 and the cable laying propulsion load factor is 0.12. Auxiliary engine loads and auxiliary boiler loads for the two modes were obtained from the Port of Los Angeles 2016 emission inventory (Starcrest Consulting Group 2017). The calculations for the transit mode assumed an auxiliary load of 643 kilowatts (kW), while the cable laying mode assumed an auxiliary load of 597 kW. Boiler loads were assumed at 33 kW during transit and 65 kW during cable laying.

Emission factors for the main lay vessel were obtained from the Port of Los Angeles 2014 emission inventory (Starcrest Consulting Group 2015),[3] assuming that all engines were Category 3 medium-speed engines running on 0.1% sulfur marine gasoil/marine diesel oil (MGO/MDO), which has been required within California waters since 2014 and within the North American Emission Control Area (up to 200 nm from the U.S. coastline) since 2015 (CARB 2011a). The main lay emission factors are presented in Table B-7.

Table B-7. Main Lay Vessel Emission Factors (g/hp-hr)

Engine	ROG	NOx	CO	PM10	PM2.5	SO2	CO2	N2O	CH4
Propulsion/ Auxiliary	0.5	9.1	0.8	0.19	0.18	0.3	484	0.022	0.007
Boiler	0.1	1.5	0.1	0.10	0.10	0.5	688	0.056	0.001

Note:
The emission factors from the 2014 emissions inventory have been corrected for use of 0.1% sulfur distillate fuel. Accordingly, application of a fuel correction factor is not required. Because deterioration factors are not applied to ocean-going vessels, per California Air Resources Board guidance, the emission factors are held constant for all analysis years.

Support Vessel

The support vessel is modelled after the DSV Clean Ocean (Aqueos n.d.). It is a 155-foot-long anchor, offshore supply, dive, and remotely operated undersea vehicle support. The support vessel will be used for the prelay grapnel run (where it will pull a grapnel along the cable alignment to ensure that it is free of debris) and to support the main cable lay through control of remotely operated vehicles (ROVs). It also will be used during cable burial.

Under CARB's harbor craft regulations, the support vessel falls under the category of crew and supply boat. It was repowered in 2015 under the CARB (2011b) harbor craft rule. It is currently powered by two 750-hp Cummins QSK-19 Tier 3 engines and has two 133-hp auxiliary Tier 3 engines.

[3] Emission factors for OGV have not changed since the 2014 emissions inventory and therefore are not repeated in subsequent inventories, including the latest 2016 emissions inventory.

Load factors for this type of vessel were obtained from CARB's (2010a) Harbor Craft Methodology and were assumed to be 0.38 for the propulsion engines and 0.32 for the auxiliary engines. Uncorrected zero hour emission rates for NOx, PM10, ROG, and CO were derived from CARB's Harbor Craft Methodology. GHG and SO_2 emission factors were obtained from the Port of Los Angeles 2013 emission inventory (Starcrest Consulting Group 2014).[4] All harbor craft must use ultra-low sulfur diesel (ULSD) within California regulated waters (CARB 2005). Since these vessels are small and generally have only one fuel tank, it was assumed that they also would use ULSD out to 24 nm.

Uncorrected zero hour emission rates are shown in Table B-8. Fuel correction factors for ULSD are shown in Table B-9 (these also apply to the work boat described in the next section).

Table B-8. Support Vessel Uncorrected Zero Hour Emission Rates (g/hp-hr)

Engine	ROG	NOx	CO	PM10	PM2.5	SO_2	CO_2	N_2O	CH_4
Propulsion	0.68	5.10	3.73	0.15	0.15	0.13	486.2	0.023	0.013
Auxiliary	0.81	5.10	3.73	0.22	0.21	0.13	486.2	0.023	0.016

Table B-9. Fuel Correction Factors for the Support Vessel and Work Boat

Engine	ROG	NOx	CO	PM10	PM2.5	SO_2	CO_2	N_2O	CH_4
All	0.720	0.948	1.000	0.852	0.852	0.043	1.000	0.948	0.720

Deterioration factors were applied to compensate for engine wear. CARB's Harbor Craft Methodology recommends that a tug or barge at the end of its useful life could have NOx, PM, hydrocarbons (e.g., ROG), and CO emission factors that are 21%, 67%, 44% and 25%, respectively, higher than the zero-hour values. Since the Harbor Craft Methodology was released, CARB has revised its methodology to limit deterioration at 12,000 hours of operation. This is because CARB found, in discussions with stakeholders and the industry, that diesel engines are typically rebuilt after 12,000 hours of use (Dolney pers. comm.). Based on this new guidance, once an engine's cumulative hours equals 12,000 hours, the deteriorated emission factor is assumed to remain constant (CARB 2010b).

Annual hours of operation, useful life, and the deterioration factors for the propulsion and auxiliary engines are shown in Table B-10. Final emission factors are shown in Table B-11.

[4] Emission factors for crew and supply boats have not changed since the 2013 emissions inventory and therefore are not repeated in subsequent inventories, including the latest 2016 emissions inventory.

Table B-10. Hours of Operation, Useful Life and Deterioration Factors for Support Vessel

Engine	Annual Hours	Useful Life	Deterioration Factor			
Propulsion	1,796	28	0.21	0.67	0.44	0.25
Auxiliary	2,265	28	0.14	0.44	0.28	0.16

Table B-11 Support Vessel Emission Factors (g/hp-hr)

Year	Engine	ROG	NOx	CO	PM10	PM2.5	SO_2	CO_2	N_2O	CH_4
2019	Propulsion	0.52	4.98	3.86	0.14	0.14	0.01	486.2	0.022	0.010
	Auxiliary	0.61	4.93	3.82	0.20	0.19	0.01	486.2	0.022	0.012
2020	Propulsion	0.53	5.02	3.90	0.14	0.14	0.01	486.2	0.022	0.010
	Auxiliary	0.61	4.96	3.84	0.20	0.20	0.01	486.2	0.022	0.012
2021	Propulsion	0.54	5.05	3.93	0.15	0.14	0.01	486.2	0.022	0.010
	Auxiliary	0.61	4.96	3.84	0.20	0.20	0.01	486.2	0.022	0.012
2022+[a]	Propulsion	0.54	5.08	3.95	0.15	0.14	0.01	486.2	0.022	0.010
	Auxiliary	0.61	4.96	3.84	0.20	0.20	0.01	486.2	0.022	0.012

[a] The support vessel will reach the 12,000-hour deterioration cap in 2022. After this time, it was assumed that the engine will be rebuilt, per CARB guidance. However, this analysis conservatively holds the final deteriorated emission factor constant for all future analysis years.

Work Boat

The work boat is modelled after the *Danny C* vessel, which is a 77-foot utility boat used in dive support, ROV support, anchor support, and equipment transport. The work boat will be used during construction to perform the following activities.

- As a dive platform for divers to support the marine side of the landing pipes.
- As a dive platform for divers to support the cable landing where the main cable vessel feeds the marine cable into the landing pipe.
- As a dive platform for divers to jet bury the cable in the shallow water areas (out to a water depth of approximately 30 meters).
- As a taxi to take divers to and from the dive platform.

Under CARB harbor craft regulations, the *Danny C* falls under the category of work boat. It was repowered in 2015 under the CARB harbor craft rule. It is currently powered by two 405-hp Cummins QSM11 Tier 3 engines and has two 32-hp auxiliary Tier 3 engines.

Load factors,[5] zero hour emission rates, annual hours of operation, useful life assumptions, and deterioration factors were derived using the same methods and sources as described above for the support vessel. Uncorrected zero hour emission rates are shown in Table B-12. Annual hours of operation, useful life, and the deterioration factors for the propulsion and auxiliary engines are shown in Table B-13. Final emission factors are shown in Table B-14. Refer to Table B-9 above for the ULSD fuel correction factors.

Table B-12. Work Boat Uncorrected Zero Hour Emission Rates (g/hp-hr)

Engine	ROG	NOx	CO	PM10	PM2.5	SO_2	CO_2	N_2O	CH_4
Propulsion	0.68	5.10	3.73	0.15	0.15	0.13	486.2	0.023	0.013
Auxiliary	0.81	5.10	3.73	0.22	0.21	0.13	486.2	0.023	0.016

Table B-13. Hours of Operation, Useful Life and Deterioration Factors for Work Boat

Engine	Annual Hours	Useful Life	Deterioration Factor			
			NOx	PM	ROG	CO
Propulsion	675	17	0.21	0.67	0.44	0.25
Auxiliary	750	23	0.06	0.31	0.51	0.41

Table B-14. Work Boat Emission Factors (g/hp-hr)

Year	Engine	ROG	NOx	CO	PM10	PM2.5	SO_2	CO_2	N_2O	CH_4
2019	Propulsion	0.54	5.08	3.95	0.15	0.14	0.01	486.2	0.022	0.010
	Auxiliary	1.68	5.10	4.00	0.20	0.19	0.01	486.2	0.022	0.031
2020	Propulsion	0.55	5.13	4.00	0.15	0.15	0.01	486.2	0.022	0.010
	Auxiliary	1.71	5.11	4.06	0.20	0.19	0.01	486.2	0.022	0.031
2021	Propulsion	0.57	5.19	4.06	0.16	0.15	0.01	486.2	0.022	0.010
	Auxiliary	1.75	5.12	4.13	0.20	0.20	0.01	486.2	0.022	0.031
2022	Propulsion	0.58	5.25	4.11	0.16	0.16	0.01	486.2	0.022	0.010
	Auxiliary	1.78	5.14	4.20	0.21	0.20	0.01	486.2	0.022	0.031
2023	Propulsion	0.59	5.31	4.17	0.17	0.16	0.01	486.2	0.022	0.010
	Auxiliary	1.82	5.15	4.26	0.21	0.20	0.01	486.2	0.022	0.031
2024	Propulsion	0.60	5.37	4.22	0.17	0.17	0.01	486.2	0.022	0.010
	Auxiliary	1.85	5.16	4.33	0.21	0.20	0.01	486.2	0.022	0.031
2025	Propulsion	0.62	5.43	4.28	0.18	0.17	0.01	486.2	0.022	0.010
	Auxiliary	1.88	5.17	4.39	0.21	0.21	0.01	486.2	0.022	0.031
2026	Propulsion	0.63	5.49	4.33	0.18	0.18	0.01	486.2	0.022	0.010
	Auxiliary	1.92	5.19	4.46	0.22	0.21	0.01	486.2	0.022	0.031

[5] Load factors for the work boat were assumed to be 0.45 for the propulsion engines and 0.43 for the auxiliary engines.

Patrol Boat and Tug Boat

The patrol boat would be used to shuttle divers to and from the dive platform or to take observers (inspectors or monitors) to the site during the landing pipe activities or during the cable landing. The tug boat may be needed to anchor the main lay vessel. Tug boats rarely are required because the cable ships usually have dynamic thrusters so they can hold station. Tug boats have been added in the emission calculations in the event they are needed.

Under the CARB harbor craft rule, the patrol boat falls under the category of a crew and supply boat, and the tug boat falls under the category of a tow boat. Both ships are a "ship of opportunity," meaning that any available crew and supply boat can be used. Average crew boat characteristics were obtained from the Port of Los Angeles 2016 emission inventory (Starcrest Consulting Group 2017) to define the characteristics of the patrol boat, and average towboat characteristics were used to define the characteristics of the tug boats for analysis purposes. The assumptions are listed in Table B-15.

Table B-15. Patrol Boat and Tug Boat Characteristics

Engine Type	Patrol Boat			Tug Boat		
	Model Year	Engines		Model Year	Engines	
		HP	Number		HP	Number
Propulsion	2009	572	2	2010	777	2
Auxiliary	2008	55	1	2009	64	2

Load factors,[6] zero hour emission rates, annual hours of operation, useful life assumptions, and deterioration factors were derived using the same methods and sources as described above for the support vessel. Uncorrected zero hour emission rates are shown in Table B-16. Annual hours of operation, useful life, and the deterioration factors for the propulsion and auxiliary engines are shown in Table B-17. Table B-18 summarizes the ULSD fuel correction factors, which are applicable to engines older than model year 2011. Final emission factors are shown in Table B-19.

Table B-16. Patrol Boat and Tug Boat Uncorrected Zero Hour Emission Rates (g/hp-hr)

Engine	ROG	NOx	CO	PM10	PM2.5	SO_2	CO_2	N_2O	CH_4
Patrol Boat									
Propulsion	0.68	5.10	3.73	0.15	0.15	0.13	486.2	0.023	0.013
Auxiliary	1.18	5.32	3.73	0.30	0.29	0.13	486.2	0.023	0.016

[6] Load factors for the patrol boat were assumed to be 0.38 for the propulsion engines and 0.32 for the auxiliary engines. Load factors for the tug boat were assumed to be 0.68 for the propulsion engines and 0.43 for the auxiliary engines.

Engine	ROG	NOx	CO	PM10	PM2.5	SO_2	CO_2	N_2O	CH_4
Tug Boat									
Propulsion	0.68	5.53	3.73	0.20	0.19	0.13	486.2	0.023	0.013
Auxiliary	1.18	5.32	3.73	0.22	0.21	0.13	486.2	0.023	0.024

Table B-17. Useful Life and Deterioration Factors for Patrol Boat and Tug Boat

Engine	Annual Hours	Useful Life	Deterioration Factor			
			NOx	PM	ROG	CO
Patrol Boat						
Propulsion	1,796	28	0.21	0.67	0.44	0.25
Auxiliary	2,265	28	0.14	0.44	0.28	0.16
Tug Boat						
Propulsion	1,993	26	0.21	0.67	0.44	0.25
Auxiliary	2,965	25	0.14	0.44	0.28	0.16

Table B-18. Fuel Correction Factors for the Patrol Boat and Tug Boat

Engine	ROG	NOx	CO	PM10	PM2.5	SO_2	CO_2	N_2O	CH_4
All	0.720	0.948	1.000	0.800	0.800	0.043	1.000	0.948	0.720

Table B-19. Patrol Boat and Tug Boat Emission Factors (g/hp-hr)

Engine	ROG	NOx	CO	PM10	PM2.5	SO_2	CO_2	N_2O	CH_4
Patrol Boat									
Propulsion	0.54	5.08	3.95	0.14	0.14	0.01	486.19	0.022	0.010
Auxiliary	0.89	5.18	3.84	0.26	0.25	0.01	486.19	0.022	0.012
Tug Boat									
Propulsion	0.54	5.50	3.95	0.18	0.18	0.01	486.2	0.022	0.010
Auxiliary	0.89	5.16	3.83	0.19	0.18	0.01	486.2	0.022	0.017

Note:
The patrol and tug boats will reach the 12,000 hour deterioration cap before 2019. After this time, it was assumed that the engines will be rebuilt, per California Air Resources Board guidance. However, this analysis conservatively holds the final deteriorated emission factor constant for all future analysis years.

B.2 OPERATION

The Project's normal operation consists of monthly inspections, requiring a vehicle trip. Electricity would be consumed at the CLS facilities. Emissions from employee commutes were quantified using the methods described above for on-road vehicles. The employee was assumed conservatively to travel 100 miles to the Project site. Indirect GHG emissions from electricity consumption were quantified using emission factors from Pacific Gas and Electric Company (2015) and EPA (2018). The Project was assumed to use 292 megawatt-hours of electricity each year. Emissions were quantified using 2026 emission rates, which is the first year of full operation.

B.3 INFORMATIONAL CRITERIA POLLUTANT ANALYSIS

Criteria pollutants generated by construction activities out to 24 nm are presented in Table B-20. As previously noted, these emissions are presented for informational purposes only.

Table B-20. Informational Criteria Pollutant Emissions Generated by Terrestrial and Marine Activities Out to 24 Nautical Miles (nm)

Phase	Source	Tons per Year					
		ROG	NOx	CO	PM10	PM2.5	SO_2
Phase 1	Terrestrial	<1	1	1	<1	<1	<1
	Marine (0 to 3 nm)	<1	4	2	<1	<1	<1
	Marine (3 to 24 nm)	<1	7	1	<1	<1	<1
	Total	1	13	3	1	<1	<1
Phase 2	Terrestrial	<1	<1	<1	<1	<1	<1
	Marine (0 to 3 nm)	<1	3	<1	<1	<1	<1
	Marine (3 to 24 nm)	<1	7	1	<1	<1	<1
	Total	1	10	1	<1	<1	1
Phase 3	Terrestrial	<1	<1	<1	<1	<1	<1
	Marine (0 to 3 nm)	<1	3	<1	<1	<1	<1
	Marine (3 to 24 nm)	<1	7	1	<1	<1	<1
	Total	1	10	1	<1	<1	<1
Phase 4	Terrestrial	<1	<1	<1	<1	<1	<1
	Marine (0 to 3 nm)	<1	3	<1	<1	<1	<1
	Marine (3 to 24 nm)	<1	7	1	<1	<1	<1
	Total	**1**	**10**	**1**	**<1**	**<1**	**<1**

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B.4.2 Personal Communications

Brian Bergfalk. RTI Solutions, Inc. San Francisco, CA. June 5, 2019—conversation with Laura Yoon of ICF.

Nicole Dolney. California Air Resource Board. Sacramento, CA. March 25, 2013—conversation with Lou Browning of ICF.

Construction (within 3 NM)

Schedule

Phase	Code	Start Date	End Date	Working Days
Phase 1				
Terrestrial conduit installation	1-1	5/1/2020	7/24/2020	84
Directional bores – marine	1-2	4/1/2020	4/29/2020	28
OGB and LMH	1-3	4/29/2020	5/13/2020	14
Terrestrial cable pulling	1-4	7/24/2020	7/29/2020	5
CLS facility (construction and testing)	1-5	5/1/2020	8/29/2020	120
Pre-lay grapnel run	1-6	8/30/2020	8/31/2020	1
Marine cable landing	1-7	9/4/2020	9/5/2020	1
Marine cable lay	1-8	9/6/2020	9/7/2020	1
Marine cable burial (diver-assisted)	1-9	9/8/2020	9/10/2020	2
Marine cable burial (ROV-assisted)	1-10	9/11/2020	9/13/2020	2
Worker/Delivery	1-11	4/1/2020	9/13/2020	165
Phase 2				
OGB installation	2-1	8/1/2021	8/6/2021	5
Terrestrial cable pulling	2-2	8/7/2021	8/14/2021	7
CLS facility (construction and testing)	2-3	8/15/2021	8/20/2021	5
Pre-lay grapnel run	2-4	8/21/2021	8/22/2021	1
Marine cable landing	2-5	8/26/2021	8/27/2021	1
Marine cable lay	2-6	8/28/2021	8/29/2021	1
Marine cable burial (diver-assisted)	2-7	8/30/2021	9/1/2021	2
Marine cable burial (ROV-assisted)	2-8	9/2/2021	9/4/2021	2
Worker/Delivery	2-9	8/1/2021	9/4/2021	34
Phase 3				
OGB installation	3-1	9/1/2023	9/6/2023	5
Terrestrial cable pulling	3-2	9/7/2023	9/14/2023	7
CLS facility (construction and testing)	3-3	9/15/2023	9/20/2023	5
Pre-lay grapnel run	3-4	9/21/2023	9/22/2023	1
Marine cable landing	3-5	9/26/2023	9/27/2023	1
Marine cable lay	3-6	9/28/2023	9/29/2023	1
Marine cable burial (diver-assisted)	3-7	9/30/2023	10/2/2023	2
Marine cable burial (ROV-assisted)	3-8	10/3/2023	10/5/2023	2
Worker/Delivery	3-9	9/1/2023	10/5/2023	34
Phase 4				
OGB installation	4-1	10/1/2025	10/6/2025	5
Terrestrial cable pulling	4-2	10/7/2025	10/14/2025	7
CLS facility (construction and testing)	4-3	10/15/2025	10/20/2025	5
Pre-lay grapnel run	4-4	10/21/2025	10/22/2025	1
Marine cable landing	4-5	10/26/2025	10/27/2025	1
Marine cable lay	4-6	10/28/2025	10/29/2025	1
Marine cable burial (diver-assisted)	4-7	10/30/2025	11/1/2025	2
Marine cable burial (ROV-assisted)	4-8	11/2/2025	11/4/2025	2
Worker/Delivery	4-9	10/1/2025	11/4/2025	34

Off-road Calculations

Code	Equip	#/day	hrs/day	HP	LF	Fuel	2020 Pounds per day ROG	NOX	CO	PM10	PM2.5	SO2	Metric tons per year CO2	CH4	N2O	CO2e
1-1	Concrete/Asphalt Saw	1	2	81	0.7	Diesel	0.1	0.8	0.9	0.0	0.0	0.0	5.6	0.0	0.0	5.7
1-1	Backhoe	1	8	97	0.4	Diesel	0.2	2.1	2.3	0.1	0.1	0.0	11.4	0.0	0.0	11.6
1-1	Pavement Roller	1	2	80	0.4	Diesel	0.1	0.5	0.5	0.0	0.0	0.0	2.4	0.0	0.0	2.4
1-1	Handheld Vibratory Compactor	1	1	8	0.4	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2
1-2	HDD Powerplant (AA DD625)	1	10	600	0.5	Diesel	0.7	8.2	6.5	0.3	0.3	0.0	40.0	0.0	0.0	40.6
1-2	Excavator	1	2	158	0.4	Diesel	0.1	0.6	0.8	0.0	0.0	0.0	1.6	0.0	0.0	1.6
1-2	Welder	1	8	46	0.5	Diesel	0.3	1.6	1.8	0.1	0.1	0.0	2.6	0.0	0.0	2.7
1-2	Generator	1	10	84	0.7	Diesel	0.5	4.3	4.6	0.2	0.2	0.0	9.9	0.0	0.0	10.0
1-3	Backhoe	1	8	97	0.4	Diesel	0.2	2.1	2.3	0.1	0.1	0.0	1.9	0.0	0.0	1.9
1-3	Well Drilling Machine	1	4	221	0.5	Diesel	0.1	1.8	1.0	0.1	0.0	0.0	2.9	0.0	0.0	2.9
1-3	Handheld Vibratory Compactor	1	1	8	0.4	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-1	Backhoe	1	8	97	0.4	Diesel	0.2	2.1	2.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0
2-1	Well Drilling Machine	1	4	221	0.5	Diesel	0.1	1.8	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2-1	Handheld Vibratory Compactor	1	1	8	0.4	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-1	Backhoe	1	8	97	0.4	Diesel	0.2	2.1	2.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0
3-1	Well Drilling Machine	1	4	221	0.5	Diesel	0.1	1.8	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
3-1	Handheld Vibratory Compactor	1	1	8	0.4	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-1	Backhoe	1	8	97	0.4	Diesel	0.2	2.1	2.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0
4-1	Well Drilling Machine	1	4	221	0.5	Diesel	0.1	1.8	1.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
4-1	Handheld Vibratory Compactor	1	1	8	0.4	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-7	Backhoe	1	4	97	0.4	Diesel	0.1	1.0	1.1	0.1	0.1	0.0	0.1	0.0	0.0	0.1
1-7	Winch	1	8	88	0.3	Diesel	0.2	2.2	2.0	0.2	0.1	0.0	0.1	0.0	0.0	0.1
1-7	Crane	1	2	231	0.3	Diesel	0.1	1.3	0.5	0.1	0.1	0.0	0.1	0.0	0.0	0.1
1-7	Generator	1	4	84	0.7	Diesel	0.2	1.7	1.9	0.1	0.1	0.0	0.1	0.0	0.0	0.1
2-5	Backhoe	1	4	97	0.4	Diesel	0.1	1.0	1.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
2-5	Winch	1	8	88	0.3	Diesel	0.2	2.2	2.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
2-5	Crane	1	2	231	0.3	Diesel	0.1	1.3	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0
2-5	Generator	1	4	84	0.7	Diesel	0.2	1.7	1.9	0.1	0.1	0.0	0.0	0.0	0.0	0.0
3-5	Backhoe	1	4	97	0.4	Diesel	0.1	1.0	1.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
3-5	Winch	1	8	88	0.3	Diesel	0.2	2.2	2.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
3-5	Crane	1	2	231	0.3	Diesel	0.1	1.3	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0
3-5	Generator	1	4	84	0.7	Diesel	0.2	1.7	1.9	0.1	0.1	0.0	0.0	0.0	0.0	0.0
4-5	Backhoe	1	4	97	0.4	Diesel	0.1	1.0	1.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
4-5	Winch	1	8	88	0.3	Diesel	0.2	2.2	2.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
4-5	Crane	1	2	231	0.3	Diesel	0.1	1.3	0.5	0.1	0.1	0.0	0.0	0.0	0.0	0.0
4-5	Generator	1	4	84	0.7	Diesel	0.2	1.7	1.9	0.1	0.1	0.0	0.0	0.0	0.0	0.0

							2021									
							Pounds per day						Metric tons per year			
Code	Equip	#/day	hrs/day	HP	LF	Fuel	ROG	NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CO2e
1-1	Concrete/Asphalt Saw	1	2	81	0.7	Diesel	0.1	0.8	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-1	Backhoe	1	8	97	0.4	Diesel	0.2	1.9	2.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0
1-1	Pavement Roller	1	2	80	0.4	Diesel	0.0	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-1	Handheld Vibratory Compactor	1	1	8	0.4	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-2	HDD Powerplant (AA DD625)	1	10	600	0.5	Diesel	0.7	6.3	6.5	0.2	0.2	0.0	0.0	0.0	0.0	0.0
1-2	Excavator	1	2	158	0.4	Diesel	0.1	0.5	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-2	Welder	1	8	46	0.5	Diesel	0.3	1.5	1.7	0.1	0.1	0.0	0.0	0.0	0.0	0.0
1-2	Generator	1	10	84	0.7	Diesel	0.4	4.0	4.6	0.2	0.2	0.0	0.0	0.0	0.0	0.0
1-3	Backhoe	1	8	97	0.4	Diesel	0.2	1.9	2.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0
1-3	Well Drilling Machine	1	4	221	0.5	Diesel	0.1	1.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-3	Handheld Vibratory Compactor	1	1	8	0.4	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-1	Backhoe	1	8	97	0.4	Diesel	0.2	1.9	2.3	0.1	0.1	0.0	0.7	0.0	0.0	0.7
2-1	Well Drilling Machine	1	4	221	0.5	Diesel	0.1	1.5	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.1
2-1	Handheld Vibratory Compactor	1	1	8	0.4	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-1	Backhoe	1	8	97	0.4	Diesel	0.2	1.9	2.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0
3-1	Well Drilling Machine	1	4	221	0.5	Diesel	0.1	1.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-1	Handheld Vibratory Compactor	1	1	8	0.4	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-1	Backhoe	1	8	97	0.4	Diesel	0.2	1.9	2.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0
4-1	Well Drilling Machine	1	4	221	0.5	Diesel	0.1	1.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-1	Handheld Vibratory Compactor	1	1	8	0.4	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-7	Backhoe	1	4	97	0.4	Diesel	0.1	0.9	1.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
1-7	Winch	1	8	88	0.3	Diesel	0.2	2.0	2.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
1-7	Crane	1	2	231	0.3	Diesel	0.1	1.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-7	Generator	1	4	84	0.7	Diesel	0.2	1.6	1.8	0.1	0.1	0.0	0.0	0.0	0.0	0.0
2-5	Backhoe	1	4	97	0.4	Diesel	0.1	0.9	1.1	0.1	0.1	0.0	0.1	0.0	0.0	0.1
2-5	Winch	1	8	88	0.3	Diesel	0.2	2.0	2.0	0.1	0.1	0.0	0.1	0.0	0.0	0.1
2-5	Crane	1	2	231	0.3	Diesel	0.1	1.2	0.5	0.0	0.0	0.0	0.1	0.0	0.0	0.1
2-5	Generator	1	4	84	0.7	Diesel	0.2	1.6	1.8	0.1	0.1	0.0	0.1	0.0	0.0	0.1
3-5	Backhoe	1	4	97	0.4	Diesel	0.1	0.9	1.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
3-5	Winch	1	8	88	0.3	Diesel	0.2	2.0	2.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
3-5	Crane	1	2	231	0.3	Diesel	0.1	1.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-5	Generator	1	4	84	0.7	Diesel	0.2	1.6	1.8	0.1	0.1	0.0	0.0	0.0	0.0	0.0
4-5	Backhoe	1	4	97	0.4	Diesel	0.1	0.9	1.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
4-5	Winch	1	8	88	0.3	Diesel	0.2	2.0	2.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
4-5	Crane	1	2	231	0.3	Diesel	0.1	1.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-5	Generator	1	4	84	0.7	Diesel	0.2	1.6	1.8	0.1	0.1	0.0	0.0	0.0	0.0	0.0

Code	Equip	#/day	hrs/day	HP	LF	Fuel	2023									
							Pounds per day						Metric tons per year			
							ROG	NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CO2e
1-1	Concrete/Asphalt Saw	1	2	81	0.7	Diesel	0.1	0.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-1	Backhoe	1	8	97	0.4	Diesel	0.2	1.5	2.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0
1-1	Pavement Roller	1	2	80	0.4	Diesel	0.0	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-1	Handheld Vibratory Compactor	1	1	8	0.4	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-2	HDD Powerplant (AA DD625)	1	10	600	0.5	Diesel	0.6	4.8	6.5	0.2	0.2	0.0	0.0	0.0	0.0	0.0
1-2	Excavator	1	2	158	0.4	Diesel	0.0	0.4	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-2	Welder	1	8	46	0.5	Diesel	0.3	1.4	1.7	0.1	0.1	0.0	0.0	0.0	0.0	0.0
1-2	Generator	1	10	84	0.7	Diesel	0.4	3.4	4.6	0.2	0.2	0.0	0.0	0.0	0.0	0.0
1-3	Backhoe	1	8	97	0.4	Diesel	0.2	1.5	2.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0
1-3	Well Drilling Machine	1	4	221	0.5	Diesel	0.1	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-3	Handheld Vibratory Compactor	1	1	8	0.4	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-1	Backhoe	1	8	97	0.4	Diesel	0.2	1.5	2.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0
2-1	Well Drilling Machine	1	4	221	0.5	Diesel	0.1	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-1	Handheld Vibratory Compactor	1	1	8	0.4	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-1	Backhoe	1	8	97	0.4	Diesel	0.2	1.5	2.2	0.1	0.1	0.0	0.7	0.0	0.0	0.7
3-1	Well Drilling Machine	1	4	221	0.5	Diesel	0.1	1.0	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.1
3-1	Handheld Vibratory Compactor	1	1	8	0.4	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-1	Backhoe	1	8	97	0.4	Diesel	0.2	1.5	2.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0
4-1	Well Drilling Machine	1	4	221	0.5	Diesel	0.1	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-1	Handheld Vibratory Compactor	1	1	8	0.4	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-7	Backhoe	1	4	97	0.4	Diesel	0.1	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-7	Winch	1	8	88	0.3	Diesel	0.2	1.6	1.9	0.1	0.1	0.0	0.0	0.0	0.0	0.0
1-7	Crane	1	2	231	0.3	Diesel	0.1	0.9	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-7	Generator	1	4	84	0.7	Diesel	0.2	1.4	1.8	0.1	0.1	0.0	0.0	0.0	0.0	0.0
2-5	Backhoe	1	4	97	0.4	Diesel	0.1	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-5	Winch	1	8	88	0.3	Diesel	0.2	1.6	1.9	0.1	0.1	0.0	0.0	0.0	0.0	0.0
2-5	Crane	1	2	231	0.3	Diesel	0.1	0.9	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-5	Generator	1	4	84	0.7	Diesel	0.2	1.4	1.8	0.1	0.1	0.0	0.0	0.0	0.0	0.0
3-5	Backhoe	1	4	97	0.4	Diesel	0.1	0.8	1.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1
3-5	Winch	1	8	88	0.3	Diesel	0.2	1.6	1.9	0.1	0.1	0.0	0.1	0.0	0.0	0.1
3-5	Crane	1	2	231	0.3	Diesel	0.1	0.9	0.5	0.0	0.0	0.0	0.1	0.0	0.0	0.1
3-5	Generator	1	4	84	0.7	Diesel	0.2	1.4	1.8	0.1	0.1	0.0	0.1	0.0	0.0	0.1
4-5	Backhoe	1	4	97	0.4	Diesel	0.1	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-5	Winch	1	8	88	0.3	Diesel	0.2	1.6	1.9	0.1	0.1	0.0	0.0	0.0	0.0	0.0
4-5	Crane	1	2	231	0.3	Diesel	0.1	0.9	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-5	Generator	1	4	84	0.7	Diesel	0.2	1.4	1.8	0.1	0.1	0.0	0.0	0.0	0.0	0.0

Code	Equip	#/day	hrs/day	HP	LF	Fuel	2025									
							Pounds per day						Metric tons per year			
							ROG	NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CO2e
1-1	Concrete/Asphalt Saw	1	2	81	0.7	Diesel	0.1	0.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-1	Backhoe	1	8	97	0.4	Diesel	0.1	1.3	2.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1-1	Pavement Roller	1	2	80	0.4	Diesel	0.0	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-1	Handheld Vibratory Compactor	1	1	8	0.4	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-2	HDD Powerplant (AA DD625)	1	10	600	0.5	Diesel	0.6	4.0	6.5	0.2	0.1	0.0	0.0	0.0	0.0	0.0
1-2	Excavator	1	2	158	0.4	Diesel	0.0	0.3	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-2	Welder	1	8	46	0.5	Diesel	0.2	1.3	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-2	Generator	1	10	84	0.7	Diesel	0.3	3.0	4.6	0.1	0.1	0.0	0.0	0.0	0.0	0.0
1-3	Backhoe	1	8	97	0.4	Diesel	0.1	1.3	2.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
1-3	Well Drilling Machine	1	4	221	0.5	Diesel	0.1	0.9	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-3	Handheld Vibratory Compactor	1	1	8	0.4	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-1	Backhoe	1	8	97	0.4	Diesel	0.1	1.3	2.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
2-1	Well Drilling Machine	1	4	221	0.5	Diesel	0.1	0.9	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-1	Handheld Vibratory Compactor	1	1	8	0.4	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-1	Backhoe	1	8	97	0.4	Diesel	0.1	1.3	2.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
3-1	Well Drilling Machine	1	4	221	0.5	Diesel	0.1	0.9	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-1	Handheld Vibratory Compactor	1	1	8	0.4	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-1	Backhoe	1	8	97	0.4	Diesel	0.1	1.3	2.2	0.1	0.0	0.0	0.7	0.0	0.0	0.7
4-1	Well Drilling Machine	1	4	221	0.5	Diesel	0.1	0.9	1.0	0.0	0.0	0.0	1.0	0.0	0.0	1.1
4-1	Handheld Vibratory Compactor	1	1	8	0.4	Diesel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-7	Backhoe	1	4	97	0.4	Diesel	0.1	0.7	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-7	Winch	1	8	88	0.3	Diesel	0.1	1.3	1.9	0.1	0.1	0.0	0.0	0.0	0.0	0.0
1-7	Crane	1	2	231	0.3	Diesel	0.1	0.8	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-7	Generator	1	4	84	0.7	Diesel	0.1	1.2	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-5	Backhoe	1	4	97	0.4	Diesel	0.1	0.7	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-5	Winch	1	8	88	0.3	Diesel	0.1	1.3	1.9	0.1	0.1	0.0	0.0	0.0	0.0	0.0
2-5	Crane	1	2	231	0.3	Diesel	0.1	0.8	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-5	Generator	1	4	84	0.7	Diesel	0.1	1.2	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-5	Backhoe	1	4	97	0.4	Diesel	0.1	0.7	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-5	Winch	1	8	88	0.3	Diesel	0.1	1.3	1.9	0.1	0.1	0.0	0.0	0.0	0.0	0.0
3-5	Crane	1	2	231	0.3	Diesel	0.1	0.8	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-5	Generator	1	4	84	0.7	Diesel	0.1	1.2	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-5	Backhoe	1	4	97	0.4	Diesel	0.1	0.7	1.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1
4-5	Winch	1	8	88	0.3	Diesel	0.1	1.3	1.9	0.1	0.1	0.0	0.1	0.0	0.0	0.1
4-5	Crane	1	2	231	0.3	Diesel	0.1	0.8	0.4	0.0	0.0	0.0	0.1	0.0	0.0	0.1
4-5	Generator	1	4	84	0.7	Diesel	0.1	1.2	1.8	0.0	0.0	0.0	0.1	0.0	0.0	0.1

Employee Calculations

Code	Round Trips/day	Miles/day	Vehicle Type	2020 Pounds per day								2020 Metric tons per year			
				ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	CO2	CH4	N2O	CO2e
1-11	10	1000	LDA-LDT	0.1	0.2	2.1	0.0	0.0	1.9	0.5	0.0	48.9	0.0	0.0	49.3
2-9	10	1000	LDA-LDT	0.1	0.2	2.1	0.0	0.0	1.9	0.5	0.0	0.0	0.0	0.0	0.0
3-9	10	1000	LDA-LDT	0.1	0.2	2.1	0.0	0.0	1.9	0.5	0.0	0.0	0.0	0.0	0.0
4-9	10	1000	LDA-LDT	0.1	0.2	2.1	0.0	0.0	1.9	0.5	0.0	0.0	0.0	0.0	0.0

Code	Round Trips/day	Miles/day	Vehicle Type	2021 Pounds per day								2021 Metric tons per year			
				ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	CO2	CH4	N2O	CO2e
1-11	10	1000	LDA-LDT	0.1	0.2	1.9	0.0	0.0	1.9	0.5	0.0	0.0	0.0	0.0	0.0
2-9	10	1000	LDA-LDT	0.1	0.2	1.9	0.0	0.0	1.9	0.5	0.0	9.8	0.0	0.0	9.8
3-9	10	1000	LDA-LDT	0.1	0.2	1.9	0.0	0.0	1.9	0.5	0.0	0.0	0.0	0.0	0.0
4-9	10	1000	LDA-LDT	0.1	0.2	1.9	0.0	0.0	1.9	0.5	0.0	0.0	0.0	0.0	0.0

Code	Round Trips/day	Miles/day	Vehicle Type	2023 Pounds per day								2023 Metric tons per year			
				ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	CO2	CH4	N2O	CO2e
1-11	10	1000	LDA-LDT	0.0	0.1	1.5	0.0	0.0	1.9	0.5	0.0	0.0	0.0	0.0	0.0
2-9	10	1000	LDA-LDT	0.0	0.1	1.5	0.0	0.0	1.9	0.5	0.0	0.0	0.0	0.0	0.0
3-9	10	1000	LDA-LDT	0.0	0.1	1.5	0.0	0.0	1.9	0.5	0.0	9.2	0.0	0.0	9.2
4-9	10	1000	LDA-LDT	0.0	0.1	1.5	0.0	0.0	1.9	0.5	0.0	0.0	0.0	0.0	0.0

Code	Round Trips/day	Miles/day	Vehicle Type	2025 Pounds per day								2025 Metric tons per year			
				ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	CO2	CH4	N2O	CO2e
1-11	10	1000	LDA-LDT	0.0	0.1	1.3	0.0	0.0	1.9	0.5	0.0	0.0	0.0	0.0	0.0
2-9	10	1000	LDA-LDT	0.0	0.1	1.3	0.0	0.0	1.9	0.5	0.0	0.0	0.0	0.0	0.0
3-9	10	1000	LDA-LDT	0.0	0.1	1.3	0.0	0.0	1.9	0.5	0.0	0.0	0.0	0.0	0.0
4-9	10	1000	LDA-LDT	0.0	0.1	1.3	0.0	0.0	1.9	0.5	0.0	8.5	0.0	0.0	8.6

Onroad Truck Calculations

Code	Trips/day	Miles/day	Vehicle	Vehicle Type	2020											
					Pounds per day								Metric tons per year			
					ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	CO2	CH4	N2O	CO2e
1-1	2	10	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3
1-1	2	20	Dump Truck	T7SingleOnsite	0.1	0.8	0.2	0.0	0.0	0.7	0.1	0.0	6.3	0.0	0.0	6.6
1-1	2	10	Asphalt Truck	T6InstateOnsite	0.0	0.3	0.1	0.0	0.0	0.3	0.0	0.0	2.1	0.0	0.0	2.2
1-2	2	15	Pickup Truck	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2
1-2	2	20	Tractor Trailer	T7Tractor	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	1.2
1-3	2	10	One Ton Truck	T6InstateOnsite	0.0	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.0	0.4
1-3	2	15	Pickup Truck	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
1-3	2	10	Delivery Truck	T7Single	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3
1-3	2	10	Dump Truck	T7SingleOnsite	0.0	0.4	0.1	0.0	0.0	0.3	0.0	0.0	0.5	0.0	0.0	0.6
2-1	2	10	One Ton Truck	T6InstateOnsite	0.0	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
2-1	2	15	Pickup Truck	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-1	2	10	Delivery Truck	T7Single	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-1	2	10	Dump Truck	T7SingleOnsite	0.0	0.4	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
3-1	2	10	One Ton Truck	T6InstateOnsite	0.0	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
3-1	2	15	Pickup Truck	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-1	2	10	Delivery Truck	T7Single	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-1	2	10	Dump Truck	T7SingleOnsite	0.0	0.4	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
4-1	2	10	One Ton Truck	T6InstateOnsite	0.0	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
4-1	2	15	Pickup Truck	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-1	2	10	Delivery Truck	T7Single	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-1	2	10	Dump Truck	T7SingleOnsite	0.0	0.4	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
1-4	2	40	Cable-Pulling Truck	T6UtilityOnsite	0.0	0.5	0.1	0.0	0.0	1.4	0.1	0.0	0.5	0.0	0.0	0.5
1-4	2	20	Pickup Truck with Reel	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-4	2	15	Equipment Truck	T6InstateOnsite	0.1	0.5	0.1	0.0	0.0	0.5	0.1	0.0	0.2	0.0	0.0	0.2
2-2	2	40	Cable-Pulling Truck	T6UtilityOnsite	0.0	0.5	0.1	0.0	0.0	1.4	0.1	0.0	0.0	0.0	0.0	0.0
2-2	2	20	Pickup Truck with Reel	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-2	2	15	Equipment Truck	T6InstateOnsite	0.1	0.5	0.1	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0
3-2	2	40	Cable-Pulling Truck	T6UtilityOnsite	0.0	0.5	0.1	0.0	0.0	1.4	0.1	0.0	0.0	0.0	0.0	0.0
3-2	2	20	Pickup Truck with Reel	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-2	2	15	Equipment Truck	T6InstateOnsite	0.1	0.5	0.1	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0
4-2	2	40	Cable-Pulling Truck	T6UtilityOnsite	0.0	0.5	0.1	0.0	0.0	1.4	0.1	0.0	0.0	0.0	0.0	0.0
4-2	2	20	Pickup Truck with Reel	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-2	2	15	Equipment Truck	T6InstateOnsite	0.1	0.5	0.1	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0
1-11	5	500	Tractor Trailer	T7Tractor	0.6	8.5	1.7	0.1	0.1	1.0	0.3	0.0	157.3	0.0	0.0	164.7
2-9	5	500	Tractor Trailer	T7Tractor	0.6	8.5	1.7	0.1	0.1	1.0	0.3	0.0	0.0	0.0	0.0	0.0
3-9	5	500	Tractor Trailer	T7Tractor	0.6	8.5	1.7	0.1	0.1	1.0	0.3	0.0	0.0	0.0	0.0	0.0
4-9	5	500	Tractor Trailer	T7Tractor	0.6	8.5	1.7	0.1	0.1	1.0	0.3	0.0	0.0	0.0	0.0	0.0
1-11	1	100	Fuel and Misc Delivery	T6Instate	0.1	1.2	0.2	0.0	0.0	0.2	0.1	0.0	18.1	0.0	0.0	19.0
2-9	1	100	Fuel and Misc Delivery	T6Instate	0.1	1.2	0.2	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
3-9	1	100	Fuel and Misc Delivery	T6Instate	0.1	1.2	0.2	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
4-9	1	100	Fuel and Misc Delivery	T6Instate	0.1	1.2	0.2	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
1-5	2	15	Equipment Truck	T6InstateOnsite	0.1	0.5	0.1	0.0	0.0	0.5	0.1	0.0	4.4	0.0	0.0	4.6
1-7	2	15	Pickup Truck	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-5	2	15	Pickup Truck	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-5	2	15	Pickup Truck	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-5	2	15	Pickup Truck	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

					2021											
					Pounds per day								Metric tons per year			
Code	Trips/day	Miles/day	Vehicle	Vehicle Type	ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	CO2	CH4	N2O	CO2e
1-1	2	10	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-1	2	20	Dump Truck	T7SingleOnsite	0.1	0.7	0.2	0.0	0.0	0.7	0.1	0.0	0.0	0.0	0.0	0.0
1-1	2	10	Asphalt Truck	T6InstateOnsite	0.0	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
1-2	2	15	Pickup Truck	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-2	2	20	Tractor Trailer	T7Tractor	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-3	2	10	One Ton Truck	T6InstateOnsite	0.0	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
1-3	2	15	Pickup Truck	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-3	2	10	Delivery Truck	T7Single	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-3	2	10	Dump Truck	T7SingleOnsite	0.0	0.4	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
2-1	2	10	One Ton Truck	T6InstateOnsite	0.0	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.1	0.0	0.0	0.1
2-1	2	15	Pickup Truck	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-1	2	10	Delivery Truck	T7Single	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
2-1	2	10	Dump Truck	T7SingleOnsite	0.0	0.4	0.1	0.0	0.0	0.3	0.0	0.0	0.2	0.0	0.0	0.2
3-1	2	10	One Ton Truck	T6InstateOnsite	0.0	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
3-1	2	15	Pickup Truck	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-1	2	10	Delivery Truck	T7Single	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-1	2	10	Dump Truck	T7SingleOnsite	0.0	0.4	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
4-1	2	10	One Ton Truck	T6InstateOnsite	0.0	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
4-1	2	15	Pickup Truck	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-1	2	10	Delivery Truck	T7Single	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-1	2	10	Dump Truck	T7SingleOnsite	0.0	0.4	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
1-4	2	40	Cable-Pulling Truck	T6UtilityOnsite	0.0	0.4	0.1	0.0	0.0	1.4	0.1	0.0	0.0	0.0	0.0	0.0
1-4	2	20	Pickup Truck with Reel	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-4	2	15	Equipment Truck	T6InstateOnsite	0.0	0.4	0.1	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0
2-2	2	40	Cable-Pulling Truck	T6UtilityOnsite	0.0	0.4	0.1	0.0	0.0	1.4	0.1	0.0	0.7	0.0	0.0	0.7
2-2	2	20	Pickup Truck with Reel	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-2	2	15	Equipment Truck	T6InstateOnsite	0.0	0.4	0.1	0.0	0.0	0.5	0.1	0.0	0.3	0.0	0.0	0.3
3-2	2	40	Cable-Pulling Truck	T6UtilityOnsite	0.0	0.4	0.1	0.0	0.0	1.4	0.1	0.0	0.0	0.0	0.0	0.0
3-2	2	20	Pickup Truck with Reel	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-2	2	15	Equipment Truck	T6InstateOnsite	0.0	0.4	0.1	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0
4-2	2	40	Cable-Pulling Truck	T6UtilityOnsite	0.0	0.4	0.1	0.0	0.0	1.4	0.1	0.0	0.0	0.0	0.0	0.0
4-2	2	20	Pickup Truck with Reel	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-2	2	15	Equipment Truck	T6InstateOnsite	0.0	0.4	0.1	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0
1-11	5	500	Tractor Trailer	T7Tractor	0.5	7.7	1.4	0.1	0.1	1.0	0.3	0.0	0.0	0.0	0.0	0.0
2-9	5	500	Tractor Trailer	T7Tractor	0.5	7.7	1.4	0.1	0.1	1.0	0.3	0.0	31.9	0.0	0.0	33.5
3-9	5	500	Tractor Trailer	T7Tractor	0.5	7.7	1.4	0.1	0.1	1.0	0.3	0.0	0.0	0.0	0.0	0.0
4-9	5	500	Tractor Trailer	T7Tractor	0.5	7.7	1.4	0.1	0.1	1.0	0.3	0.0	0.0	0.0	0.0	0.0
1-11	1	100	Fuel and Misc Delivery	T6Instate	0.0	1.0	0.1	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
2-9	1	100	Fuel and Misc Delivery	T6Instate	0.0	1.0	0.1	0.0	0.0	0.2	0.1	0.0	3.7	0.0	0.0	3.8
3-9	1	100	Fuel and Misc Delivery	T6Instate	0.0	1.0	0.1	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
4-9	1	100	Fuel and Misc Delivery	T6Instate	0.0	1.0	0.1	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
1-5	2	15	Equipment Truck	T6InstateOnsite	0.0	0.4	0.1	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0
1-7	2	15	Pickup Truck	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-5	2	15	Pickup Truck	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-5	2	15	Pickup Truck	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-5	2	15	Pickup Truck	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

					2023											
					Pounds per day								Metric tons per year			
Code	Trips/day	Miles/day	Vehicle	Vehicle Type	ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	CO2	CH4	N2O	CO2e
1-1	2	10	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-1	2	20	Dump Truck	T7SingleOnsite	0.0	0.5	0.1	0.0	0.0	0.7	0.1	0.0	0.0	0.0	0.0	0.0
1-1	2	10	Asphalt Truck	T6InstateOnsite	0.0	0.2	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
1-2	2	15	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-2	2	20	Tractor Trailer	T7Tractor	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-3	2	10	One Ton Truck	T6InstateOnsite	0.0	0.2	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
1-3	2	15	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-3	2	10	Delivery Truck	T7Single	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-3	2	10	Dump Truck	T7SingleOnsite	0.0	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
2-1	2	10	One Ton Truck	T6InstateOnsite	0.0	0.2	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
2-1	2	15	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-1	2	10	Delivery Truck	T7Single	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-1	2	10	Dump Truck	T7SingleOnsite	0.0	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
3-1	2	10	One Ton Truck	T6InstateOnsite	0.0	0.2	0.0	0.0	0.0	0.3	0.0	0.0	0.1	0.0	0.0	0.1
3-1	2	15	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-1	2	10	Delivery Truck	T7Single	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
3-1	2	10	Dump Truck	T7SingleOnsite	0.0	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.2	0.0	0.0	0.2
4-1	2	10	One Ton Truck	T6InstateOnsite	0.0	0.2	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
4-1	2	15	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-1	2	10	Delivery Truck	T7Single	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-1	2	10	Dump Truck	T7SingleOnsite	0.0	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
1-4	2	40	Cable-Pulling Truck	T6UtilityOnsite	0.0	0.4	0.1	0.0	0.0	1.4	0.1	0.0	0.0	0.0	0.0	0.0
1-4	2	20	Pickup Truck with Reel	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-4	2	15	Equipment Truck	T6InstateOnsite	0.0	0.3	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0
2-2	2	40	Cable-Pulling Truck	T6UtilityOnsite	0.0	0.4	0.1	0.0	0.0	1.4	0.1	0.0	0.0	0.0	0.0	0.0
2-2	2	20	Pickup Truck with Reel	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-2	2	15	Equipment Truck	T6InstateOnsite	0.0	0.3	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0
3-2	2	40	Cable-Pulling Truck	T6UtilityOnsite	0.0	0.4	0.1	0.0	0.0	1.4	0.1	0.0	0.7	0.0	0.0	0.7
3-2	2	20	Pickup Truck with Reel	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-2	2	15	Equipment Truck	T6InstateOnsite	0.0	0.3	0.0	0.0	0.0	0.5	0.1	0.0	0.2	0.0	0.0	0.3
4-2	2	40	Cable-Pulling Truck	T6UtilityOnsite	0.0	0.4	0.1	0.0	0.0	1.4	0.1	0.0	0.0	0.0	0.0	0.0
4-2	2	20	Pickup Truck with Reel	LDT	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-2	2	15	Equipment Truck	T6InstateOnsite	0.0	0.3	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0
1-11	5	500	Tractor Trailer	T7Tractor	0.1	5.1	0.6	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0	0.0
2-9	5	500	Tractor Trailer	T7Tractor	0.1	5.1	0.6	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0	0.0
3-9	5	500	Tractor Trailer	T7Tractor	0.1	5.1	0.6	0.0	0.0	1.0	0.3	0.0	29.6	0.0	0.0	31.0
4-9	5	500	Tractor Trailer	T7Tractor	0.1	5.1	0.6	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0	0.0
1-11	1	100	Fuel and Misc Delivery	T6Instate	0.0	0.6	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
2-9	1	100	Fuel and Misc Delivery	T6Instate	0.0	0.6	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
3-9	1	100	Fuel and Misc Delivery	T6Instate	0.0	0.6	0.0	0.0	0.0	0.2	0.1	0.0	3.4	0.0	0.0	3.6
4-9	1	100	Fuel and Misc Delivery	T6Instate	0.0	0.6	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
1-5	2	15	Equipment Truck	T6InstateOnsite	0.0	0.3	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0
1-7	2	15	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-5	2	15	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-5	2	15	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-5	2	15	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Code	Trips/day	Miles/day	Vehicle	Vehicle Type	2025											
					Pounds per day								Metric tons per year			
					ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	CO2	CH4	N2O	CO2e
1-1	2	10	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-1	2	20	Dump Truck	T7SingleOnsite	0.0	0.5	0.1	0.0	0.0	0.7	0.1	0.0	0.0	0.0	0.0	0.0
1-1	2	10	Asphalt Truck	T6InstateOnsite	0.0	0.2	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
1-2	2	15	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-2	2	20	Tractor Trailer	T7Tractor	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-3	2	10	One Ton Truck	T6InstateOnsite	0.0	0.2	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
1-3	2	15	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-3	2	10	Delivery Truck	T7Single	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-3	2	10	Dump Truck	T7SingleOnsite	0.0	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
2-1	2	10	One Ton Truck	T6InstateOnsite	0.0	0.2	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
2-1	2	15	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-1	2	10	Delivery Truck	T7Single	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-1	2	10	Dump Truck	T7SingleOnsite	0.0	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
3-1	2	10	One Ton Truck	T6InstateOnsite	0.0	0.2	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
3-1	2	15	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-1	2	10	Delivery Truck	T7Single	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-1	2	10	Dump Truck	T7SingleOnsite	0.0	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
4-1	2	10	One Ton Truck	T6InstateOnsite	0.0	0.2	0.0	0.0	0.0	0.3	0.0	0.0	0.1	0.0	0.0	0.1
4-1	2	15	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-1	2	10	Delivery Truck	T7Single	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
4-1	2	10	Dump Truck	T7SingleOnsite	0.0	0.3	0.1	0.0	0.0	0.3	0.0	0.0	0.2	0.0	0.0	0.2
1-4	2	40	Cable-Pulling Truck	T6UtilityOnsite	0.0	0.4	0.1	0.0	0.0	1.4	0.1	0.0	0.0	0.0	0.0	0.0
1-4	2	20	Pickup Truck with Reel	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1-4	2	15	Equipment Truck	T6InstateOnsite	0.0	0.3	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0
2-2	2	40	Cable-Pulling Truck	T6UtilityOnsite	0.0	0.4	0.1	0.0	0.0	1.4	0.1	0.0	0.0	0.0	0.0	0.0
2-2	2	20	Pickup Truck with Reel	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-2	2	15	Equipment Truck	T6InstateOnsite	0.0	0.3	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0
3-2	2	40	Cable-Pulling Truck	T6UtilityOnsite	0.0	0.4	0.1	0.0	0.0	1.4	0.1	0.0	0.0	0.0	0.0	0.0
3-2	2	20	Pickup Truck with Reel	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-2	2	15	Equipment Truck	T6InstateOnsite	0.0	0.3	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0
4-2	2	40	Cable-Pulling Truck	T6UtilityOnsite	0.0	0.4	0.1	0.0	0.0	1.4	0.1	0.0	0.6	0.0	0.0	0.7
4-2	2	20	Pickup Truck with Reel	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-2	2	15	Equipment Truck	T6InstateOnsite	0.0	0.3	0.0	0.0	0.0	0.5	0.1	0.0	0.2	0.0	0.0	0.3
1-11	5	500	Tractor Trailer	T7Tractor	0.1	5.1	0.6	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0	0.0
2-9	5	500	Tractor Trailer	T7Tractor	0.1	5.1	0.6	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0	0.0
3-9	5	500	Tractor Trailer	T7Tractor	0.1	5.1	0.6	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0	0.0
4-9	5	500	Tractor Trailer	T7Tractor	0.1	5.1	0.6	0.0	0.0	1.0	0.3	0.0	29.0	0.0	0.0	30.3
1-11	1	100	Fuel and Misc Delivery	T6Instate	0.0	0.6	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
2-9	1	100	Fuel and Misc Delivery	T6Instate	0.0	0.6	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
3-9	1	100	Fuel and Misc Delivery	T6Instate	0.0	0.6	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
4-9	1	100	Fuel and Misc Delivery	T6Instate	0.0	0.6	0.0	0.0	0.0	0.2	0.1	0.0	3.3	0.0	0.0	3.5
1-5	2	15	Equipment Truck	T6InstateOnsite	0.0	0.3	0.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.0	0.0
1-7	2	15	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-5	2	15	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-5	2	15	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-5	2	15	Pickup Truck	LDT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Marine Calculations

			2020									
Code	Boat	Hrs/day	Pounds per day						Metric tons per year			
			ROG	NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CO2e
1-2	Work Boat	6	3	27	21	1	1	0	32.0	0.0	0.0	32.5
1-2	Tug Boat	5	7	67	48	2	2	0	75.7	0.0	0.0	76.7
1-2	Patrol Boat	6	3	30	24	1	1	0	36.9	0.0	0.0	37.5
1-6	Main Lay Vessel (laying)	24	52	992	89	21	20	37	25.2	0.0	0.0	25.6
1-7	Main Lay Vessel (transit)	10	53	1,017	92	22	20	36	24.8	0.0	0.0	25.2
1-8	Main Lay Vessel (laying)	24	52	992	89	21	20	37	25.2	0.0	0.0	25.6
1-9	Support Vessel	24	19	174	135	5	5	0	15.3	0.0	0.0	15.5
1-10	Main Lay Vessel (laying)	24	52	992	89	21	20	37	50.4	0.0	0.0	51.1
2-4	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
2-5	Main Lay Vessel (transit)	10	53	1,017	92	22	20	36	0.0	0.0	0.0	0.0
2-6	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
2-7	Support Vessel	24	19	174	135	5	5	0	0.0	0.0	0.0	0.0
2-8	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
3-4	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
3-5	Main Lay Vessel (transit)	10	53	1,017	92	22	20	36	0.0	0.0	0.0	0.0
3-6	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
3-7	Support Vessel	24	19	174	135	5	5	0	0.0	0.0	0.0	0.0
3-8	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
4-4	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
4-5	Main Lay Vessel (transit)	10	53	1,017	92	22	20	36	0.0	0.0	0.0	0.0
4-6	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
4-7	Support Vessel	24	19	174	135	5	5	0	0.0	0.0	0.0	0.0
4-8	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0

Code	Boat	Hrs/day	2021									
			Pounds per day						Metric tons per year			
			ROG	NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CO2e
1-2	Work Boat	6	3	27	21	1	1	0	0.0	0.0	0.0	0.0
1-2	Tug Boat	5	7	67	48	2	2	0	0.0	0.0	0.0	0.0
1-2	Patrol Boat	6	3	30	24	1	1	0	0.0	0.0	0.0	0.0
1-6	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
1-7	Main Lay Vessel (transit)	10	53	1,017	92	22	20	36	0.0	0.0	0.0	0.0
1-8	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
1-9	Support Vessel	24	19	175	136	5	5	0	0.0	0.0	0.0	0.0
1-10	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
2-4	Main Lay Vessel (laying)	24	52	992	89	21	20	37	25.2	0.0	0.0	25.6
2-5	Main Lay Vessel (transit)	10	53	1,017	92	22	20	36	24.8	0.0	0.0	25.2
2-6	Main Lay Vessel (laying)	24	52	992	89	21	20	37	25.2	0.0	0.0	25.6
2-7	Support Vessel	24	19	175	136	5	5	0	15.3	0.0	0.0	15.5
2-8	Main Lay Vessel (laying)	24	52	992	89	21	20	37	50.4	0.0	0.0	51.1
3-4	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
3-5	Main Lay Vessel (transit)	10	53	1,017	92	22	20	36	0.0	0.0	0.0	0.0
3-6	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
3-7	Support Vessel	24	19	175	136	5	5	0	0.0	0.0	0.0	0.0
3-8	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
4-4	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
4-5	Main Lay Vessel (transit)	10	53	1,017	92	22	20	36	0.0	0.0	0.0	0.0
4-6	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
4-7	Support Vessel	24	19	175	136	5	5	0	0.0	0.0	0.0	0.0
4-8	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0

Code	Boat	Hrs/day	2023									
			Pounds per day						Metric tons per year			
			ROG	NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CO2e
1-2	Work Boat	6	4	27	22	1	1	0	0.0	0.0	0.0	0.0
1-2	Tug Boat	5	7	67	48	2	2	0	0.0	0.0	0.0	0.0
1-2	Patrol Boat	6	3	30	24	1	1	0	0.0	0.0	0.0	0.0
1-6	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
1-7	Main Lay Vessel (transit)	10	53	1,017	92	22	20	36	0.0	0.0	0.0	0.0
1-8	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
1-9	Support Vessel	24	19	176	137	5	5	0	0.0	0.0	0.0	0.0
1-10	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
2-4	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
2-5	Main Lay Vessel (transit)	10	53	1,017	92	22	20	36	0.0	0.0	0.0	0.0
2-6	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
2-7	Support Vessel	24	19	176	137	5	5	0	0.0	0.0	0.0	0.0
2-8	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
3-4	Main Lay Vessel (laying)	24	52	992	89	21	20	37	25.2	0.0	0.0	25.6
3-5	Main Lay Vessel (transit)	10	53	1,017	92	22	20	36	24.8	0.0	0.0	25.2
3-6	Main Lay Vessel (laying)	24	52	992	89	21	20	37	25.2	0.0	0.0	25.6
3-7	Support Vessel	24	19	176	137	5	5	0	15.3	0.0	0.0	15.5
3-8	Main Lay Vessel (laying)	24	52	992	89	21	20	37	50.4	0.0	0.0	51.1
4-4	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
4-5	Main Lay Vessel (transit)	10	53	1,017	92	22	20	36	0.0	0.0	0.0	0.0
4-6	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
4-7	Support Vessel	24	19	176	137	5	5	0	0.0	0.0	0.0	0.0
4-8	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0

Code	Boat	Hrs/day	2025									
			Pounds per day						Metric tons per year			
			ROG	NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CO2e
1-2	Work Boat	6	4	28	22	1	1	0	0.0	0.0	0.0	0.0
1-2	Tug Boat	5	7	67	48	2	2	0	0.0	0.0	0.0	0.0
1-2	Patrol Boat	6	3	30	24	1	1	0	0.0	0.0	0.0	0.0
1-6	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
1-7	Main Lay Vessel (transit)	10	53	1,017	92	22	20	36	0.0	0.0	0.0	0.0
1-8	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
1-9	Support Vessel	24	19	176	137	5	5	0	0.0	0.0	0.0	0.0
1-10	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
2-4	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
2-5	Main Lay Vessel (transit)	10	53	1,017	92	22	20	36	0.0	0.0	0.0	0.0
2-6	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
2-7	Support Vessel	24	19	176	137	5	5	0	0.0	0.0	0.0	0.0
2-8	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
3-4	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
3-5	Main Lay Vessel (transit)	10	53	1,017	92	22	20	36	0.0	0.0	0.0	0.0
3-6	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
3-7	Support Vessel	24	19	176	137	5	5	0	0.0	0.0	0.0	0.0
3-8	Main Lay Vessel (laying)	24	52	992	89	21	20	37	0.0	0.0	0.0	0.0
4-4	Main Lay Vessel (laying)	24	52	992	89	21	20	37	25.2	0.0	0.0	25.6
4-5	Main Lay Vessel (transit)	10	53	1,017	92	22	20	36	24.8	0.0	0.0	25.2
4-6	Main Lay Vessel (laying)	24	52	992	89	21	20	37	25.2	0.0	0.0	25.6
4-7	Support Vessel	24	19	176	137	5	5	0	15.3	0.0	0.0	15.5
4-8	Main Lay Vessel (laying)	24	52	992	89	21	20	37	50.4	0.0	0.0	51.1

Earthmoving/Paving Calculations

Code	Acres /day	Cut/Fill (cy/day)	Paving (sf/day)	2020 Pounds per day			2021 Pounds per day			2023 Pounds per day			2025 Pounds per day		
				ROG	PM10 D	PM2.5 D	ROG	PM10 D	PM2.5 D	ROG	PM10 D	PM2.5 D	ROG	PM10 D	PM2.5 D
1-1	0.069	44.444	0.003	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0
1-2	0.092			0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0
1-3		13.704		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-1		13.704		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-1		13.704		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4-1		13.704		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Construction (3 to 24 NM)

Schedule

Phase	Code	Start Date	End Date	Working Days
Phase 1				
Pre-lay grapnel run	1-6	9/1/2020	9/3/2020	2
Marine cable lay	1-8	9/8/2020	9/16/2020	6
Marine cable burial (ROV-assisted)	1-10	9/14/2020	9/19/2020	4
Phase 2				
Pre-lay grapnel run	2-4	8/23/2021	8/25/2021	2
Marine cable lay	2-6	8/30/2021	9/7/2021	6
Marine cable burial (ROV-assisted)	2-8	9/5/2021	9/10/2021	4
Phase 3				
Pre-lay grapnel run	3-4	9/23/2023	9/25/2023	2
Marine cable lay	3-6	9/30/2023	10/8/2023	6
Marine cable burial (ROV-assisted)	3-8	10/6/2023	10/11/2023	4
Phase 4				
Pre-lay grapnel run	4-4	10/23/2025	10/25/2025	2
Marine cable lay	4-6	10/30/2025	11/7/2025	6
Marine cable burial (ROV-assisted)	4-8	11/5/2025	11/10/2025	4

Marine Calculations

Code	Boat	Hrs/day	2020									
			Pounds per day						Metric tons per year			
			ROG	NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CO2e
1-6	Main Lay Vessel (laying)	20	43	826	75	18	17	31	42.0	0.0	0.0	42.6
1-6	Main Lay Vessel (transit)	4	21	407	37	9	8	14	19.9	0.0	0.0	20.1
1-6	Support Vessel	12	9	87	67	3	3	0	7.6	0.0	0.0	7.8
1-8	Main Lay Vessel (laying)	20	43	826	75	18	17	31	126.0	0.0	0.0	127.8
1-8	Main Lay Vessel (transit)	4	21	407	37	9	8	14	59.6	0.0	0.0	60.4
1-10	Main Lay Vessel (laying)	20	43	826	75	18	17	31	84.0	0.0	0.0	85.2
1-10	Main Lay Vessel (transit)	4	21	407	37	9	8	14	39.7	0.0	0.0	40.3
2-4	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
2-4	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
2-4	Support Vessel	12	9	87	67	3	3	0	0.0	0.0	0.0	0.0
2-6	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
2-6	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
2-8	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
2-8	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
3-4	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
3-4	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
3-4	Support Vessel	12	9	87	67	3	3	0	0.0	0.0	0.0	0.0
3-6	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
3-6	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
3-8	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
3-8	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
4-4	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
4-4	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
4-4	Support Vessel	12	9	87	67	3	3	0	0.0	0.0	0.0	0.0
4-6	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
4-6	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
4-8	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
4-8	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0

Code	Boat	Hrs/day	2021									
			Pounds per day						Metric tons per year			
			ROG	NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CO2e
1-6	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
1-6	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
1-6	Support Vessel	12	9	87	68	3	3	0	0.0	0.0	0.0	0.0
1-8	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
1-8	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
1-10	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
1-10	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
2-4	Main Lay Vessel (laying)	20	43	826	75	18	17	31	42.0	0.0	0.0	42.6
2-4	Main Lay Vessel (transit)	4	21	407	37	9	8	14	19.9	0.0	0.0	20.1
2-4	Support Vessel	12	9	87	68	3	3	0	7.6	0.0	0.0	7.8
2-6	Main Lay Vessel (laying)	20	43	826	75	18	17	31	126.0	0.0	0.0	127.8
2-6	Main Lay Vessel (transit)	4	21	407	37	9	8	14	59.6	0.0	0.0	60.4
2-8	Main Lay Vessel (laying)	20	43	826	75	18	17	31	84.0	0.0	0.0	85.2
2-8	Main Lay Vessel (transit)	4	21	407	37	9	8	14	39.7	0.0	0.0	40.3
3-4	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
3-4	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
3-4	Support Vessel	12	9	87	68	3	3	0	0.0	0.0	0.0	0.0
3-6	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
3-6	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
3-8	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
3-8	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
4-4	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
4-4	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
4-4	Support Vessel	12	9	87	68	3	3	0	0.0	0.0	0.0	0.0
4-6	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
4-6	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
4-8	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
4-8	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0

Code	Boat	Hrs/day	2023									
			Pounds per day						Metric tons per year			
			ROG	NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CO2e
1-6	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
1-6	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
1-6	Support Vessel	12	10	88	68	3	3	0	0.0	0.0	0.0	0.0
1-8	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
1-8	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
1-10	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
1-10	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
2-4	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
2-4	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
2-4	Support Vessel	12	10	88	68	3	3	0	0.0	0.0	0.0	0.0
2-6	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
2-6	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
2-8	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
2-8	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
3-4	Main Lay Vessel (laying)	20	43	826	75	18	17	31	42.0	0.0	0.0	42.6
3-4	Main Lay Vessel (transit)	4	21	407	37	9	8	14	19.9	0.0	0.0	20.1
3-4	Support Vessel	12	10	88	68	3	3	0	7.6	0.0	0.0	7.8
3-6	Main Lay Vessel (laying)	20	43	826	75	18	17	31	126.0	0.0	0.0	127.8
3-6	Main Lay Vessel (transit)	4	21	407	37	9	8	14	59.6	0.0	0.0	60.4
3-8	Main Lay Vessel (laying)	20	43	826	75	18	17	31	84.0	0.0	0.0	85.2
3-8	Main Lay Vessel (transit)	4	21	407	37	9	8	14	39.7	0.0	0.0	40.3
4-4	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
4-4	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
4-4	Support Vessel	12	10	88	68	3	3	0	0.0	0.0	0.0	0.0
4-6	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
4-6	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
4-8	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
4-8	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0

			2025									
			Pounds per day						Metric tons per year			
Code	Boat	Hrs/day	ROG	NOX	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CO2e
1-6	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
1-6	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
1-6	Support Vessel	12	10	88	68	3	3	0	0.0	0.0	0.0	0.0
1-8	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
1-8	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
1-10	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
1-10	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
2-4	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
2-4	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
2-4	Support Vessel	12	10	88	68	3	3	0	0.0	0.0	0.0	0.0
2-6	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
2-6	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
2-8	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
2-8	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
3-4	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
3-4	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
3-4	Support Vessel	12	10	88	68	3	3	0	0.0	0.0	0.0	0.0
3-6	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
3-6	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
3-8	Main Lay Vessel (laying)	20	43	826	75	18	17	31	0.0	0.0	0.0	0.0
3-8	Main Lay Vessel (transit)	4	21	407	37	9	8	14	0.0	0.0	0.0	0.0
4-4	Main Lay Vessel (laying)	20	43	826	75	18	17	31	42.0	0.0	0.0	42.6
4-4	Main Lay Vessel (transit)	4	21	407	37	9	8	14	19.9	0.0	0.0	20.1
4-4	Support Vessel	12	10	88	68	3	3	0	7.6	0.0	0.0	7.8
4-6	Main Lay Vessel (laying)	20	43	826	75	18	17	31	126.0	0.0	0.0	127.8
4-6	Main Lay Vessel (transit)	4	21	407	37	9	8	14	59.6	0.0	0.0	60.4
4-8	Main Lay Vessel (laying)	20	43	826	75	18	17	31	84.0	0.0	0.0	85.2
4-8	Main Lay Vessel (transit)	4	21	407	37	9	8	14	39.7	0.0	0.0	40.3

Operational Emissions

Schedule

Phase	Code	Start Date	End Date	Days per Year
Power Feed Equipment Station	1-1	1/1/2026	12/31/202X	12
Employee Vehicle Trips	1-5	1/1/2026	12/31/202X	12
Electricity Consumption	1-6	1/1/2026	12/31/202X	-

Employee Calculations

Code	Round Trips/day	Miles/day	Vehicle Type	2026 +																			
				Pounds per day								Tons per year								Metric tons per year			
				ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	ROG	NOX	CO	PM10	PM2.5	PM10 D	PM2.5 D	SO2	CO2	CH4	N2O	CO2e
1-5	2	100	LDA-LDT	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3

Emission Factors

Marine Emission Factors

Boat	Year	ROG	NOx	CO	PM10	PM2.5	SO2	CO2	CH4	N2O
		gram per hour (inclusive of hp and lf)								
Work Boat	2020	249	2,012	1,571	61	59	2	190,596	4	9
Tug Boat	2020	619	6,092	4,380	206	200	6	540,526	11	24
Patrol Boat	2020	251	2,299	1,786	65	63	2	219,913	4	10
Main Lay Vessel (laying)	2020	974	18,742	1,691	406	375	696	1,050,044	15	49
Main Lay Vessel (transit)	2020	2,396	46,146	4,161	987	911	1,644	2,481,714	38	112
Support Vessel	2020	353	3,282	2,548	99	96	4	318,513	7	14
Work Boat	2021	254	2,034	1,593	63	61	2	190,596	4	9
Tug Boat	2021	619	6,092	4,380	206	200	6	540,526	11	24
Patrol Boat	2021	251	2,299	1,786	65	63	2	219,913	4	10
Main Lay Vessel (laying)	2021	974	18,742	1,691	406	375	696	1,050,044	15	49
Main Lay Vessel (transit)	2021	2,396	46,146	4,161	987	911	1,644	2,481,714	38	112
Support Vessel	2021	358	3,303	2,567	101	98	4	318,513	7	14
Work Boat	2023	265	2,079	1,637	67	65	2	190,596	4	9
Tug Boat	2023	619	6,092	4,380	206	200	6	540,526	11	24
Patrol Boat	2023	251	2,299	1,786	65	63	2	219,913	4	10
Main Lay Vessel (laying)	2023	974	18,742	1,691	406	375	696	1,050,044	15	49
Main Lay Vessel (transit)	2023	2,396	46,146	4,161	987	911	1,644	2,481,714	38	112
Support Vessel	2023	361	3,317	2,580	102	99	4	318,513	7	14
Work Boat	2025	277	2,123	1,680	71	69	2	190,596	4	9
Tug Boat	2025	619	6,092	4,380	206	200	6	540,526	11	24
Patrol Boat	2025	251	2,299	1,786	65	63	2	219,913	4	10
Main Lay Vessel (laying)	2025	974	18,742	1,691	406	375	696	1,050,044	15	49
Main Lay Vessel (transit)	2025	2,396	46,146	4,161	987	911	1,644	2,481,714	38	112
Support Vessel	2025	361	3,317	2,580	102	99	4	318,513	7	14

Earthmoving Emission Factors

Source	Factor	Unit	Source
Paving ROG EF	2.6200	lbs/acre	CalEEMod (no mitigation)
Grading PM10 EF	1.0605	lbs/acre	CalEEMod (no mitigation)
Grading PM2.5 EF	0.1145	lbs/acre	CalEEMod (no mitigation)
Bulldozing PM10 EF	0.7528	lbs/hr	CalEEMod (no mitigation)
Bulldozing PM2.5 EF	0.4138	lbs/hr	CalEEMod (no mitigation)
Truck loading PM10 EF	0.000144	lb/ton	CalEEMod (no mitigation)
Truck loading PM2.5 EF	0.000022	lb/ton	CalEEMod (no mitigation)
Demo PM10 EF	0.0221	lb/ton	CalEEMod (no mitigation)
Demo PM2.5 EF	0.0033	lb/ton	CalEEMod (no mitigation)

On-Raod Emission Factors (EMFAC2017, AP-42)

		Running (RUNEX, PMTW, PMBW, RD) grams per mile											Process (IDLEX, STREX, TOTEX, DIURN, HTSK, RUNLS, RESTL) grams per trip										
Year	VehType	ROG	NOx	CO	PM10 Ex	PM10 D	PM2.5 Ex	PM2.5 D	SO2	CO2	CH4	N2O	ROG	NOx	CO	PM10 Ex	PM10 D	PM2.5 Ex	PM2.5 D	SO2	CO2	CH4	N2O
2020	T6InstateOnsite	1.8	14.3	2.7	0.3	15.5	0.3	1.6	0.0	2440	0.1	0.4	0.0	1.6	0.2	0.0	0.0	0.0	0.0	0.0	58.5	0.0	0.0
2021	T6InstateOnsite	1.4	12.6	2.3	0.2	15.5	0.2	1.6	0.0	2418	0.1	0.4	0.0	1.7	0.2	0.0	0.0	0.0	0.0	0.0	57.7	0.0	0.0
2023	T6InstateOnsite	0.2	9.2	0.9	0.0	15.5	0.0	1.6	0.0	2357	0.0	0.4	0.0	2.1	0.2	0.0	0.0	0.0	0.0	0.0	54.3	0.0	0.0
2025	T6InstateOnsite	0.2	9.1	0.9	0.0	15.5	0.0	1.6	0.0	2295	0.0	0.4	0.0	2.2	0.2	0.0	0.0	0.0	0.0	0.0	53.6	0.0	0.0
2020	T6UtilityOnsite	0.1	5.9	0.8	0.0	15.5	0.0	1.6	0.0	2445	0.0	0.4	0.0	2.6	0.4	0.0	0.0	0.0	0.0	0.0	155.0	0.0	0.0
2021	T6UtilityOnsite	0.0	4.3	0.6	0.0	15.5	0.0	1.6	0.0	2459	0.0	0.4	0.0	2.6	0.5	0.0	0.0	0.0	0.0	0.0	147.0	0.0	0.0
2023	T6UtilityOnsite	0.0	4.4	0.6	0.0	15.5	0.0	1.6	0.0	2379	0.0	0.4	0.0	2.6	0.5	0.0	0.0	0.0	0.0	0.0	143.3	0.0	0.0
2025	T6UtilityOnsite	0.0	4.5	0.6	0.0	15.5	0.0	1.6	0.0	2271	0.0	0.4	0.0	2.6	0.5	0.0	0.0	0.0	0.0	0.0	137.9	0.0	0.0
2020	T7SingleOnsite	2.1	17.7	4.1	0.3	15.4	0.3	1.6	0.0	3669	0.1	0.6	0.3	8.5	4.3	0.0	0.0	0.0	0.0	0.0	855.2	0.0	0.1
2021	T7SingleOnsite	1.7	15.7	3.7	0.2	15.4	0.2	1.6	0.0	3632	0.1	0.6	0.3	8.5	4.4	0.0	0.0	0.0	0.0	0.0	866.6	0.0	0.1
2023	T7SingleOnsite	0.2	10.7	1.8	0.0	15.4	0.0	1.6	0.0	3499	0.0	0.6	0.3	8.6	5.1	0.0	0.0	0.0	0.0	0.0	882.8	0.0	0.1
2025	T7SingleOnsite	0.1	10.8	1.8	0.0	15.4	0.0	1.6	0.0	3413	0.0	0.5	0.3	8.7	5.2	0.0	0.0	0.0	0.0	0.0	865.6	0.0	0.1
2020	T7TractorOnsite	2.2	18.2	4.9	0.2	15.4	0.2	1.6	0.0	3699	0.1	0.6	0.4	8.5	4.3	0.0	0.0	0.0	0.0	0.0	902.0	0.0	0.1
2021	T7TractorOnsite	1.7	17.0	4.4	0.2	15.4	0.2	1.6	0.0	3666	0.1	0.6	0.4	8.6	4.5	0.0	0.0	0.0	0.0	0.0	907.9	0.0	0.1
2023	T7TractorOnsite	0.2	14.1	2.2	0.0	15.4	0.0	1.6	0.0	3524	0.0	0.6	0.4	8.7	5.2	0.0	0.0	0.0	0.0	0.0	887.2	0.0	0.1
2025	T7TractorOnsite	0.2	14.5	2.3	0.0	15.4	0.0	1.6	0.0	3447	0.0	0.5	0.4	8.7	5.2	0.0	0.0	0.0	0.0	0.0	870.3	0.0	0.1
2020	LDA-LDT	0.0	0.1	0.9	0.0	0.9	0.0	0.2	0.0	296	0.0	0.0	1.1	0.3	2.8	0.0	0.0	0.0	0.0	0.0	64.4	0.1	0.0
2021	LDA-LDT	0.0	0.1	0.8	0.0	0.9	0.0	0.2	0.0	287	0.0	0.0	1.0	0.3	2.7	0.0	0.0	0.0	0.0	0.0	62.4	0.1	0.0
2023	LDA-LDT	0.0	0.1	0.7	0.0	0.9	0.0	0.2	0.0	269	0.0	0.0	0.9	0.2	2.5	0.0	0.0	0.0	0.0	0.0	58.6	0.1	0.0
2025	LDA-LDT	0.0	0.0	0.6	0.0	0.9	0.0	0.2	0.0	251	0.0	0.0	0.8	0.2	2.3	0.0	0.0	0.0	0.0	0.0	54.8	0.1	0.0
2020	LDT	0.0	0.1	1.2	0.0	0.9	0.0	0.2	0.0	349	0.0	0.0	1.6	0.4	3.3	0.0	0.0	0.0	0.0	0.0	77.0	0.1	0.0
2021	LDT	0.0	0.1	1.1	0.0	0.9	0.0	0.2	0.0	339	0.0	0.0	1.5	0.4	3.2	0.0	0.0	0.0	0.0	0.0	74.8	0.1	0.0
2023	LDT	0.0	0.1	0.9	0.0	0.9	0.0	0.2	0.0	318	0.0	0.0	1.4	0.3	2.9	0.0	0.0	0.0	0.0	0.0	70.3	0.1	0.0
2025	LDT	0.0	0.1	0.8	0.0	0.9	0.0	0.2	0.0	297	0.0	0.0	1.2	0.3	2.7	0.0	0.0	0.0	0.0	0.0	65.9	0.1	0.0
2020	T6Instate	0.2	5.4	0.7	0.1	1.0	0.1	0.3	0.0	1099	0.0	0.2	0.0	1.6	0.2	0.0	0.0	0.0	0.0	0.0	58.5	0.0	0.0
2021	T6Instate	0.2	4.6	0.6	0.1	1.0	0.1	0.3	0.0	1075	0.0	0.2	0.0	1.7	0.2	0.0	0.0	0.0	0.0	0.0	57.7	0.0	0.0
2023	T6Instate	0.0	2.8	0.2	0.0	1.0	0.0	0.3	0.0	1007	0.0	0.2	0.0	2.1	0.2	0.0	0.0	0.0	0.0	0.0	54.3	0.0	0.0
2025	T6Instate	0.0	2.7	0.2	0.0	1.0	0.0	0.3	0.0	980	0.0	0.2	0.0	2.2	0.2	0.0	0.0	0.0	0.0	0.0	53.6	0.0	0.0
2020	T6Utility	0.0	1.8	0.1	0.0	1.0	0.0	0.3	0.0	1071	0.0	0.2	0.0	2.6	0.4	0.0	0.0	0.0	0.0	0.0	155.0	0.0	0.0
2021	T6Utility	0.0	1.0	0.1	0.0	1.0	0.0	0.3	0.0	1030	0.0	0.2	0.0	2.6	0.5	0.0	0.0	0.0	0.0	0.0	147.0	0.0	0.0
2023	T6Utility	0.0	1.0	0.1	0.0	1.0	0.0	0.3	0.0	996	0.0	0.2	0.0	2.6	0.5	0.0	0.0	0.0	0.0	0.0	143.3	0.0	0.0
2025	T6Utility	0.0	1.0	0.1	0.0	1.0	0.0	0.3	0.0	951	0.0	0.1	0.0	2.6	0.5	0.0	0.0	0.0	0.0	0.0	137.9	0.0	0.0
2020	T7Single	0.5	7.6	1.3	0.1	0.9	0.1	0.2	0.0	1892	0.0	0.3	0.3	8.5	4.3	0.0	0.0	0.0	0.0	0.0	855.2	0.0	0.1
2021	T7Single	0.4	6.5	1.1	0.1	0.9	0.1	0.2	0.0	1860	0.0	0.3	0.3	8.5	4.4	0.0	0.0	0.0	0.0	0.0	866.6	0.0	0.1
2023	T7Single	0.0	3.6	0.4	0.0	0.9	0.0	0.2	0.0	1727	0.0	0.3	0.3	8.6	5.1	0.0	0.0	0.0	0.0	0.0	882.8	0.0	0.1
2025	T7Single	0.0	3.5	0.4	0.0	0.9	0.0	0.2	0.0	1682	0.0	0.3	0.3	8.7	5.2	0.0	0.0	0.0	0.0	0.0	865.6	0.0	0.1
2020	T7Tractor	0.6	7.6	1.5	0.1	0.9	0.1	0.2	0.0	1898	0.0	0.3	0.4	8.5	4.3	0.0	0.0	0.0	0.0	0.0	902.0	0.0	0.1
2021	T7Tractor	0.4	6.9	1.3	0.1	0.9	0.1	0.2	0.0	1870	0.0	0.3	0.4	8.6	4.5	0.0	0.0	0.0	0.0	0.0	907.9	0.0	0.1
2023	T7Tractor	0.0	4.5	0.5	0.0	0.9	0.0	0.2	0.0	1734	0.0	0.3	0.4	8.7	5.2	0.0	0.0	0.0	0.0	0.0	887.2	0.0	0.1
2025	T7Tractor	0.0	4.6	0.5	0.0	0.9	0.0	0.2	0.0	1696	0.0	0.3	0.4	8.7	5.2	0.0	0.0	0.0	0.0	0.0	870.3	0.0	0.1

On-Raod Emission Factors (EMFAC2017, AP-42)

		Running (RUNEX, PMTW, PMBW, RD) grams per mile											Process (IDLEX, STREX, TOTEX, DIURN, HTSK, RUNLS, RESTL) grams per trip										
Year	VehType	ROG	NOx	CO	PM10 Ex	PM10 D	PM2.5 Ex	PM2.5 D	SO2	CO2	CH4	N2O	ROG	NOx	CO	PM10 Ex	PM10 D	PM2.5 Ex	PM2.5 D	SO2	CO2	CH4	N2O
2026	LDA-LDT	0.0	0.0	0.5	0.0	0.9	0.0	0.2	0.0	243	0.0	0.0	0.7	0.2	2.2	0.0	0.0	0.0	0.0	0.0	53.1	0.0	0.0