



June 27, 2025

Elaine Shen, Planning and Rules Manager
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4178

Re: John Wayne Airport 2024 MOU Progress Report Update

Dear Ms. Shen,

John Wayne Airport, Orange County ("SNA," "JWA," or "Airport") is pleased to submit this annual progress report as requested by the South Coast Air Quality Management District ("AQMD"). On December 6, 2019, a Memorandum of Understanding ("MOU") was entered into by the AQMD and the Airport, acting by and through the County of Orange, California ("County") in its capacity as the proprietor and certificated operator of JWA. The purpose of this annual progress report is to provide information concerning progress on the MOU measures. There are three measures in the JWA MOU, as related to non-aircraft commercial passenger airport mobile sources. These measures are intended to assist the AQMD in their effort to reach attainment for the 1997 and 2008 8-hour ozone national ambient air quality standards ("NAAQS") by 2023 and 2031, respectively. Information requested by AQMD on each of these measures, their associated equipment, and associated emissions is provided in the following sections. Oxides of Nitrogen ("NOx") and volatile organic compound ("VOC")¹ emissions are provided for each measure as these pollutants are considered ozone precursors.

MOU Schedule No. 1 – Ground Support Equipment (GSE)

MOU Schedule No. 1 is a measure for GSE.² This measure requires that GSE associated with commercial operations achieve a fleet-average emission factor for NOx of 1.7 and 0.9 grams per brake horsepower hour (g/bhp-hr) in 2023 and 2031, respectively. To achieve this measure, the Airport has been working with Airport tenants and GSE operators to achieve the performance targets by specified dates through accelerated turnover to cleaner equipment.

¹ For purposes of this MOU, VOC emissions are assumed to be equal to ROG as calculated in the attached tables.

² GSE is any vehicle or equipment used to support aircraft operations that is subject to, or included in compliance plans to meet, the requirements of the California Air Resources Board ("CARB") In-Use Off-Road Diesel ("ORD") Vehicle Regulation Program, CARB Off-Road Large Spark-Ignition ("LSI") Engine Fleet Requirements Regulation Program, or CARB Portable Equipment Registration Program and associated Portable Diesel Engine Airborne Toxic Control Measure. Furthermore, GSE as defined here only includes equipment that is not subject to compliance with SCAQMD Rule XX – RECLAIM, or included in a mobile source emission reduction credit program under SCAQMD Rule XVI.

A list of GSE subject to this measure with the required information specified in MOU Schedule No. 1, Section III.B.1 is provided in **Table 1**. Information on the sale or retirement of non-zero emission GSE subject to this measure including information submitted to the California Air Resources Board Diesel Off-Road Online Reporting System (“DOORS”) database and any relocation details (as applicable) as required by MOU Schedule No. 1, Section III.B.2 is also presented in **Table 1**.

As noted in the CY 2021 MOU submittal, there are a few pieces of GSE that are used to support commercial aircraft activity at JWA for only a portion of the time (and otherwise used for other non-commercial activity). For these units, operator-specific information was provided regarding refueling activities for commercial aircraft vs. non-commercial aircraft, which was used to ratio annual activity for Jet-A Refuelers to better represent commercial-only aircraft-related emissions.³ Based on discussions with the operator, several ground power units are used to support non-commercial activity, however the annual ground power unit usage related to commercial-only activity is equal to the full operation of one unit.⁴

There are several ground power units in operation at JWA. These units are mainly on standby, as all but two commercial gate ramps have been electrified and are typically used by the majority of aircraft when parked at the gate. The emission estimates for ground power units are based on default activity derived from OFFROAD2017, which are anticipated to result in much more conservative estimates of use compared to actual use.

At the request of AQMD in September 2021, the GSE emission inventory methodology was revised to incorporate new engine standards for spark-ignited engines for gasoline-fueled equipment, and CARB’s 2017 ORD Emission Factors for diesel-fueled equipment (Method A). This revision updated the original GSE emission inventory methodology that was previously used to develop MOU targets using emissions calculated in OFFROAD2017 (Method B). Calculation methodologies for Method A and Method B are described below. The 2024 GSE emissions inventory calculated using Method A can be found in **Table 2**. The 2024 fleet averaged NOx emission factor calculated using Method B can be found in **Table 3**.

Calculation Methodology

GSE emissions are based on an inventory of GSE equipment, provided by individual airlines and GSE operators at JWA for 2024. In the 2024 inventory, GSE identified as licensed for on-road use are not included; all other GSE (including small and low-use

³ The operating hours for units 121-127 were calculated differently since these units only service commercial operations at JWA for a portion of their total usage time. Operating hours were estimated by multiplying OFFROAD default usage by the ratio of commercial gallons refueled to total gallons refueled in 2024. In 2023, there were 395,057 commercial-specific gallons refueled and 7,720,502 total gallons refueled. In 2024, there were 449,841 commercial-specific gallons refueled and 7,126,353 total gallons refueled. The percentage of commercial-specific usage was applied to each of the default OFFROAD values.

⁴ Operating hours for these nine GPU units were estimated as equivalent to the full usage of a single GPU based on OFFROAD defaults. This estimate was based on discussions with the operator.

equipment) are included at the request of AQMD. A summary of all GSE included in the revised inventory can be found in **Table 4**.

Emission Factor Calculation – Method A

Model year specific emission factors were calculated based on the new engine standards for spark-ignited engines for gasoline-fueled equipment, and CARB's 2017 ORD Emission Factors for diesel-fueled equipment. For units powered by liquified petroleum gas (LPG), emission factors for gasoline-fueled equipment were used. NO_x and Reactive Organic Gas ("ROG") emission factors for combustion equipment were calculated by summing the zero-hour pollutant emission factor with the product of the deterioration rate and cumulative hours and multiplying by the pollutant-specific fuel correction factor. Model year specific gasoline-fueled emission factor constants were provided by AQMD. Model year specific diesel-fueled emission factor constants were referenced from CARB's 2017 Off-road Diesel Emission Factors for diesel-fueled equipment.⁵

The cumulative hours of operation for each unit were calculated by multiplying the equipment age (taken as the difference between the inventory year and engine model year ("MY")) by the annual equipment usage. Annual equipment usage hours were calculated for 2024 using activity data from the OFFROAD2017 database.

Cumulative hours of operation were capped according to guidance transmitted by the AQMD on August 13, 2021, as summarized below engine displacement information for GSE was not provided by the GSE owner/operator, therefore deterioration caps for gasoline-fueled GSE were determined solely based on model year.

Diesel GSE

25-50 horsepower ("HP"), use deterioration rate ("DR") cap of 5,000 hours
>50 HP, use DR cap of 12,000 hours

Gasoline and Liquified Petroleum Gas GSE

25-50 HP and <1 liter ("L"), use DR cap of 2,000 hours
>1L, for MY2007+, use 10,000 hours
>1L, for MY2007 and earlier, use 7,000 hours

The Method A emission factor methodology provides emission factors for hydrocarbon (HC) emissions. HC emission factors were converted to ROG emission factors by multiplying by a ROG to HC ratio of 0.9198 for gasoline-fueled units and 1.21 for diesel-fueled units, both derived from OFFROAD2017 for the airport ground support equipment sector.

⁵ 2017 Off-road Diesel Emission Factors. CARB. Available at: https://ww2.arb.ca.gov/sites/default/files/2023-06/ordas_ef_fcf_2017_v8.xlsx. Accessed: June 2025.

Additional Calculation Assumptions

The calculation methodology required additional assumptions as summarized in the following bullet points.

- Emission factors and deterioration rates for gasoline-fueled equipment were provided up to a maximum HP bin of 300 HP. Emissions calculated for gasoline-fueled equipment operating at greater than 300 HP were calculated using the 300 HP bin values.
- Zero-hour emission factors and deterioration rates for the 50 HP bin were provided for three different engine displacements for 50 HP engines. Since engine displacement information was not provided for GSE at JWA, the maximum emission factor and deterioration rate was assumed between the three 50 HP constants.

Multiple fuel correction factors were provided for gasoline-fueled equipment. In the situation where multiple fuel correction factors applied, the newest (topmost) factor in the CARB lookup table was selected.

Emission Factor Methodology – Method B

Model year specific emission factors were derived from the OFFROAD2017 database for each equipment type, HP bin, and fuel type operating in Orange County in 2024. Where an exact model year and HP bin match did not exist for calendar year 2023, previous calendar years were reviewed for an exact model year and HP bin match. Where an exact model year and/or HP bin match did not exist for any calendar year in OFFROAD2017, an alternate model year/HP bin combination was selected to look up emission factors. The alternate model year and HP bin were selected based on the combination that would most accurately represent the specific equipment. Lastly, the selected OFFROAD2017 emission factor was compared against the NOx emission factor reported in the first year the specific unit was reported. If the percentage difference for the same GSE is greater than or equal to 25%, the first reporting year emission factor was used. Additional details on this methodology can be referenced in South Coast AQMD's Methodology for Calculating Ground Support Equipment Fleet-Average Emission Factor documentation.⁶ Default load factors from CARB were used for all equipment.

An emission factor of zero was used for electric vehicles. Additionally, equipment that did not meet the criteria for GSE as specified in the MOU were not included in the fleet-average emission factor calculation. Some examples of equipment that do not meet MOU GSE criteria include gasoline vehicles licensed by the California Department

⁶ South Coast AQMD Airport MOUs Methodology for Calculating Ground Support Equipment Fleet Average Emission Factor. November 2024. Available at: <https://www.aqmd.gov/docs/default-source/planning/fbmsm-docs/methodology-for-calculating-ground-support-equipment-fleet-average-emission-factor.pdf?sfvrsn=6>. Accessed: June 2025.

of Motor Vehicles (“DMV”) for on-road usage,⁷ gasoline equipment with a rating less than 25 brake horsepower,⁸ and diesel equipment used for fewer than 200 hours per year which are exempt as part of a low-usage exemption.⁹ Emission factors for LPG fueled equipment were assumed to be equal to gasoline emission factors derived from OFFROAD2017.

Progress Update

The fleet averaged NOx emission factor for commercial GSE at JWA at the end of 2024 was 1.66 g/bhp-hr using Method B, which is 59% lower than the 2017 Baseline fleet averaged NOx emission factor of 4.0 g/bhp-hr. The GSE fleet-average emission factor is below the 2023 target of 1.7 g/bhp-hr. In 2025, JWA has and will continue to engage in consistent and clear communication with operators to identify older combustion units that operators should target for upcoming replacements. In particular, the highest priority units include Tier 0 and Tier 1 diesel engines, and older gasoline engines (i.e., any units with pre-2000 model years). JWA will continue to work with operators to move toward higher Tier or electric replacements for these retired (or moved out of state) units, as feasible.

Electrical service is provided on the airside of the commercial ramp along the gates. This electrical service has been used to operate electric chargers for the GSE. However, since Terminals A and B were installed in the early 1990s, the original infrastructure was not designed or capable of handling the significant increase in necessary electrical supply for modern GSE chargers. In order to accommodate the GSE charger electrical needs JWA has initiated two major projects to upgrade these systems. Once the systems are upgraded, the modern chargers can be installed. The project consists of two phases. Phase 1 included the installation and upgrades in late 2024 at four gates. These gates were selected for Phase 1 because they currently have the power needed to facilitate the operation of new chargers. In addition, they are located where some of the highest emission units are used and will allow for the transition of high emitting GSE to electric alternatives. The infrastructure upgrades for these four gates are complete; airlines and GSE operators have obtained necessary permits and are completing installation of new fast chargers at each of these gates. Phase 1 was limited to select areas due to limitations of existing electrical supply systems at all terminals and gates.

⁷ The CARB LSI regulation's definition for airport GSE does not include those categories of GSE equipment that are designated and licensed for on-road use. These pieces of equipment are not subject to the requirements of the LSI regulation. Available at: <https://ww2.arb.ca.gov/sites/default/files/classic/msprog/offroad/orspark/faqs/lsifaqagse.pdf>. Accessed: June 2025.

⁸ The CARB LSI regulation's definition for airport GSE does not include those categories of GSE equipment that are less than 25 horsepower, per California Code of Regulations (“CCR”) § 2775 (a)(1). Available at: <https://ww2.arb.ca.gov/sites/default/files/classic/msprog/offroad/orspark/largesparkappa-clean.pdf>. Accessed: June 2025.

⁹ The CARB ORD regulation exempts permanent and year-by-year low-use vehicles as defined in CCR § 2449 (e)(7). Available at: <https://ww2.arb.ca.gov/sites/default/files/2019-03/finalregorder-dec2011.pdf>. Accessed: June 2025.

Phase 2 installations and upgrades will include all remaining gates as well as the Commuter Gates (Gates 1 and 22) and the Cargo Area. Phase 2 will coincide with major upgrades to the electrical supply to the terminals, which will provide the additional electrical supply needed at the remaining gates. Phase 2, as well as the project to upgrade the electrical supply to the gates, have been assigned and funded. During the interim, the Airport will remain in communication with airlines and third party GSE operators to encourage increased use of existing chargers (where possible), and replacement of older tier engines with newer tier engines (or cleaner alternative fuel GSE).

MOU Schedule No. 2 – Jet Fuel Delivery Trucks

MOU Schedule No. 2 is a measure for commercial passenger airline jet fuel delivery trucks. The measure requires that the Airport install a jet fuel pipeline by the end of 2019 and eliminate routine commercial aviation jet fuel delivery trucks by January 1, 2023.

A summary of required data per the MOU is provided in **Table 5**. As required in MOU Schedule No. 2, Section III.B, information on jet fuel delivery is summarized in **Table 6** and **Table 7**. **Table 6** contains information on monthly jet fuel receipts via truck delivery and pipeline. **Table 7a and Table 7b** shows the total number of routine and non-routine truck trips delivering jet fuel for commercial passenger aviation and vehicle model years (as available), an estimate of total vehicle miles traveled and an emission inventory for the jet fuel delivery trucks. In 2024 there were no routine truck trips delivering commercial jet fuel.

Calculation Methodology

The jet fuel delivery truck exhaust emissions for 2024 are calculated based on the number of delivery trips that occurred in 2024, the trip distance traveled by the delivery trucks, and emission factors from EMFAC2017. The number of annual truck trips in 2024 were provided by the two commercial jet fuel suppliers at JWA: the Commercial Fuel Farm and a Fixed Base Operator (“FBO”) servicing one commercial service airline. There were no Commercial Fuel Farm truck trips in 2024. The total number of truck trips provided by the FBO were apportioned to reflect the truck trips attributable to the commercial operations based on the fraction of monthly fuel volume received by the FBO that was sold to the commercial operator. A supplier-specific trip distance of 30 miles/trip was used for the FBO. Fleet-averaged exhaust emission factors for ROG and NOx were obtained from EMFAC2017 for Heavy-Heavy Duty Trucks (“HHDT”) in Orange County in 2024. The fuel supplier provided details on the supply truck model year and the fuel pickup location, therefore, the fleet averaged emission factors were obtained from EMFAC2017 by calculating the emission factor for the specified model year and the miles traveled in the calendar year 2024. Otherwise, a fleet-average was used for all HHDT vehicles in 2024. Average daily emissions were calculated assuming operation for 365 days in a year.

Progress Update

The jet fuel pipeline was installed and began operation in October 2019. All routine jet fuel truck deliveries have been replaced with pipeline fuel delivery. However, an existing contract with a fixed based operator serving a commercial service airline receives fuel delivery via tanker truck in addition to pipeline fuel delivery.

In 2024, there were no truck deliveries to the Commercial Fuel Farm.

JWA has worked with third parties to develop a fuel delivery tracking system for delivery of fuel by pipeline as well as by tanker truck. The third parties have agreed to a tracking system which consists of recordkeeping forms that are completed and submitted to JWA. These records form the basis of the data and inventory supplied as part of the 2024 MOU progress update. JWA continues to perform a quality assurance review of the information received.

MOU Schedule No. 3 – Parking Shuttle Bus Electrification

MOU Schedule No. 3 is a measure for shuttle bus (for airport employee and passenger parking lots) electrification. Under this measure, the Airport will replace a minimum of 50% and 80% of Airport employee and passenger remote parking compressed natural gas shuttle buses with battery-electric shuttle buses by January 1, 2023 and 2031, respectively. The Airport may continue to reserve non-battery-electric shuttle buses for standby and emergency use.

As stated in MOU Schedule No. 3, Section III.B.1 and III.B.3, an inventory of shuttle buses operating at JWA and shuttle buses operating at JWA during the reported year is provided in **Table 8**. An annual emissions inventory for shuttle buses including methodology and calculations, as required by MOU Schedule No. 3, Section III.B.2, is provided in **Table 9**.

Calculation Methodology

On-road emission factors for exhaust, idling, and starting ROG and NOx, as well as evaporative ROG from hot soak, running losses, resting losses, and diurnal losses were obtained from EMFAC2017 based on vehicle model year, vehicle category and fuel type in Orange County for each scenario's calendar year. The vehicle model years for the shuttle bus fleet vehicles operating in 2024 are 2017 (12 buses) and 2013 (1 bus) for January 2024 – June 2024 and 2017 (2 buses) and 2013 (4 buses) for July 2024 – December 2024. The fleet change is due to the expiration of the shuttle bus vendor contract and the start of operation of the new vendor. Exhaust emission factors were calculated using a weighted average of the emission factors from each model year and using the 25 miles per hour (mph) speed bin in EMFAC as an average speed representation for the predominant travel route. Average daily emissions were calculated assuming operation for 365 days in a year.

Progress Update

In CY 2024, the existing shuttle bus vendor ended their contract on June 2025 and a new shuttle bus vendor began operation in July 2025. Under the new shuttle bus

vendor, JWA maintains five (5) electric and six (6) alternative fuel shuttle buses for routine transport. Three (3) of the eleven buses are used in rotation in reserve (standby/emergency).

JWA was approved in 2019 for Federal Aviation Administration ("FAA") Zero Emission Vehicle ("ZEV") grant funding support for the purchase of three electric shuttle buses and received an additional grant in 2021 for the purchase of two additional shuttle buses. Five electric shuttle buses were purchased and delivered to JWA, including associated chargers. However, in order to operate the bus chargers, electric service from the local utility to the charger lot must be upgraded. The utility continues to be backlogged in completing this installation due to supply chain issues, and the delivery times for the electric equipment are still pending. Therefore, installation of the electric bus charging infrastructure has not been completed. While a nominal amount of mileage was incurred on the electric buses in CY 2024 to maintain upkeep and warranty requirements, only intermittent shuttle bus operations were conducted using these vehicles. The intermittent operation occurred when off airport charging was feasible and available. Thus, standard CNG or propane buses were primarily used to support shuttle operations. JWA has completed all design and obtained necessary permits to install the chargers, so they can be installed once the utility completes installation of the necessary power equipment. In the interim of installation and startup of the permanent chargers (and all associated parking lot and infrastructure upgrade), JWA completed the installation of a small temporary charger in May 2025. Due to limited existing availability of power at the lot, only a small charger can be utilized at this time. Installation of this small charger allows for operation of a few electric buses starting in 2025 until the final permanent charger installation can be completed.

Please feel free to call Melinda McCoy at (949) 252-5267, with questions or concerns regarding this report.

Sincerely,



Melinda McCoy, PG
Environmental Resources Manager

Attachments

Copy: Shawn Wang, Program Supervisor (AQMD)
Charlene Reynolds, Airport Director (John Wayne Airport)

TABLES

Table 1. 2024 Ground Support Equipment (GSE) MOU Reporting Data
John Wayne Airport MOU
Santa Ana, California

Unit #	MOU Schedule No. 1. Obligations												
	III.B.1								III.B.2				
	III.B.1.a	III.B.1.b	III.B.1.c	III.B.1.d	III.B.1.e		III.B.1.f	III.B.1.g	--	--	III.B.2.a	III.B.2.b	III.B.2.c
	Equipment ID ¹	Airline GSE Type ¹	Fuel Type ¹ (Electric, Diesel, Propane, Gasoline)	Engine Model Year ¹	Engine Power Rating ¹ (HP or kW)	Engine Power Rating Units ¹	Engine Tier Level ¹ (for diesel engines)	Default Activity Level - hrs/yr of engine operation or annual mileage ^{2,3,4}	Equipment Sold or Relocated? ¹	Date of Status Change ¹	If relocated within South Coast, relocation destination airport ¹	Date of Relocation ¹	Estimated Projected Usage Hours ¹
1	AS0118	Air Start	Diesel	2008	665	HP	Tier 3	1,372	--	--	--	--	--
2	BL0342	Belt Loader	Electric	2004	84	HP	--	--	--	--	--	--	--
3	BL0344	Belt Loader	Electric	2004	84	HP	--	--	--	--	--	--	--
4	BL18927	Belt Loader	Electric	1999	84	HP	--	--	--	--	--	--	--
5	BL18928	Belt Loader	Electric	1999	84	HP	--	--	--	--	--	--	--
6	BL18930	Belt Loader	Electric	1999	84	HP	--	--	--	--	--	--	--
7	BL18943	Belt Loader	Electric	1999	84	HP	--	--	--	--	--	--	--
8	BL20011	Belt Loader	Electric	1999	84	HP	--	--	--	--	--	--	--
9	GT202	GPU	Diesel	2016	150	HP	Tier 4 Final	492	--	--	--	--	--
10	LV19806	Lavatory Truck	Gasoline	2000	65	HP	--	365	--	--	--	--	--
11	PJ123	Push Back	Diesel	1990	110	HP	Tier 0	323	--	--	--	--	--
12	RV20027	Service Truck	Gasoline	1999	260	HP	--	886	--	--	--	--	--
13	SQ180	Passenger Stairs	Gasoline	2017	61	HP	--	191	--	--	--	--	--
14	TV0995	Bag Tug	Electric	2004	93	HP	--	--	--	--	--	--	--
15	TV0997	Bag Tug	Electric	2000	93	HP	--	--	--	--	--	--	--
16	TV0998	Bag Tug	Electric	1999	93	HP	--	--	--	--	--	--	--
17	TV1168	Push Back	Electric	2016	83	HP	--	--	--	--	--	--	--
18	TV1169	Push Back	Electric	2016	83	HP	--	--	--	--	--	--	--
19	TV19845	Bag Tug	Electric	2000	93	HP	--	--	--	--	--	--	--
20	TV19846	Bag Tug	Electric	2000	93	HP	--	--	--	--	--	--	--
21	TV19847	Bag Tug	Electric	2000	93	HP	--	--	--	--	--	--	--
22	TV19848	Bag Tug	Electric	2000	93	HP	--	--	--	--	--	--	--
23	TV19849	Bag Tug	Electric	2000	93	HP	--	--	--	--	--	--	--
24	TV19850	Bag Tug	Electric	2000	93	HP	--	--	--	--	--	--	--
25	TV20561	Push Back	Diesel	2000	87	HP	Tier 1	335	--	--	--	--	--
26	SL253	Lavatory Truck	Gasoline	2023	350	HP	--	1,013	--	--	--	--	--
27	3301	Lift	Electric	2005	59	HP	--	--	--	--	--	--	--
28	4561	Fork Lift	Electric	2008	53	HP	--	--	--	--	--	--	--
29	8308	Golf Cart	Electric	2018	8	HP	--	--	--	--	--	--	--
30	10391	Other GSE	Diesel	2022	134	HP	Tier 4 Final	494	Yes - Relocated	12/31/2024	--	12/31/2024	--
31	3072	Lift	Propane	2000	68	HP	--	365	--	--	--	--	--
32	7566	GPU	Diesel	2017	155	HP	Tier 4 Final	82	Yes - Relocated	3/1/2024	LAX	3/1/2024	--
33	8628	Golf Cart	Electric	2019	32	HP	--	--	--	--	--	--	--
34	11056	Golf Cart	Electric	2023	32	HP	--	--	--	--	--	--	--
35	AS5615	Air Start	Diesel	2016	380	HP	Tier 4 Final	1,372	--	--	--	--	--
36	BL 6093	Belt Loader	Electric	2000	40	HP	--	--	--	--	--	--	--
37	BL 6094	Belt Loader	Electric	2000	40	HP	--	--	--	--	--	--	--
38	BL1875	Belt Loader	Gasoline	2015	84	HP	--	816	--	--	--	--	--
39	BL3112	Belt Loader	Gasoline	2015	84	HP	--	816	--	--	--	--	--
40	BL3130	Belt Loader	Gasoline	2009	27	HP	--	852	--	--	--	--	--
41	BL3692	Belt Loader	Gasoline	2009	18	HP	--	852	--	--	--	--	--
42	BL3693	Belt Loader	Gasoline	2009	18	HP	--	852	--	--	--	--	--
43	BL5397	Belt Loader	Electric	2016	40	HP	--	--	--	--	--	--	--
44	BL5433	Belt Loader	Electric	2016	40	HP	--	--	--	--	--	--	--
45	BL5434	Belt Loader	Electric	2016	40	HP	--	--	--	--	--	--	--
46	BL6455	Belt Loader	Electric	2018	40	HP	--	--	--	--	--	--	--
47	BT 16125	Bag Tug	Electric	2002	40	HP	--	--	--	--	--	--	--
48	BT 16158	Bag Tug	Electric	2002	40	HP	--	--	--	--	--	--	--
49	BT3917	Bag Tug	Electric	2012	40	HP	--	--	--	--	--	--	--

Table 1. 2024 Ground Support Equipment (GSE) MOU Reporting Data
John Wayne Airport MOU
Santa Ana, California

Unit #	MOU Schedule No. 1. Obligations												
	III.B.1								III.B.2				
	III.B.1.a	III.B.1.b	III.B.1.c	III.B.1.d	III.B.1.e		III.B.1.f	III.B.1.g	--	--	III.B.2.a	III.B.2.b	III.B.2.c
	Equipment ID ¹	Airline GSE Type ¹	Fuel Type ¹ (Electric, Diesel, Propane, Gasoline)	Engine Model Year ¹	Engine Power Rating ¹ (HP or kW)	Engine Power Rating Units ¹	Engine Tier Level ¹ (for diesel engines)	Default Activity Level - hrs/yr of engine operation or annual mileage ^{2,3,4}	Equipment Sold or Relocated? ¹	Date of Status Change ¹	If relocated within South Coast, relocation destination airport ¹	Date of Relocation ¹	Estimated Projected Usage Hours ¹
50	BT3918	Bag Tug	Electric	2012	40	HP	--	--	--	--	--	--	--
51	BT5431	Bag Tug	Electric	2016	40	HP	--	--	--	--	--	--	--
52	BT5432	Bag Tug	Electric	2016	40	HP	--	--	--	--	--	--	--
53	BT5612	Bag Tug	Electric	2016	40	HP	--	--	--	--	--	--	--
54	BT5613	Bag Tug	Electric	2016	40	HP	--	--	--	--	--	--	--
55	BT5904	Bag Tug	Electric	2017	40	HP	--	--	--	--	--	--	--
56	BT5907	Bag Tug	Electric	2017	40	HP	--	--	--	--	--	--	--
57	GP5372	GPU	Diesel	2016	116	HP	Tier 4 Final	492	--	--	--	--	--
58	HS6826	Cargo Tractor	Diesel	2019	74	HP	Tier 4 Final	700	--	--	--	--	--
59	LT3457	Lavatory Truck	Gasoline	2005	285	HP	--	1,825	--	--	--	--	--
60	PB 14095	Push Back	Diesel	2008	74	HP	Tier 4 Interim	335	--	--	--	--	--
61	PB5000	Push Back	Diesel	2019	74	HP	Tier 4 Final	335	--	--	--	--	--
62	PB6507	Push Back	Diesel	2019	74	HP	Tier 4 Final	335	--	--	--	--	--
63	PB6729	Push Back	Diesel	2019	74	HP	Tier 4 Final	335	--	--	--	--	--
64	PB6832	Push Back	Diesel	2019	74	HP	Tier 4 Final	335	--	--	--	--	--
65	14242	Air Start	Diesel	2007	511	HP	Tier 3	200	--	--	--	--	--
66	18637	Aircraft Tug	Gasoline	1997	200	HP	--	496	Yes - Relocated	9/4/2024	--	9/4/2024	--
67	78172	Passenger Stairs	Diesel	2000	49	HP	Tier 1	222	--	--	--	--	--
68	170562	Bag Tug	Diesel	2001	60	HP	Tier 1	733	--	--	--	--	--
69	170563	Bag Tug	Diesel	2001	60	HP	Tier 1	123	Yes - Relocated	3/1/2024	--	3/1/2024	--
70	270550	Aircraft Tug	Electric	2011	45	HP	--	--	--	--	--	--	--
71	270962	Aircraft Tug	Electric	2016	45	HP	--	--	--	--	--	--	--
72	270963	Aircraft Tug	Electric	2016	45	HP	--	--	--	--	--	--	--
73	521651	Belt Loader	Diesel	2000	60	HP	Tier 1	245	Yes - Sold/Retired	6/20/2024	--	--	--
74	521853	Belt Loader	Diesel	2006	65	HP	Tier 2	515	--	--	--	--	--
75	522183	Belt Loader	Electric	2011	60	HP	--	--	--	--	--	--	--
76	522401	Belt Loader	Gasoline	2016	86	HP	--	820	--	--	--	--	--
77	522402	Belt Loader	Gasoline	2016	86	HP	--	820	--	--	--	--	--
78	523229	Belt Loader	Electric	2001	60	HP	--	--	--	--	--	--	--
79	770310	Bag Tug	Electric	2010	40	HP	--	--	--	--	--	--	--
80	770312	Bag Tug	Electric	2010	40	HP	--	--	--	--	--	--	--
81	770313	Bag Tug	Electric	2010	40	HP	--	--	--	--	--	--	--
82	770321	Bag Tug	Electric	2010	40	HP	--	--	--	--	--	--	--
83	770322	Bag Tug	Electric	2011	40	HP	--	--	--	--	--	--	--
84	770323	Bag Tug	Electric	2011	40	HP	--	--	--	--	--	--	--
85	770333	Bag Tug	Electric	2011	40	HP	--	--	--	--	--	--	--
86	770667	Bag Tug	Electric	2012	40	HP	--	--	--	--	--	--	--
87	900051	GPU	Diesel	2007	220	HP	Tier 3	492	--	--	--	--	--
88	270014	Aircraft Tug	Diesel	2007	138	HP	Tier 3	335	--	--	--	--	--
89	270964	Aircraft Tug	Electric	2017	45	HP	--	--	--	--	--	--	--
90	48737	Lavatory Truck	Diesel	2022	401	HP	Tier 4 Final	492	--	--	--	--	--
91	570064	Belt Loader	Electric	2017	15	HP	--	--	--	--	--	--	--
92	770124	Bag Tug	Electric	2005	40	HP	--	--	--	--	--	--	--
93	270918	Aircraft Tug	Diesel	2012	74	HP	Tier 4 Interim	16	--	--	--	--	--
94	13085	Service Truck	Gasoline (On-Road)	1994	250	HP	--	--	Yes - Relocated	12/19/2024	--	12/19/2024	--
95	23262	Cargo Tractor	Gasoline	2010	80	HP	--	1,336	--	--	--	--	--
96	23263	Cargo Tractor	Gasoline	2010	80	HP	--	1,336	--	--	--	--	--
97	41009	Cargo Loader	Diesel	2009	110	HP	Tier 3	485	--	--	--	--	--
98	51100	Cargo Loader	Diesel	2021	130	HP	Tier 4 Final	485	--	--	--	--	--

Table 1. 2024 Ground Support Equipment (GSE) MOU Reporting Data
John Wayne Airport MOU
Santa Ana, California

Unit #	MOU Schedule No. 1. Obligations												
	III.B.1								III.B.2				
	III.B.1.a	III.B.1.b	III.B.1.c	III.B.1.d	III.B.1.e		III.B.1.f	III.B.1.g	--	--	III.B.2.a	III.B.2.b	III.B.2.c
	Equipment ID ¹	Airline GSE Type ¹	Fuel Type ¹ (Electric, Diesel, Propane, Gasoline)	Engine Model Year ¹	Engine Power Rating ¹ (HP or kW)	Engine Power Rating Units ¹	Engine Tier Level ¹ (for diesel engines)	Default Activity Level - hrs/yr of engine operation or annual mileage ^{2,3,4}	Equipment Sold or Relocated? ¹	Date of Status Change ¹	If relocated within South Coast, relocation destination airport ¹	Date of Relocation ¹	Estimated Projected Usage Hours ¹
99	99123	Cargo Loader	Diesel	2016	110	HP	Tier 4 Final	485	--	--	--	--	--
100	501565	Cargo Tractor	Diesel	2012	65	HP	Tier 4 Interim	700	--	--	--	--	--
101	507098	Air Start	Diesel	2015	550	HP	Tier 4 Final	1,372	--	--	--	--	--
102	512143	Cargo Tractor	Gasoline	2017	86	HP	--	1,350	--	--	--	--	--
103	512144	Cargo Tractor	Gasoline	2017	86	HP	--	1,350	--	--	--	--	--
104	515410	Cargo Tractor	Gasoline	2018	86	HP	--	1,353	--	--	--	--	--
105	515411	Cargo Tractor	Gasoline	2018	86	HP	--	1,353	--	--	--	--	--
106	522879	GPU	Diesel	2022	173	HP	Tier 4 Final	492	--	--	--	--	--
107	523497	Belt Loader	Gasoline	2021	80	HP	--	812	--	--	--	--	--
108	37335	Wide Aircraft Tug	Diesel	2021	173	HP	Tier 4 Final	406	--	--	--	--	--
109	502563	Other GSE	Diesel	2014	13	HP	Tier 4 Final	492	--	--	--	--	--
110	BL0002	Belt Loader	Electric	--	6	HP	--	--	--	--	--	--	--
111	BL0003	Belt Loader	Diesel	1989	74	HP	Tier 0	222	--	--	--	--	--
112	GP0006	GPU	Diesel	2017	42	HP	Tier 4 Final	492	--	--	--	--	--
113	GP0008	GPU	Diesel	2017	42	HP	Tier 4 Final	492	--	--	--	--	--
114	GP0010	GPU	Diesel	2020	74	HP	Tier 4 Final	492	--	--	--	--	--
115	GP0011	GPU	Diesel	2020	74	HP	Tier 4 Final	492	--	--	--	--	--
116	GP0012	GPU	Diesel	2020	74	HP	Tier 4 Final	492	--	--	--	--	--
117	GP0013	GPU	Diesel	2020	155	HP	Tier 4 Final	492	--	--	--	--	--
118	GP0014	GPU	Diesel	2022	74	HP	Tier 4 Final	492	--	--	--	--	--
119	GP0015	GPU	Diesel	2022	74	HP	Tier 4 Final	492	--	--	--	--	--
120	GP0016	GPU	Diesel	2022	74	HP	Tier 4 Final	492	--	--	--	--	--
121	JT0015	Fuel Truck	Diesel	2020	260	HP	Tier 4 Final	492	--	--	--	--	--
122	JT0016	Fuel Truck	Diesel	2020	260	HP	Tier 4 Final	492	--	--	--	--	--
123	JT0017	Fuel Truck	Diesel	2019	260	HP	Tier 4 Final	492	--	--	--	--	--
124	JT0020	Fuel Truck	Diesel	2022	200	HP	Tier 4 Final	492	--	--	--	--	--
125	JT0021	Fuel Truck	Diesel	2022	200	HP	Tier 4 Final	492	--	--	--	--	--
126	JT0022	Fuel Truck	Diesel	2022	200	HP	Tier 4 Final	492	--	--	--	--	--
127	JT0023	Fuel Truck	Diesel	2022	200	HP	Tier 4 Final	492	--	--	--	--	--
128	TG0009	Aircraft Tug	Electric	2016	45	HP	--	--	--	--	--	--	--
129	TG0012	Aircraft Tug	Electric	1999	33	HP	--	--	--	--	--	--	--
130	TG0014	Aircraft Tug	Electric	2020	45	HP	--	--	--	--	--	--	--
131	TG0016	Aircraft Tug	Electric	2006	45	HP	--	--	--	--	--	--	--
132	TG0017	Aircraft Tug	Electric	2022	45	HP	--	--	--	--	--	--	--
133	UV0007	Golf Cart	Electric	2017	8	HP	--	--	--	--	--	--	--
134	UV0008	Golf Cart	Electric	2017	8	HP	--	--	--	--	--	--	--
135	UV0009	Golf Cart	Electric	2017	8	HP	--	--	--	--	--	--	--
136	UV0010	Golf Cart	Electric	2017	8	HP	--	--	--	--	--	--	--
137	UV0011	Golf Cart	Electric	2017	8	HP	--	--	--	--	--	--	--
138	UV0017	Golf Cart	Electric	2020	17	HP	--	--	--	--	--	--	--
139	UV0018	Golf Cart	Electric	2020	17	HP	--	--	--	--	--	--	--
140	UV0019	Golf Cart	Electric	2020	17	HP	--	--	--	--	--	--	--
141	UV0020	Golf Cart	Electric	2020	17	HP	--	--	--	--	--	--	--
142	UV0025	Golf Cart	Electric	2024	13	HP	--	--	--	--	--	--	--
143	UV0026	Golf Cart	Electric	2024	13	HP	--	--	--	--	--	--	--
144	UV0027	Golf Cart	Electric	2024	17	HP	--	--	--	--	--	--	--
145	897	Push Back	Diesel	2009	110	HP	Tier 3	246	Yes - Sold/Retired	9/24/2024	--	--	--
146	2308	Push Back	Electric	2001	110	HP	--	--	--	--	--	--	--
147	2309	Push Back	Electric	2001	110	HP	--	--	--	--	--	--	--

Table 1. 2024 Ground Support Equipment (GSE) MOU Reporting Data
John Wayne Airport MOU
Santa Ana, California

Unit #	MOU Schedule No. 1. Obligations												
	III.B.1								III.B.2				
	III.B.1.a	III.B.1.b	III.B.1.c	III.B.1.d	III.B.1.e		III.B.1.f	III.B.1.g	--	--	III.B.2.a	III.B.2.b	III.B.2.c
	Equipment ID ¹	Airline GSE Type ¹	Fuel Type ¹ (Electric, Diesel, Propane, Gasoline)	Engine Model Year ¹	Engine Power Rating ¹ (HP or kW)	Engine Power Rating Units ¹	Engine Tier Level ¹ (for diesel engines)	Default Activity Level - hrs/yr of engine operation or annual mileage ^{2,3,4}	Equipment Sold or Relocated? ¹	Date of Status Change ¹	If relocated within South Coast, relocation destination airport ¹	Date of Relocation ¹	Estimated Projected Usage Hours ¹
148	2310	Push Back	Electric	2001	110	HP	--	--	--	--	--	--	--
149	3809	Belt Loader	Electric	2001	60	HP	--	--	Yes - Sold/Retired	12/3/2024	--	--	--
150	3810	Belt Loader	Electric	2001	60	HP	--	--	Yes - Sold/Retired	12/3/2024	--	--	--
151	3811	Belt Loader	Electric	2001	60	HP	--	--	Yes - Sold/Retired	12/3/2024	--	--	--
152	3812	Belt Loader	Electric	2001	60	HP	--	--	Yes - Sold/Retired	12/3/2024	--	--	--
153	9513	Bag Tug	Gasoline	2004	85	HP	--	939	--	--	--	--	--
154	10039	Passenger Stairs	Electric	2004	19	HP	--	--	--	--	--	--	--
155	10743	Belt Loader	Electric	2004	60	HP	--	--	Yes - Sold/Retired	12/3/2024	--	--	--
156	10744	Belt Loader	Electric	2004	60	HP	--	--	Yes - Sold/Retired	12/3/2024	--	--	--
157	10760	Belt Loader	Electric	2005	60	HP	--	--	Yes - Sold/Retired	12/3/2024	--	--	--
158	10761	Belt Loader	Electric	2005	60	HP	--	--	Yes - Sold/Retired	12/3/2024	--	--	--
159	10818	Push Back	Electric	1988	110	HP	--	--	--	--	--	--	--
160	13101	Belt Loader	Electric	2007	60	HP	--	--	Yes - Sold/Retired	12/3/2024	--	--	--
161	13102	Belt Loader	Electric	2007	60	HP	--	--	Yes - Sold/Retired	12/3/2024	--	--	--
162	13590	Bag Tug	Gasoline	2008	40	HP	--	493	Yes - Sold/Retired	7/15/2024	--	--	--
163	15707	Lavatory Truck	Gasoline	2011	260	HP	--	1,217	--	--	--	--	--
164	18552	Service Truck	Gasoline (On-Road)	2012	200	HP	--	--	--	--	--	--	--
165	21778	Belt Loader	Electric	2015	60	HP	--	--	--	--	--	--	--
166	21884	Belt Loader	Electric	2015	60	HP	--	--	--	--	--	--	--
167	21885	Belt Loader	Electric	2015	60	HP	--	--	--	--	--	--	--
168	21886	Belt Loader	Electric	2015	60	HP	--	--	--	--	--	--	--
169	21888	Push Back	Diesel	2015	74	HP	Tier 4 Final	335	--	--	--	--	--
170	21889	Push Back	Diesel	2015	74	HP	Tier 4 Final	335	--	--	--	--	--
171	21891	Bag Tug	Electric	2015	40	HP	--	--	--	--	--	--	--
172	21893	Bag Tug	Electric	2015	40	HP	--	--	--	--	--	--	--
173	21894	Bag Tug	Electric	2015	40	HP	--	--	Yes - Relocated	4/2/2024	--	4/2/2024	--
174	21896	GPU	Diesel	2015	155	HP	Tier 4 Final	492	--	--	--	--	--
175	21985	Golf Cart	Electric	2012	10	HP	--	--	--	--	--	--	--
176	21986	Golf Cart	Electric	2012	10	HP	--	--	--	--	--	--	--
177	22020	Service Truck	Gasoline	2016	320	HP	--	845	--	--	--	--	--
178	22047	Bag Tug	Diesel	2015	85	HP	Tier 4 Final	744	--	--	--	--	--
179	22101	GPU	Diesel	2015	155	HP	Tier 4 Final	492	--	--	--	--	--
180	22495	Air Start	Diesel	2015	333	HP	Tier 4 Final	1,372	--	--	--	--	--
181	24565	Service Truck	Gasoline	2017	362	HP	--	841	--	--	--	--	--
182	26521	Bag Tug	Electric	2018	40	HP	--	--	--	--	--	--	--
183	26522	Bag Tug	Electric	2018	40	HP	--	--	--	--	--	--	--
184	26523	Bag Tug	Electric	2018	40	HP	--	--	--	--	--	--	--
185	26524	Bag Tug	Electric	2018	40	HP	--	--	--	--	--	--	--
186	26525	Bag Tug	Electric	2018	40	HP	--	--	--	--	--	--	--
187	26526	Bag Tug	Electric	2018	40	HP	--	--	--	--	--	--	--
188	26527	Bag Tug	Electric	2018	40	HP	--	--	--	--	--	--	--
189	26528	Bag Tug	Electric	2018	40	HP	--	--	--	--	--	--	--
190	26529	Bag Tug	Electric	2018	40	HP	--	--	--	--	--	--	--
191	26530	Bag Tug	Electric	2018	40	HP	--	--	--	--	--	--	--
192	26531	Bag Tug	Electric	2018	40	HP	--	--	--	--	--	--	--
193	26532	Bag Tug	Electric	2018	40	HP	--	--	--	--	--	--	--
194	26533	Bag Tug	Electric	2018	40	HP	--	--	--	--	--	--	--
195	26534	Bag Tug	Electric	2018	40	HP	--	--	--	--	--	--	--
196	26535	Bag Tug	Electric	2018	40	HP	--	--	--	--	--	--	--

Table 1. 2024 Ground Support Equipment (GSE) MOU Reporting Data
John Wayne Airport MOU
Santa Ana, California

Unit #	MOU Schedule No. 1. Obligations												
	III.B.1								III.B.2				
	III.B.1.a	III.B.1.b	III.B.1.c	III.B.1.d	III.B.1.e		III.B.1.f	III.B.1.g	--	--	III.B.2.a	III.B.2.b	III.B.2.c
	Equipment ID ¹	Airline GSE Type ¹	Fuel Type ¹ (Electric, Diesel, Propane, Gasoline)	Engine Model Year ¹	Engine Power Rating ¹ (HP or kW)	Engine Power Rating Units ¹	Engine Tier Level ¹ (for diesel engines)	Default Activity Level - hrs/yr of engine operation or annual mileage ^{2,3,4}	Equipment Sold or Relocated? ¹	Date of Status Change ¹	If relocated within South Coast, relocation destination airport ¹	Date of Relocation ¹	Estimated Projected Usage Hours ¹
197	26536	Bag Tug	Electric	2018	40	HP	--	--	--	--	--	--	--
198	26537	Bag Tug	Electric	2018	40	HP	--	--	--	--	--	--	--
199	26538	Bag Tug	Electric	2018	40	HP	--	--	--	--	--	--	--
200	26539	Bag Tug	Electric	2018	40	HP	--	--	--	--	--	--	--
201	26868	Push Back	Diesel	2018	74	HP	Tier 4 Final	335	--	--	--	--	--
202	28286	Lavatory Truck	Gasoline	2018	200	HP	--	1,211	--	--	--	--	--
203	38586	Bag Tug	Electric	2024	40	HP	--	--	--	--	--	--	--
204	42064	Belt Loader	Electric	2024	18	HP	--	--	--	--	--	--	--
205	42066	Belt Loader	Electric	2024	18	HP	--	--	--	--	--	--	--
206	42068	Belt Loader	Electric	2024	18	HP	--	--	--	--	--	--	--
207	42070	Belt Loader	Electric	2024	18	HP	--	--	--	--	--	--	--
208	42072	Belt Loader	Electric	2024	18	HP	--	--	--	--	--	--	--
209	42074	Belt Loader	Electric	2024	18	HP	--	--	--	--	--	--	--
210	42076	Belt Loader	Electric	2024	18	HP	--	--	--	--	--	--	--
211	42078	Belt Loader	Electric	2024	18	HP	--	--	--	--	--	--	--
212	42080	Belt Loader	Electric	2024	18	HP	--	--	--	--	--	--	--
213	42082	Belt Loader	Electric	2024	18	HP	--	--	--	--	--	--	--
214	270936	Aircraft Tug	Diesel	2020	136	HP	Tier 4 Final	335	--	--	--	--	--
215	PB271075	Aircraft Tug	Diesel	2022	130	HP	Tier 4 Final	335	--	--	--	--	--
216	172283	Bag Tug	Gasoline	2000	86	HP	--	834	--	--	--	--	--
217	174451	Bag Tug	Gasoline	2000	86	HP	--	834	--	--	--	--	--
218	BT176147	Bag Tug	Gasoline	2022	86	HP	--	877	--	--	--	--	--
219	BT176148	Bag Tug	Gasoline	2022	86	HP	--	877	--	--	--	--	--
220	BL570386	Belt Loader	Gasoline	2022	86	HP	--	810	--	--	--	--	--
221	522297	Belt Loader	Diesel	1999	14	HP	Tier 0	383	Yes - Relocated	9/25/2024	--	9/25/2024	--
222	BL570375	Belt Loader	Diesel	2022	83	HP	Tier 4 Final	382	Yes - Relocated	9/24/2024	--	9/24/2024	--
223	BL570418	Belt Loader	Gasoline	2023	62	HP	--	595	Yes - Relocated	9/24/2024	--	9/24/2024	--
224	900289	GPU	Diesel	2020	155	HP	Tier 4 Final	492	--	--	--	--	--
225	492255	Service Truck	Gasoline (On-Road)	2019	360	HP	--	--	--	--	--	--	--
226	LT480239	Lavatory Truck	Gasoline	2022	385	HP	--	1,217	--	--	--	--	--
227	AL0426	Lift	Diesel	2016	67	HP	Tier 4 Final	422	--	--	--	--	--
228	AS0999	Air Start	Diesel	2018	450	HP	Tier 4 Final	1,372	--	--	--	--	--
229	AU0253	Service Truck	Gasoline (On-Road)	2017	N/A - On-Road	N/A - On-Road	--	--	--	--	--	--	--
230	BL0843	Belt Loader	Electric	2001	84	HP	--	--	--	--	--	--	--
231	BL0878	Belt Loader	Electric	2002	84	HP	--	--	--	--	--	--	--
232	BL1756	Belt Loader	Electric	2002	59	HP	--	--	--	--	--	--	--
233	BL1757	Belt Loader	Electric	2002	59	HP	--	--	--	--	--	--	--
234	BL1849	Belt Loader	Electric	2007	59	HP	--	--	--	--	--	--	--
235	BL1851	Belt Loader	Electric	2007	59	HP	--	--	--	--	--	--	--
236	BL1854	Belt Loader	Electric	2007	59	HP	--	--	--	--	--	--	--
237	BL1855	Belt Loader	Electric	2007	59	HP	--	--	--	--	--	--	--
238	CB0054	Other GSE	Electric	2019	55	HP	--	--	--	--	--	--	--
239	CT1262	Cargo Tractor	Electric	2001	93	HP	--	--	--	--	--	--	--
240	CT1263	Cargo Tractor	Electric	2001	93	HP	--	--	--	--	--	--	--
241	CT1467	Cargo Tractor	Electric	2008	93	HP	--	--	--	--	--	--	--
242	CT3251	Cargo Tractor	Electric	2008	93	HP	--	--	--	--	--	--	--
243	CT3252	Cargo Tractor	Electric	2008	93	HP	--	--	--	--	--	--	--
244	CT5846	Cargo Tractor	Electric	2008	55	HP	--	--	--	--	--	--	--
245	CT5847	Cargo Tractor	Electric	2008	55	HP	--	--	--	--	--	--	--

Table 1. 2024 Ground Support Equipment (GSE) MOU Reporting Data
John Wayne Airport MOU
Santa Ana, California

Unit #	MOU Schedule No. 1. Obligations												
	III.B.1								III.B.2				
	III.B.1.a	III.B.1.b	III.B.1.c	III.B.1.d	III.B.1.e		III.B.1.f	III.B.1.g	--	--	III.B.2.a	III.B.2.b	III.B.2.c
	Equipment ID ¹	Airline GSE Type ¹	Fuel Type ¹ (Electric, Diesel, Propane, Gasoline)	Engine Model Year ¹	Engine Power Rating ¹ (HP or kW)	Engine Power Rating Units ¹	Engine Tier Level ¹ (for diesel engines)	Default Activity Level - hrs/yr of engine operation or annual mileage ^{2,3,4}	Equipment Sold or Relocated? ¹	Date of Status Change ¹	If relocated within South Coast, relocation destination airport ¹	Date of Relocation ¹	Estimated Projected Usage Hours ¹
246	CT5848	Cargo Tractor	Electric	2008	55	HP	--	--	--	--	--	--	--
247	CT5856	Cargo Tractor	Electric	2008	55	HP	--	--	--	--	--	--	--
248	CT8321	Cargo Tractor	Electric	1999	93	HP	--	--	--	--	--	--	--
249	CT8360	Cargo Tractor	Electric	1999	93	HP	--	--	--	--	--	--	--
250	CT8361	Cargo Tractor	Electric	1999	93	HP	--	--	--	--	--	--	--
251	CT8362	Cargo Tractor	Electric	1999	93	HP	--	--	--	--	--	--	--
252	FL0151	Fork Lift	Electric	2013	80	HP	--	--	--	--	--	--	--
253	GC1696	Golf Cart	Electric	2006	14	HP	--	--	Yes - Sold/Retired	3/18/2024	--	--	--
254	GC2373	Golf Cart	Electric	2015	14	HP	--	--	--	--	--	--	--
255	GC3597	Golf Cart	Electric	2007	14	HP	--	--	Yes - Sold/Retired	3/1/2024	--	--	--
256	GC3598	Golf Cart	Electric	2007	14	HP	--	--	Yes - Sold/Retired	3/18/2024	--	--	--
257	GP1907	GPU	Gasoline	2018	229	HP	--	786	--	--	--	--	--
258	GP1908	GPU	Gasoline	2018	229	HP	--	786	--	--	--	--	--
259	GP1911	GPU	Gasoline	2018	229	HP	--	786	--	--	--	--	--
260	GP1912	GPU	Gasoline	2018	229	HP	--	786	--	--	--	--	--
261	GP2004	GPU	Gasoline	2019	229	HP	--	811	--	--	--	--	--
262	PI0820	Service Truck	Gasoline (On-Road)	1998	N/A - On-Road	N/A - On-Road	--	--	--	--	--	--	--
263	PI1694	Service Truck	Gasoline (On-Road)	2013	N/A - On-Road	N/A - On-Road	--	--	--	--	--	--	--
264	PI2123	Service Truck	Gasoline (On-Road)	2019	N/A - On-Road	N/A - On-Road	--	--	--	--	--	--	--
265	PT0645	Aircraft Tug	Diesel	2001	88	HP	Tier 1	335	--	--	--	--	--
266	PT0726	Aircraft Tug	Electric	2018	74	HP	--	--	--	--	--	--	--
267	PT0727	Aircraft Tug	Electric	2018	74	HP	--	--	--	--	--	--	--
268	PT0730	Aircraft Tug	Electric	2018	74	HP	--	--	--	--	--	--	--
269	PT7648	Aircraft Tug	Diesel	1998	88	HP	Tier 1	325	--	--	--	--	--
270	UL1043	Lift	Diesel	2012	67	HP	Tier 4 Interim	422	--	--	--	--	--
271	UL3368	Lift	Electric	2009	114	HP	--	--	--	--	--	--	--
272	VCO156	Service Truck	Gasoline (On-Road)	2019	N/A - On-Road	N/A - On-Road	--	--	--	--	--	--	--
273	BL3448	Belt Loader	Electric	2023	59	HP	--	--	--	--	--	--	--
274	BL3449	Belt Loader	Electric	2023	59	HP	--	--	--	--	--	--	--
275	CB0088	Other GSE	Electric	2023	55	HP	--	--	--	--	--	--	--
276	GC2679	Golf Cart	Electric	2020	14	HP	--	--	--	--	--	--	--
277	GC2680	Golf Cart	Electric	2020	14	HP	--	--	--	--	--	--	--
278	GC2681	Golf Cart	Electric	2020	14	HP	--	--	--	--	--	--	--
279	BL3547	Belt Loader	Electric	2023	59	HP	--	--	--	--	--	--	--
280	CT4155	Cargo Tractor	Electric	2024	40	HP	--	--	--	--	--	--	--
281	CT4156	Cargo Tractor	Electric	2024	40	HP	--	--	--	--	--	--	--
282	CT4354	Cargo Tractor	Electric	2024	40	HP	--	--	--	--	--	--	--
283	CT4355	Cargo Tractor	Electric	2024	40	HP	--	--	--	--	--	--	--
284	CT4356	Cargo Tractor	Electric	2024	40	HP	--	--	--	--	--	--	--
285	AC5412	Air Conditioner	Diesel	2023	172	HP	Tier 4 Final	203	--	--	--	--	--
286	BL3581	Belt Loader	Electric	2023	59	HP	--	--	--	--	--	--	--
287	411986	Air Start	Diesel	2016	675	HP	Tier 4 Final	304	Yes - Relocated	3/21/2024	ONT	3/21/2024	--
288	412127	Service Truck	Gasoline	2017	300	HP	--	841	--	--	--	--	--
289	414625	Cargo Loader	Gasoline	2018	152	HP	--	723	--	--	--	--	--
290	415069	Other GSE	Diesel	2018	21	HP	Tier 4 Final	492	--	--	--	--	--
291	416263	Other GSE	Diesel	2019	21	HP	Tier 4 Final	492	--	--	--	--	--
292	419058	Belt Loader	Gasoline	2019	84	HP	--	813	--	--	--	--	--
293	419165	GPU	Diesel	2019	173	HP	Tier 4 Final	492	--	--	--	--	--
294	423668	Belt Loader	Gasoline	2022	86	HP	--	810	--	--	--	--	--

Table 1. 2024 Ground Support Equipment (GSE) MOU Reporting Data
John Wayne Airport MOU
Santa Ana, California

Unit #	MOU Schedule No. 1. Obligations												
	III.B.1								III.B.2				
	III.B.1.a	III.B.1.b	III.B.1.c	III.B.1.d	III.B.1.e		III.B.1.f	III.B.1.g	--	--	III.B.2.a	III.B.2.b	III.B.2.c
	Equipment ID ¹	Airline GSE Type ¹	Fuel Type ¹ (Electric, Diesel, Propane, Gasoline)	Engine Model Year ¹	Engine Power Rating ¹ (HP or kW)	Engine Power Rating Units ¹	Engine Tier Level ¹ (for diesel engines)	Default Activity Level - hrs/yr of engine operation or annual mileage ^{2,3,4}	Equipment Sold or Relocated? ¹	Date of Status Change ¹	If relocated within South Coast, relocation destination airport ¹	Date of Relocation ¹	Estimated Projected Usage Hours ¹
295	423669	Belt Loader	Gasoline	2022	86	HP	--	810	--	--	--	--	--
296	770627	Cargo Loader	Gasoline	2015	21	HP	--	702	--	--	--	--	--
297	770873	Cargo Tractor	Gasoline	2015	21	HP	--	1,348	--	--	--	--	--
298	770874	Cargo Tractor	Gasoline	2015	21	HP	--	1,348	--	--	--	--	--
299	770875	Cargo Tractor	Gasoline	2015	21	HP	--	1,348	--	--	--	--	--
300	835319	Lift	Diesel	2011	21	HP	Tier 4 Final	422	--	--	--	--	--
301	424164	Push Back	Diesel	2022	175	HP	Tier 4 Final	335	--	--	--	--	--
302	414543	Air Start	Diesel	2018	675	HP	Tier 4 Final	1,071	--	--	--	--	--
303	#1	Lavatory Truck	Gasoline	2015	360	HP	--	1,251	--	--	--	--	--
304	#2	Lavatory Truck	Gasoline	2014	360	HP	--	1,161	--	--	--	--	--
305	Green	Lavatory Truck	Diesel (On-Road)	1997	135	HP	Tier 1	--	Yes - Sold/Retired	7/31/2024	--	--	--
306	Dodge Van	Service Truck	Gasoline (On-Road)	2012	135	HP	--	--	--	--	--	--	--
307	Ram Truck	Service Truck	Gasoline	2021	220	HP	--	491	--	--	--	--	--

Notes:

¹ Data provided by tenant airlines and GSE operators at JWA for CY 2024.

² Annual activity data was obtained from CARB's OFFROAD model.

³ Equipment shaded in blue were provided by tenant airlines and GSE operators but were deemed to be outside the scope of GSE as defined under this MOU. These equipment are listed, as they are omitted from the emission factor calculations and included in the emission inventory calculations.

⁴ Units 112-120 only service commercial flight operations at JWA for a portion of time. For disclosure purposes, all equipment IDs that may be used to service commercial flights are listed. An aggregate annual usage is estimated using operator guidance.

Refer to Table 2 and 3 for additional details.

Table 2. 2024 GSE Emissions (Method A)

John Wayne Airport MOU
Santa Ana, California

Unit #	Equipment ID	GSE Type	Fuel Type	Engine Model Year	Engine Power Rating	Engine Power Rating Units	2024 Activity ^{1,4,5} (hrs)	ROG EF ^{2,3} (g/bhp-hr)	NOx EF ^{2,3} (g/bhp-hr)	ROG Emissions (lbs/year)	NOx Emissions (lbs/year)
1	AS0118	Air Start	Diesel	2008	665	HP	1,372	0.44	3.02	293	2,032
2	BL0342	Belt Loader	Electric	2004	84	HP	--	--	--	--	--
3	BL0344	Belt Loader	Electric	2004	84	HP	--	--	--	--	--
4	BL18927	Belt Loader	Electric	1999	84	HP	--	--	--	--	--
5	BL18928	Belt Loader	Electric	1999	84	HP	--	--	--	--	--
6	BL18930	Belt Loader	Electric	1999	84	HP	--	--	--	--	--
7	BL18943	Belt Loader	Electric	1999	84	HP	--	--	--	--	--
8	BL20011	Belt Loader	Electric	1999	84	HP	--	--	--	--	--
9	GT202	GPU	Diesel	2016	150	HP	492	0.11	0.90	6	49
10	LV19806	Lavatory Truck	Gasoline	2000	65	HP	365	4.27	11.98	56	157
11	PJ123	Push Back	Diesel	1990	110	HP	323	1.13	11.27	47	474
12	RV20027	Service Truck	Gasoline	1999	260	HP	886	1.75	13.51	178	1,373
13	SQ180	Passenger Stairs	Gasoline	2017	61	HP	191	0.11	0.08	2	1
14	TV0995	Bag Tug	Electric	2004	93	HP	--	--	--	--	--
15	TV0997	Bag Tug	Electric	2000	93	HP	--	--	--	--	--
16	TV0998	Bag Tug	Electric	1999	93	HP	--	--	--	--	--
17	TV1168	Push Back	Electric	2016	83	HP	--	--	--	--	--
18	TV1169	Push Back	Electric	2016	83	HP	--	--	--	--	--
19	TV19845	Bag Tug	Electric	2000	93	HP	--	--	--	--	--
20	TV19846	Bag Tug	Electric	2000	93	HP	--	--	--	--	--
21	TV19847	Bag Tug	Electric	2000	93	HP	--	--	--	--	--
22	TV19848	Bag Tug	Electric	2000	93	HP	--	--	--	--	--
23	TV19849	Bag Tug	Electric	2000	93	HP	--	--	--	--	--
24	TV19850	Bag Tug	Electric	2000	93	HP	--	--	--	--	--
25	TV20561	Push Back	Diesel	2000	87	HP	335	1.50	6.21	51	214
26	SL253	Lavatory Truck	Gasoline	2023	350	HP	1,013	0.14	0.26	27	50
27	3301	Lift	Electric	2005	59	HP	--	--	--	--	--
28	4561	Fork Lift	Electric	2008	53	HP	--	--	--	--	--
29	8308	Golf Cart	Electric	2018	8	HP	--	--	--	--	--
30	10391	Other GSE	Diesel	2022	134	HP	494	0.07	0.16	4	8
31	3072	Lift	Propane	2000	68	HP	365	2.51	10.90	69	298
32	7566	GPU	Diesel	2017	155	HP	82	0.10	1.15	1	11
33	8628	Golf Cart	Electric	2019	32	HP	--	--	--	--	--
34	11056	Golf Cart	Electric	2023	32	HP	--	--	--	--	--
35	AS5615	Air Start	Diesel	2016	380	HP	1,372	0.21	0.99	80	383
36	BL 6093	Belt Loader	Electric	2000	40	HP	--	--	--	--	--
37	BL 6094	Belt Loader	Electric	2000	40	HP	--	--	--	--	--
38	BL1875	Belt Loader	Gasoline	2015	84	HP	816	0.26	0.64	20	49
39	BL3112	Belt Loader	Gasoline	2015	84	HP	816	0.26	0.64	20	48
40	BL3130	Belt Loader	Gasoline	2009	27	HP	852	25.79	15.84	649	399
41	BL3692	Belt Loader	Gasoline	2009	18	HP	852	16.18	10.50	273	177

Table 2. 2024 GSE Emissions (Method A)

John Wayne Airport MOU
Santa Ana, California

Unit #	Equipment ID	GSE Type	Fuel Type	Engine Model Year	Engine Power Rating	Engine Power Rating Units	2024 Activity ^{1,4,5} (hrs)	ROG EF ^{2,3} (g/bhp-hr)	NOx EF ^{2,3} (g/bhp-hr)	ROG Emissions (lbs/year)	NOx Emissions (lbs/year)
42	BL3693	Belt Loader	Gasoline	2009	18	HP	852	16.18	10.50	273	177
43	BL5397	Belt Loader	Electric	2016	40	HP	--	--	--	--	--
44	BL5433	Belt Loader	Electric	2016	40	HP	--	--	--	--	--
45	BL5434	Belt Loader	Electric	2016	40	HP	--	--	--	--	--
46	BL6455	Belt Loader	Electric	2018	40	HP	--	--	--	--	--
47	BT 16125	Bag Tug	Electric	2002	40	HP	--	--	--	--	--
48	BT 16158	Bag Tug	Electric	2002	40	HP	--	--	--	--	--
49	BT3917	Bag Tug	Electric	2012	40	HP	--	--	--	--	--
50	BT3918	Bag Tug	Electric	2012	40	HP	--	--	--	--	--
51	BT5431	Bag Tug	Electric	2016	40	HP	--	--	--	--	--
52	BT5432	Bag Tug	Electric	2016	40	HP	--	--	--	--	--
53	BT5612	Bag Tug	Electric	2016	40	HP	--	--	--	--	--
54	BT5613	Bag Tug	Electric	2016	40	HP	--	--	--	--	--
55	BT5904	Bag Tug	Electric	2017	40	HP	--	--	--	--	--
56	BT5907	Bag Tug	Electric	2017	40	HP	--	--	--	--	--
57	GP5372	GPU	Diesel	2016	116	HP	492	0.11	0.90	5	38
58	HS6826	Cargo Tractor	Diesel	2019	74	HP	700	0.22	2.76	9	114
59	LT3457	Lavatory Truck	Gasoline	2005	285	HP	1,825	2.53	2.91	725	836
60	PB 14095	Push Back	Diesel	2008	74	HP	335	0.26	3.03	8	89
61	PB5000	Push Back	Diesel	2019	74	HP	335	0.16	2.69	5	79
62	PB6507	Push Back	Diesel	2019	74	HP	335	0.16	2.69	5	79
63	PB6729	Push Back	Diesel	2019	74	HP	335	0.16	2.69	5	79
64	PB6832	Push Back	Diesel	2019	74	HP	335	0.16	2.69	5	79
65	14242	Air Start	Diesel	2007	511	HP	200	0.21	2.79	16	211
66	18637	Aircraft Tug	Gasoline	1997	200	HP	496	1.75	13.51	306	2,364
67	78172	Passenger Stairs	Diesel	2000	49	HP	222	2.59	5.37	25	51
68	170562	Bag Tug	Diesel	2001	60	HP	733	1.68	6.38	60	228
69	170563	Bag Tug	Diesel	2001	60	HP	123	1.68	6.38	10	38
70	270550	Aircraft Tug	Electric	2011	45	HP	--	--	--	--	--
71	270962	Aircraft Tug	Electric	2016	45	HP	--	--	--	--	--
72	270963	Aircraft Tug	Electric	2016	45	HP	--	--	--	--	--
73	521651	Belt Loader	Diesel	2000	60	HP	245	1.68	6.42	18	70
74	521853	Belt Loader	Diesel	2006	65	HP	515	0.50	4.85	12	120
75	522183	Belt Loader	Electric	2011	60	HP	--	--	--	--	--
76	522401	Belt Loader	Gasoline	2016	86	HP	820	0.24	0.58	18	45
77	522402	Belt Loader	Gasoline	2016	86	HP	820	0.24	0.58	18	45
78	523229	Belt Loader	Electric	2001	60	HP	--	--	--	--	--
79	770310	Bag Tug	Electric	2010	40	HP	--	--	--	--	--
80	770312	Bag Tug	Electric	2010	40	HP	--	--	--	--	--
81	770313	Bag Tug	Electric	2010	40	HP	--	--	--	--	--
82	770321	Bag Tug	Electric	2010	40	HP	--	--	--	--	--

Table 2. 2024 GSE Emissions (Method A)

John Wayne Airport MOU
Santa Ana, California

Unit #	Equipment ID	GSE Type	Fuel Type	Engine Model Year	Engine Power Rating	Engine Power Rating Units	2024 Activity ^{1,4,5} (hrs)	ROG EF ^{2,3} (g/bhp-hr)	NOx EF ^{2,3} (g/bhp-hr)	ROG Emissions (lbs/year)	NOx Emissions (lbs/year)
83	770322	Bag Tug	Electric	2011	40	HP	--	--	--	--	--
84	770323	Bag Tug	Electric	2011	40	HP	--	--	--	--	--
85	770333	Bag Tug	Electric	2011	40	HP	--	--	--	--	--
86	770667	Bag Tug	Electric	2012	40	HP	--	--	--	--	--
87	900051	GPU	Diesel	2007	220	HP	492	0.35	2.86	28	229
88	270014	Aircraft Tug	Diesel	2007	138	HP	335	0.27	2.93	15	160
89	270964	Aircraft Tug	Electric	2017	45	HP	--	--	--	--	--
90	48737	Lavatory Truck	Diesel	2022	401	HP	492	0.07	0.13	11	19
91	570064	Belt Loader	Electric	2017	15	HP	--	--	--	--	--
92	770124	Bag Tug	Electric	2005	40	HP	--	--	--	--	--
93	270918	Aircraft Tug	Diesel	2012	74	HP	16	0.22	2.90	0	4
94	13085	Service Truck	Gasoline	1994	250	HP	--	N/A (On-Road)	N/A (On-Road)	--	--
95	23262	Cargo Tractor	Gasoline	2010	80	HP	1,336	0.32	0.78	40	99
96	23263	Cargo Tractor	Gasoline	2010	80	HP	1,336	0.32	0.78	40	99
97	41009	Cargo Loader	Diesel	2009	110	HP	485	0.32	2.78	13	110
98	51100	Cargo Loader	Diesel	2021	130	HP	485	0.08	0.35	4	16
99	99123	Cargo Loader	Diesel	2016	110	HP	485	0.11	0.90	4	35
100	501565	Cargo Tractor	Diesel	2012	65	HP	700	0.36	3.09	13	112
101	507098	Air Start	Diesel	2015	550	HP	1,372	0.21	0.89	116	498
102	512143	Cargo Tractor	Gasoline	2017	86	HP	1,350	0.32	0.78	44	107
103	512144	Cargo Tractor	Gasoline	2017	86	HP	1,350	0.32	0.78	44	107
104	515410	Cargo Tractor	Gasoline	2018	86	HP	1,353	0.30	0.74	42	102
105	515411	Cargo Tractor	Gasoline	2018	86	HP	1,353	0.30	0.74	42	102
106	522879	GPU	Diesel	2022	173	HP	492	0.07	0.16	5	10
107	523497	Belt Loader	Gasoline	2021	80	HP	812	0.11	0.28	8	20
108	37335	Wide Aircraft Tug	Diesel	2021	173	HP	406	0.08	0.35	6	29
109	502563	Other GSE	Diesel	2014	13	HP	492	0.33	3.67	2	17
110	BL0002	Belt Loader	Electric	--	6	HP	--	--	--	--	--
111	BL0003	Belt Loader	Diesel	1989	74	HP	222	1.48	9.15	18	111
112	GP0006	GPU	Diesel	2017	76	HP	492	0.18	2.48	5	68
113	GP0008	GPU	Diesel	2017							
114	GP0010	GPU	Diesel	2020							
115	GP0011	GPU	Diesel	2020							
116	GP0012	GPU	Diesel	2020							
117	GP0013	GPU	Diesel	2020							
118	GP0014	GPU	Diesel	2022							
119	GP0015	GPU	Diesel	2022							
120	GP0016	GPU	Diesel	2022							
121	JT0015	Fuel Truck	Diesel	2020	260	HP	492	0.09	0.12	8	11
122	JT0016	Fuel Truck	Diesel	2020	260	HP	492	0.09	0.12	8	11
123	JT0017	Fuel Truck	Diesel	2019	260	HP	492	0.09	0.12	9	11

Table 2. 2024 GSE Emissions (Method A)

John Wayne Airport MOU
Santa Ana, California

Unit #	Equipment ID	GSE Type	Fuel Type	Engine Model Year	Engine Power Rating	Engine Power Rating Units	2024 Activity ^{1,4,5} (hrs)	ROG EF ^{2,3} (g/bhp-hr)	NOx EF ^{2,3} (g/bhp-hr)	ROG Emissions (lbs/year)	NOx Emissions (lbs/year)
124	JT0020	Fuel Truck	Diesel	2022	200	HP	492	0.07	0.12	5	9
125	JT0021	Fuel Truck	Diesel	2022	200	HP	492	0.07	0.12	5	9
126	JT0022	Fuel Truck	Diesel	2022	200	HP	492	0.07	0.12	5	9
127	JT0023	Fuel Truck	Diesel	2022	200	HP	492	0.07	0.12	5	9
128	TG0009	Aircraft Tug	Electric	2016	45	HP	--	--	--	--	--
129	TG0012	Aircraft Tug	Electric	1999	33	HP	--	--	--	--	--
130	TG0014	Aircraft Tug	Electric	2020	45	HP	--	--	--	--	--
131	TG0016	Aircraft Tug	Electric	2006	45	HP	--	--	--	--	--
132	TG0017	Aircraft Tug	Electric	2022	45	HP	--	--	--	--	--
133	UV0007	Golf Cart	Electric	2017	8	HP	--	--	--	--	--
134	UV0008	Golf Cart	Electric	2017	8	HP	--	--	--	--	--
135	UV0009	Golf Cart	Electric	2017	8	HP	--	--	--	--	--
136	UV0010	Golf Cart	Electric	2017	8	HP	--	--	--	--	--
137	UV0011	Golf Cart	Electric	2017	8	HP	--	--	--	--	--
138	UV0017	Golf Cart	Electric	2020	17	HP	--	--	--	--	--
139	UV0018	Golf Cart	Electric	2020	17	HP	--	--	--	--	--
140	UV0019	Golf Cart	Electric	2020	17	HP	--	--	--	--	--
141	UV0020	Golf Cart	Electric	2020	17	HP	--	--	--	--	--
142	UV0025	Golf Cart	Electric	2024	13	HP	--	--	--	--	--
143	UV0026	Golf Cart	Electric	2024	13	HP	--	--	--	--	--
144	UV0027	Golf Cart	Electric	2024	17	HP	--	--	--	--	--
145	897	Push Back	Diesel	2009	110	HP	246	0.25	2.70	8	86
146	2308	Push Back	Electric	2001	110	HP	--	--	--	--	--
147	2309	Push Back	Electric	2001	110	HP	--	--	--	--	--
148	2310	Push Back	Electric	2001	110	HP	--	--	--	--	--
149	3809	Belt Loader	Electric	2001	60	HP	--	--	--	--	--
150	3810	Belt Loader	Electric	2001	60	HP	--	--	--	--	--
151	3811	Belt Loader	Electric	2001	60	HP	--	--	--	--	--
152	3812	Belt Loader	Electric	2001	60	HP	--	--	--	--	--
153	9513	Bag Tug	Gasoline	2004	85	HP	939	4.88	0.43	472	42
154	10039	Passenger Stairs	Electric	2004	19	HP	--	--	--	--	--
155	10743	Belt Loader	Electric	2004	60	HP	--	--	--	--	--
156	10744	Belt Loader	Electric	2004	60	HP	--	--	--	--	--
157	10760	Belt Loader	Electric	2005	60	HP	--	--	--	--	--
158	10761	Belt Loader	Electric	2005	60	HP	--	--	--	--	--
159	10818	Push Back	Electric	1988	110	HP	--	--	--	--	--
160	13101	Belt Loader	Electric	2007	60	HP	--	--	--	--	--
161	13102	Belt Loader	Electric	2007	60	HP	--	--	--	--	--
162	13590	Bag Tug	Gasoline	2008	40	HP	493	25.79	15.84	616	378
163	15707	Lavatory Truck	Gasoline	2011	260	HP	1,217	0.21	0.69	37	120
164	18552	Service Truck	Gasoline	2012	200	HP	--	N/A (On-Road)	N/A (On-Road)	--	--

Table 2. 2024 GSE Emissions (Method A)

John Wayne Airport MOU
Santa Ana, California

Unit #	Equipment ID	GSE Type	Fuel Type	Engine Model Year	Engine Power Rating	Engine Power Rating Units	2024 Activity ^{1,4,5} (hrs)	ROG EF ^{2,3} (g/bhp-hr)	NOx EF ^{2,3} (g/bhp-hr)	ROG Emissions (lbs/year)	NOx Emissions (lbs/year)
165	21778	Belt Loader	Electric	2015	60	HP	--	--	--	--	--
166	21884	Belt Loader	Electric	2015	60	HP	--	--	--	--	--
167	21885	Belt Loader	Electric	2015	60	HP	--	--	--	--	--
168	21886	Belt Loader	Electric	2015	60	HP	--	--	--	--	--
169	21888	Push Back	Diesel	2015	74	HP	335	0.20	2.67	6	78
170	21889	Push Back	Diesel	2015	74	HP	335	0.20	2.67	6	78
171	21891	Bag Tug	Electric	2015	40	HP	--	--	--	--	--
172	21893	Bag Tug	Electric	2015	40	HP	--	--	--	--	--
173	21894	Bag Tug	Electric	2015	40	HP	--	--	--	--	--
174	21896	GPU	Diesel	2015	155	HP	492	0.12	1.14	7	64
175	21985	Golf Cart	Electric	2012	10	HP	--	--	--	--	--
176	21986	Golf Cart	Electric	2012	10	HP	--	--	--	--	--
177	22020	Service Truck	Gasoline	2016	320	HP	845	0.19	0.55	23	66
178	22047	Bag Tug	Diesel	2015	85	HP	744	0.15	2.84	8	146
179	22101	GPU	Diesel	2015	155	HP	492	0.12	1.14	7	64
180	22495	Air Start	Diesel	2015	333	HP	1,372	0.21	0.89	70	302
181	24565	Service Truck	Gasoline	2017	362	HP	841	0.18	0.51	24	68
182	26521	Bag Tug	Electric	2018	40	HP	--	--	--	--	--
183	26522	Bag Tug	Electric	2018	40	HP	--	--	--	--	--
184	26523	Bag Tug	Electric	2018	40	HP	--	--	--	--	--
185	26524	Bag Tug	Electric	2018	40	HP	--	--	--	--	--
186	26525	Bag Tug	Electric	2018	40	HP	--	--	--	--	--
187	26526	Bag Tug	Electric	2018	40	HP	--	--	--	--	--
188	26527	Bag Tug	Electric	2018	40	HP	--	--	--	--	--
189	26528	Bag Tug	Electric	2018	40	HP	--	--	--	--	--
190	26529	Bag Tug	Electric	2018	40	HP	--	--	--	--	--
191	26530	Bag Tug	Electric	2018	40	HP	--	--	--	--	--
192	26531	Bag Tug	Electric	2018	40	HP	--	--	--	--	--
193	26532	Bag Tug	Electric	2018	40	HP	--	--	--	--	--
194	26533	Bag Tug	Electric	2018	40	HP	--	--	--	--	--
195	26534	Bag Tug	Electric	2018	40	HP	--	--	--	--	--
196	26535	Bag Tug	Electric	2018	40	HP	--	--	--	--	--
197	26536	Bag Tug	Electric	2018	40	HP	--	--	--	--	--
198	26537	Bag Tug	Electric	2018	40	HP	--	--	--	--	--
199	26538	Bag Tug	Electric	2018	40	HP	--	--	--	--	--
200	26539	Bag Tug	Electric	2018	40	HP	--	--	--	--	--
201	26868	Push Back	Diesel	2018	74	HP	335	0.17	2.70	5	79
202	28286	Lavatory Truck	Gasoline	2018	200	HP	1,211	0.20	0.60	26	80
203	38586	Bag Tug	Electric	2024	40	HP	--	--	--	--	--
204	42064	Belt Loader	Electric	2024	18	HP	--	--	--	--	--
205	42066	Belt Loader	Electric	2024	18	HP	--	--	--	--	--

Table 2. 2024 GSE Emissions (Method A)

John Wayne Airport MOU
Santa Ana, California

Unit #	Equipment ID	GSE Type	Fuel Type	Engine Model Year	Engine Power Rating	Engine Power Rating Units	2024 Activity ^{1,4,5} (hrs)	ROG EF ^{2,3} (g/bhp-hr)	NOx EF ^{2,3} (g/bhp-hr)	ROG Emissions (lbs/year)	NOx Emissions (lbs/year)
206	42068	Belt Loader	Electric	2024	18	HP	--	--	--	--	--
207	42070	Belt Loader	Electric	2024	18	HP	--	--	--	--	--
208	42072	Belt Loader	Electric	2024	18	HP	--	--	--	--	--
209	42074	Belt Loader	Electric	2024	18	HP	--	--	--	--	--
210	42076	Belt Loader	Electric	2024	18	HP	--	--	--	--	--
211	42078	Belt Loader	Electric	2024	18	HP	--	--	--	--	--
212	42080	Belt Loader	Electric	2024	18	HP	--	--	--	--	--
213	42082	Belt Loader	Electric	2024	18	HP	--	--	--	--	--
214	270936	Aircraft Tug	Diesel	2020	136	HP	335	0.08	0.54	4	29
215	PB271075	Aircraft Tug	Diesel	2022	130	HP	335	0.07	0.16	3	8
216	172283	Bag Tug	Gasoline	2000	86	HP	834	4.27	11.98	372	1,045
217	174451	Bag Tug	Gasoline	2000	86	HP	834	4.27	11.98	372	1,045
218	BT176147	Bag Tug	Gasoline	2022	86	HP	877	0.09	0.23	9	21
219	BT176148	Bag Tug	Gasoline	2022	86	HP	877	0.09	0.23	9	21
220	BL570386	Belt Loader	Gasoline	2022	86	HP	810	0.09	0.22	7	17
221	522297	Belt Loader	Diesel	1999	14	HP	383	2.59	6.51	10	25
222	BL570375	Belt Loader	Diesel	2022	83	HP	382	0.07	0.88	2	21
223	BL570418	Belt Loader	Gasoline	2023	62	HP	595	0.10	0.08	4	3
224	900289	GPU	Diesel	2020	155	HP	492	0.09	0.55	5	31
225	492255	Service Truck	Gasoline	2019	360	HP	--	N/A (On-Road)	N/A (On-Road)	--	--
226	LT480239	Lavatory Truck	Gasoline	2022	385	HP	1,217	0.15	0.34	39	87
227	AL0426	Lift	Diesel	2016	67	HP	422	0.21	2.75	4	57
228	AS0999	Air Start	Diesel	2018	450	HP	1,372	0.18	0.14	81	65
229	AU0253	Service Truck	Gasoline	2017	N/A - On-Road	N/A - On-Road	--	N/A (On-Road)	N/A (On-Road)	--	--
230	BL0843	Belt Loader	Electric	2001	84	HP	--	--	--	--	--
231	BL0878	Belt Loader	Electric	2002	84	HP	--	--	--	--	--
232	BL1756	Belt Loader	Electric	2002	59	HP	--	--	--	--	--
233	BL1757	Belt Loader	Electric	2002	59	HP	--	--	--	--	--
234	BL1849	Belt Loader	Electric	2007	59	HP	--	--	--	--	--
235	BL1851	Belt Loader	Electric	2007	59	HP	--	--	--	--	--
236	BL1854	Belt Loader	Electric	2007	59	HP	--	--	--	--	--
237	BL1855	Belt Loader	Electric	2007	59	HP	--	--	--	--	--
238	CB0054	Other GSE	Electric	2019	55	HP	--	--	--	--	--
239	CT1262	Cargo Tractor	Electric	2001	93	HP	--	--	--	--	--
240	CT1263	Cargo Tractor	Electric	2001	93	HP	--	--	--	--	--
241	CT1467	Cargo Tractor	Electric	2008	93	HP	--	--	--	--	--
242	CT3251	Cargo Tractor	Electric	2008	93	HP	--	--	--	--	--
243	CT3252	Cargo Tractor	Electric	2008	93	HP	--	--	--	--	--
244	CT5846	Cargo Tractor	Electric	2008	55	HP	--	--	--	--	--
245	CT5847	Cargo Tractor	Electric	2008	55	HP	--	--	--	--	--
246	CT5848	Cargo Tractor	Electric	2008	55	HP	--	--	--	--	--

Table 2. 2024 GSE Emissions (Method A)

John Wayne Airport MOU
Santa Ana, California

Unit #	Equipment ID	GSE Type	Fuel Type	Engine Model Year	Engine Power Rating	Engine Power Rating Units	2024 Activity ^{1,4,5} (hrs)	ROG EF ^{2,3} (g/bhp-hr)	NOx EF ^{2,3} (g/bhp-hr)	ROG Emissions (lbs/year)	NOx Emissions (lbs/year)
247	CT5856	Cargo Tractor	Electric	2008	55	HP	--	--	--	--	--
248	CT8321	Cargo Tractor	Electric	1999	93	HP	--	--	--	--	--
249	CT8360	Cargo Tractor	Electric	1999	93	HP	--	--	--	--	--
250	CT8361	Cargo Tractor	Electric	1999	93	HP	--	--	--	--	--
251	CT8362	Cargo Tractor	Electric	1999	93	HP	--	--	--	--	--
252	FL0151	Fork Lift	Electric	2013	80	HP	--	--	--	--	--
253	GC1696	Golf Cart	Electric	2006	14	HP	--	--	--	--	--
254	GC2373	Golf Cart	Electric	2015	14	HP	--	--	--	--	--
255	GC3597	Golf Cart	Electric	2007	14	HP	--	--	--	--	--
256	GC3598	Golf Cart	Electric	2007	14	HP	--	--	--	--	--
257	GP1907	GPU	Gasoline	2018	229	HP	786	0.17	0.44	51	130
258	GP1908	GPU	Gasoline	2018	229	HP	786	0.17	0.44	51	130
259	GP1911	GPU	Gasoline	2018	229	HP	786	0.17	0.44	51	130
260	GP1912	GPU	Gasoline	2018	229	HP	786	0.17	0.44	51	130
261	GP2004	GPU	Gasoline	2019	229	HP	811	0.16	0.40	50	124
262	PI0820	Service Truck	Gasoline	1998	N/A - On-Road	N/A - On-Road	--	N/A (On-Road)	N/A (On-Road)	--	--
263	PI1694	Service Truck	Gasoline	2013	N/A - On-Road	N/A - On-Road	--	N/A (On-Road)	N/A (On-Road)	--	--
264	PI2123	Service Truck	Gasoline	2019	N/A - On-Road	N/A - On-Road	--	N/A (On-Road)	N/A (On-Road)	--	--
265	PT0645	Aircraft Tug	Diesel	2001	88	HP	335	1.48	6.17	51	215
266	PT0726	Aircraft Tug	Electric	2018	74	HP	--	--	--	--	--
267	PT0727	Aircraft Tug	Electric	2018	74	HP	--	--	--	--	--
268	PT0730	Aircraft Tug	Electric	2018	74	HP	--	--	--	--	--
269	PT7648	Aircraft Tug	Diesel	1998	88	HP	325	1.52	9.29	51	314
270	UL1043	Lift	Diesel	2012	67	HP	422	0.26	2.96	5	62
271	UL3368	Lift	Electric	2009	114	HP	--	--	--	--	--
272	VC0156	Service Truck	Gasoline	2019	N/A - On-Road	N/A - On-Road	--	N/A (On-Road)	N/A (On-Road)	--	--
273	BL3448	Belt Loader	Electric	2023	59	HP	--	--	--	--	--
274	BL3449	Belt Loader	Electric	2023	59	HP	--	--	--	--	--
275	CB0088	Other GSE	Electric	2023	55	HP	--	--	--	--	--
276	GC2679	Golf Cart	Electric	2020	14	HP	--	--	--	--	--
277	GC2680	Golf Cart	Electric	2020	14	HP	--	--	--	--	--
278	GC2681	Golf Cart	Electric	2020	14	HP	--	--	--	--	--
279	BL3547	Belt Loader	Electric	2023	59	HP	--	--	--	--	--
280	CT4155	Cargo Tractor	Electric	2024	40	HP	--	--	--	--	--
281	CT4156	Cargo Tractor	Electric	2024	40	HP	--	--	--	--	--
282	CT4354	Cargo Tractor	Electric	2024	40	HP	--	--	--	--	--
283	CT4355	Cargo Tractor	Electric	2024	40	HP	--	--	--	--	--
284	CT4356	Cargo Tractor	Electric	2024	40	HP	--	--	--	--	--
285	AC5412	Air Conditioner	Diesel	2023	172	HP	203	0.07	0.12	2	3
286	BL3581	Belt Loader	Electric	2023	59	HP	--	--	--	--	--
287	411986	Air Start	Diesel	2016	675	HP	304	0.20	1.63	30	248

Table 2. 2024 GSE Emissions (Method A)

John Wayne Airport MOU
Santa Ana, California

Unit #	Equipment ID	GSE Type	Fuel Type	Engine Model Year	Engine Power Rating	Engine Power Rating Units	2024 Activity ^{1,4,5} (hrs)	ROG EF ^{2,3} (g/bhp-hr)	NOx EF ^{2,3} (g/bhp-hr)	ROG Emissions (lbs/year)	NOx Emissions (lbs/year)
288	412127	Service Truck	Gasoline	2017	300	HP	841	0.18	0.51	20	56
289	414625	Cargo Loader	Gasoline	2018	152	HP	723	0.17	0.41	20	50
290	415069	Other GSE	Diesel	2018	21	HP	492	0.26	3.66	2	28
291	416263	Other GSE	Diesel	2019	21	HP	492	0.24	3.66	2	28
292	419058	Belt Loader	Gasoline	2019	84	HP	813	0.16	0.40	12	30
293	419165	GPU	Diesel	2019	173	HP	492	0.09	0.75	6	47
294	423668	Belt Loader	Gasoline	2022	86	HP	810	0.09	0.22	7	17
295	423669	Belt Loader	Gasoline	2022	86	HP	810	0.09	0.22	7	17
296	770627	Cargo Loader	Gasoline	2015	21	HP	702	12.31	7.99	204	133
297	770873	Cargo Tractor	Gasoline	2015	21	HP	1,348	16.18	10.50	557	362
298	770874	Cargo Tractor	Gasoline	2015	21	HP	1,348	16.18	10.50	557	362
299	770875	Cargo Tractor	Gasoline	2015	21	HP	1,348	16.18	10.50	557	362
300	835319	Lift	Diesel	2011	21	HP	422	0.33	3.64	2	24
301	424164	Push Back	Diesel	2022	175	HP	335	0.07	0.12	5	8
302	414543	Air Start	Diesel	2018	675	HP	1,071	0.17	0.52	92	277
303	#1	Lavatory Truck	Gasoline	2015	360	HP	1,251	0.21	0.69	53	171
304	#2	Lavatory Truck	Gasoline	2014	360	HP	1,161	0.21	0.69	49	158
305	Green	Lavatory Truck	Diesel	1997	135	HP	--	N/A (On-Road)	N/A (On-Road)	--	--
306	Dodge Van	Service Truck	Gasoline	2012	135	HP	--	N/A (On-Road)	N/A (On-Road)	--	--
307	Ram Truck	Service Truck	Gasoline	2021	220	HP	491	0.15	0.30	7	14
Annual Emissions (lbs)										8,630	20,340
Daily Emissions ⁶ (lb/day)										24	56

Conversion Factors:

- 0.9198 Gasoline ROG/HC Ratio derived from OFFROAD2017
- 1.2100 Diesel ROG/HC Ratio derived from OFFROAD2017

Constants:

365 days/year

Notes:

¹ GSE annual usage hours were calculated using activity from the OFFROAD2017 database for CY 2024. GSE load factors from CARB and SCAQMD guidance are utilized instead of equipment-specific load factors. Units registered as low-use with CARB as noted in Table 3 utilize equipment-specific annual usage hours as provided by the GSE operator for CY 2024.

² Model year-specific emission factors and GSE load factors for diesel-fueled equipment were derived from CARB's 2017 Off-Road Diesel Emission Factors. For gasoline-fueled equipment, model year-specific HC and NOx emission factors were calculated based on new engine standards for spark-ignited engines. Gasoline-fueled and diesel-fueled emission factors were calculated by summing the zero-hour pollutant emission factor with the product of the deterioration rate and cumulative hours and multiplying by the fuel correction factor, following the methodology presented in Attachment A of Facility-Based Mobile Source Measure for Commercial Airports Appendix B: Sip Credit Calculations. Available at: <https://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/facility-based-mobile-source-measures/airports-final-appendix-b.pdf?sfvrsn=6>. Engine accumulated hours were capped depending on fuel type and model-year (gasoline) or HP (diesel). Model year-specific gasoline-fueled emission factor constants and engine load factors were provided by AQMD. Gasoline-fueled emission factor constants were provided up to a HP bin of 300; therefore, units with a HP greater than 300 HP were quantified using the 300 HP bin constants. Gasoline-fueled emission factor constants for the 50 HP bin were provided based on engine displacement; however since engine displacement information was not available, the maximum emission factor constants were selected. HC emission factors were converted to ROG emission factors by multiplying by a gasoline ROG to HC ratio, derived from OFFROAD 2017. Electric vehicles are assigned an EF of 0. Emissions are calculated by multiplying the respective EFs by the equipment horsepower, load factor and hours of usage in 2024 and converted to an average daily emission rate assuming 365 days of operation.

Table 2. 2024 GSE Emissions (Method A)

John Wayne Airport MOU
Santa Ana, California

Unit #	Equipment ID	GSE Type	Fuel Type	Engine Model Year	Engine Power Rating	Engine Power Rating Units	2024 Activity ^{1,4,5} (hrs)	ROG EF ^{2,3} (g/bhp-hr)	NOx EF ^{2,3} (g/bhp-hr)	ROG Emissions (lbs/year)	NOx Emissions (lbs/year)
--------	--------------	----------	-----------	----------------------	------------------------	------------------------------	---	-------------------------------------	-------------------------------------	-----------------------------	-----------------------------

³ Unit IDs 13085, 18552, 492255, AU0253, PI0820, PI1694, PI2123, VP0156, Green, and Dodge Van are designated and licensed for on-road use. Therefore, emissions from these units were not included in the inventory. Some of these units do not have a power rating listed per the GSE operator.

^a The CARB LSI regulation's definition for airport GSE does not include those categories of GSE equipment that are designated and licensed for on-road use. These pieces of equipment are not subject to the requirements of the LSI regulation. Available at: <https://ww2.arb.ca.gov/sites/default/files/classic/msprog/offroad/orspark/faqs/lsifaqagse.pdf>. Accessed: June 2025.

^b The CARB Offroad Diesel (ORD) regulation exempts permanent and year-by-year low-use vehicles as defined in CCR § 2449 (e)(7). Available at: <https://ww2.arb.ca.gov/sites/default/files/2019-03/finalregorder-dec2011.pdf>. Accessed: June 2025.

^c The CARB LSI regulation's definition for airport GSE does not include those categories of GSE equipment that are less than 25 horsepower, per CCR § 2775 (a)(1). Available at: <https://ww2.arb.ca.gov/sites/default/files/classic/msprog/offroad/orspark/largesparkappa-clean.pdf>. Accessed: June 2025.

⁴ Units 112-120 only service commercial flight operations at JWA for a portion of time. The ROG and NOx emission factors for each unit are individually calculated using the OFFROAD2017 database. Annual ROG and NOx emissions are calculated using average ROG and NOx emission factors (weighted by horsepower) emission factors, an aggregate horsepower value (an average across all units), and an aggregate annual usage (based on operator refinement guidance).

⁵ Units 121-127 only service commercial flight operations at JWA for a portion of time. Annual usage was refined for these units based on the relative fuel dispensed for commercial flight operations compared to total fuel dispensed in 2024.

⁶ Daily emissions are calculated assuming operation 365 days of the year.

Table 3. 2024 GSE Fleet Average Emission Factor (Method B)

John Wayne Airport MOU
Santa Ana, California

Unit #	Equipment ID	GSE Type	Fuel Type	Engine Model Year	Engine Power Rating	Engine Power Rating Units	NOx EF ^{1,2,3} (g/bhp-hr)
1	AS0118	Air Start	Diesel	2008	665	HP	2.75
2	BL0342	Belt Loader	Electric	2004	84	HP	--
3	BL0344	Belt Loader	Electric	2004	84	HP	--
4	BL18927	Belt Loader	Electric	1999	84	HP	--
5	BL18928	Belt Loader	Electric	1999	84	HP	--
6	BL18930	Belt Loader	Electric	1999	84	HP	--
7	BL18943	Belt Loader	Electric	1999	84	HP	--
8	BL20011	Belt Loader	Electric	1999	84	HP	--
9	GT202	GPU	Diesel	2016	150	HP	1.14
10	LV19806	Lavatory Truck	Gasoline	2000	65	HP	17.19
11	PJ123	Push Back	Diesel	1990	110	HP	9.07
12	RV20027	Service Truck	Gasoline	1999	260	HP	10.29
13	SQ180	Passenger Stairs	Gasoline	2017	61	HP	3.23
14	TV0995	Bag Tug	Electric	2004	93	HP	--
15	TV0997	Bag Tug	Electric	2000	93	HP	--
16	TV0998	Bag Tug	Electric	1999	93	HP	--
17	TV1168	Push Back	Electric	2016	83	HP	--
18	TV1169	Push Back	Electric	2016	83	HP	--
19	TV19845	Bag Tug	Electric	2000	93	HP	--
20	TV19846	Bag Tug	Electric	2000	93	HP	--
21	TV19847	Bag Tug	Electric	2000	93	HP	--
22	TV19848	Bag Tug	Electric	2000	93	HP	--
23	TV19849	Bag Tug	Electric	2000	93	HP	--
24	TV19850	Bag Tug	Electric	2000	93	HP	--
25	TV20561	Push Back	Diesel	2000	87	HP	7.67
26	SL253	Lavatory Truck	Gasoline	2023	350	HP	1.68
27	3301	Lift	Electric	2005	59	HP	--
28	4561	Fork Lift	Electric	2008	53	HP	--
29	8308	Golf Cart	Electric	2018	8	HP	--
30	10391	Other GSE	Diesel	2022	134	HP	0.26
31	3072	Lift	Propane	2000	68	HP	2.91
32	7566	GPU	Diesel	2017	155	HP	0.27
33	8628	Golf Cart	Electric	2019	32	HP	--
34	11056	Golf Cart	Electric	2023	32	HP	--
35	AS5615	Air Start	Diesel	2016	380	HP	0.85
36	BL 6093	Belt Loader	Electric	2000	40	HP	--
37	BL 6094	Belt Loader	Electric	2000	40	HP	--
38	BL1875	Belt Loader	Gasoline	2015	84	HP	4.77
39	BL3112	Belt Loader	Gasoline	2015	84	HP	4.77
40	BL3130	Belt Loader	Gasoline	2009	27	HP	5.66
41	BL3692	Belt Loader	Gasoline	2009	18	HP	N/A (< 25 HP)
42	BL3693	Belt Loader	Gasoline	2009	18	HP	N/A (< 25 HP)

Table 3. 2024 GSE Fleet Average Emission Factor (Method B)

John Wayne Airport MOU
Santa Ana, California

Unit #	Equipment ID	GSE Type	Fuel Type	Engine Model Year	Engine Power Rating	Engine Power Rating Units	NOx EF ^{1,2,3} (g/bhp-hr)
43	BL5397	Belt Loader	Electric	2016	40	HP	--
44	BL5433	Belt Loader	Electric	2016	40	HP	--
45	BL5434	Belt Loader	Electric	2016	40	HP	--
46	BL6455	Belt Loader	Electric	2018	40	HP	--
47	BT 16125	Bag Tug	Electric	2002	40	HP	--
48	BT 16158	Bag Tug	Electric	2002	40	HP	--
49	BT3917	Bag Tug	Electric	2012	40	HP	--
50	BT3918	Bag Tug	Electric	2012	40	HP	--
51	BT5431	Bag Tug	Electric	2016	40	HP	--
52	BT5432	Bag Tug	Electric	2016	40	HP	--
53	BT5612	Bag Tug	Electric	2016	40	HP	--
54	BT5613	Bag Tug	Electric	2016	40	HP	--
55	BT5904	Bag Tug	Electric	2017	40	HP	--
56	BT5907	Bag Tug	Electric	2017	40	HP	--
57	GP5372	GPU	Diesel	2016	116	HP	1.14
58	HS6826	Cargo Tractor	Diesel	2019	74	HP	1.39
59	LT3457	Lavatory Truck	Gasoline	2005	285	HP	6.32
60	PB 14095	Push Back	Diesel	2008	74	HP	5.00
61	PB5000	Push Back	Diesel	2019	74	HP	1.36
62	PB6507	Push Back	Diesel	2019	74	HP	1.36
63	PB6729	Push Back	Diesel	2019	74	HP	1.36
64	PB6832	Push Back	Diesel	2019	74	HP	1.36
65	14242	Air Start	Diesel	2007	511	HP	N/A (Low-Use)
66	18637	Aircraft Tug	Gasoline	1997	200	HP	17.50
67	78172	Passenger Stairs	Diesel	2000	49	HP	5.34
68	170562	Bag Tug	Diesel	2001	60	HP	8.37
69	170563	Bag Tug	Diesel	2001	60	HP	8.37
70	270550	Aircraft Tug	Electric	2011	45	HP	--
71	270962	Aircraft Tug	Electric	2016	45	HP	--
72	270963	Aircraft Tug	Electric	2016	45	HP	--
73	521651	Belt Loader	Diesel	2000	60	HP	8.33
74	521853	Belt Loader	Diesel	2006	65	HP	5.32
75	522183	Belt Loader	Electric	2011	60	HP	--
76	522401	Belt Loader	Gasoline	2016	86	HP	4.57
77	522402	Belt Loader	Gasoline	2016	86	HP	4.57
78	523229	Belt Loader	Electric	2001	60	HP	--
79	770310	Bag Tug	Electric	2010	40	HP	--
80	770312	Bag Tug	Electric	2010	40	HP	--
81	770313	Bag Tug	Electric	2010	40	HP	--
82	770321	Bag Tug	Electric	2010	40	HP	--
83	770322	Bag Tug	Electric	2011	40	HP	--
84	770323	Bag Tug	Electric	2011	40	HP	--

Table 3. 2024 GSE Fleet Average Emission Factor (Method B)

John Wayne Airport MOU
Santa Ana, California

Unit #	Equipment ID	GSE Type	Fuel Type	Engine Model Year	Engine Power Rating	Engine Power Rating Units	NOx EF ^{1,2,3} (g/bhp-hr)
85	770333	Bag Tug	Electric	2011	40	HP	--
86	770667	Bag Tug	Electric	2012	40	HP	--
87	900051	GPU	Diesel	2007	220	HP	2.57
88	270014	Aircraft Tug	Diesel	2007	138	HP	3.82
89	270964	Aircraft Tug	Electric	2017	45	HP	--
90	48737	Lavatory Truck	Diesel	2022	401	HP	0.26
91	570064	Belt Loader	Electric	2017	15	HP	--
92	770124	Bag Tug	Electric	2005	40	HP	--
93	270918	Aircraft Tug	Diesel	2012	74	HP	2.89
94	13085	Service Truck	Gasoline	1994	250	HP	N/A (On-Road)
95	23262	Cargo Tractor	Gasoline	2010	80	HP	7.66
96	23263	Cargo Tractor	Gasoline	2010	80	HP	7.66
97	41009	Cargo Loader	Diesel	2009	110	HP	2.99
98	51100	Cargo Loader	Diesel	2021	130	HP	1.08
99	99123	Cargo Loader	Diesel	2016	110	HP	0.27
100	501565	Cargo Tractor	Diesel	2012	65	HP	3.06
101	507098	Air Start	Diesel	2015	550	HP	0.81
102	512143	Cargo Tractor	Gasoline	2017	86	HP	5.43
103	512144	Cargo Tractor	Gasoline	2017	86	HP	5.43
104	515410	Cargo Tractor	Gasoline	2018	86	HP	5.11
105	515411	Cargo Tractor	Gasoline	2018	86	HP	5.11
106	522879	GPU	Diesel	2022	173	HP	0.26
107	523497	Belt Loader	Gasoline	2021	80	HP	3.64
108	37335	Wide Aircraft Tug	Diesel	2021	173	HP	0.26
109	502563	Other GSE	Diesel	2014	13	HP	N/A (< 25 HP)
110	BL0002	Belt Loader	Electric	--	6	HP	--
111	BL0003	Belt Loader	Diesel	1989	74	HP	10.40
112	GP0006	GPU	Diesel	2017	42	HP	2.95
113	GP0008	GPU	Diesel	2017	42	HP	2.95
114	GP0010	GPU	Diesel	2020	74	HP	1.38
115	GP0011	GPU	Diesel	2020	74	HP	1.38
116	GP0012	GPU	Diesel	2020	74	HP	1.38
117	GP0013	GPU	Diesel	2020	155	HP	0.26
118	GP0014	GPU	Diesel	2022	74	HP	1.35
119	GP0015	GPU	Diesel	2022	74	HP	1.35
120	GP0016	GPU	Diesel	2022	74	HP	1.35
121	JT0015	Fuel Truck	Diesel	2020	260	HP	0.26
122	JT0016	Fuel Truck	Diesel	2020	260	HP	0.26
123	JT0017	Fuel Truck	Diesel	2019	260	HP	0.27
124	JT0020	Fuel Truck	Diesel	2022	200	HP	0.26
125	JT0021	Fuel Truck	Diesel	2022	200	HP	0.26
126	JT0022	Fuel Truck	Diesel	2022	200	HP	0.26

Table 3. 2024 GSE Fleet Average Emission Factor (Method B)

John Wayne Airport MOU
Santa Ana, California

Unit #	Equipment ID	GSE Type	Fuel Type	Engine Model Year	Engine Power Rating	Engine Power Rating Units	NOx EF ^{1,2,3} (g/bhp-hr)
127	JT0023	Fuel Truck	Diesel	2022	200	HP	0.26
128	TG0009	Aircraft Tug	Electric	2016	45	HP	--
129	TG0012	Aircraft Tug	Electric	1999	33	HP	--
130	TG0014	Aircraft Tug	Electric	2020	45	HP	--
131	TG0016	Aircraft Tug	Electric	2006	45	HP	--
132	TG0017	Aircraft Tug	Electric	2022	45	HP	--
133	UV0007	Golf Cart	Electric	2017	8	HP	--
134	UV0008	Golf Cart	Electric	2017	8	HP	--
135	UV0009	Golf Cart	Electric	2017	8	HP	--
136	UV0010	Golf Cart	Electric	2017	8	HP	--
137	UV0011	Golf Cart	Electric	2017	8	HP	--
138	UV0017	Golf Cart	Electric	2020	17	HP	--
139	UV0018	Golf Cart	Electric	2020	17	HP	--
140	UV0019	Golf Cart	Electric	2020	17	HP	--
141	UV0020	Golf Cart	Electric	2020	17	HP	--
142	UV0025	Golf Cart	Electric	2024	13	HP	--
143	UV0026	Golf Cart	Electric	2024	13	HP	--
144	UV0027	Golf Cart	Electric	2024	17	HP	--
145	897	Push Back	Diesel	2009	110	HP	2.49
146	2308	Push Back	Electric	2001	110	HP	--
147	2309	Push Back	Electric	2001	110	HP	--
148	2310	Push Back	Electric	2001	110	HP	--
149	3809	Belt Loader	Electric	2001	60	HP	--
150	3810	Belt Loader	Electric	2001	60	HP	--
151	3811	Belt Loader	Electric	2001	60	HP	--
152	3812	Belt Loader	Electric	2001	60	HP	--
153	9513	Bag Tug	Gasoline	2004	85	HP	6.29
154	10039	Passenger Stairs	Electric	2004	19	HP	--
155	10743	Belt Loader	Electric	2004	60	HP	--
156	10744	Belt Loader	Electric	2004	60	HP	--
157	10760	Belt Loader	Electric	2005	60	HP	--
158	10761	Belt Loader	Electric	2005	60	HP	--
159	10818	Push Back	Electric	1988	110	HP	--
160	13101	Belt Loader	Electric	2007	60	HP	--
161	13102	Belt Loader	Electric	2007	60	HP	--
162	13590	Bag Tug	Gasoline	2008	40	HP	5.27
163	15707	Lavatory Truck	Gasoline	2011	260	HP	2.33
164	18552	Service Truck	Gasoline	2012	200	HP	N/A (On-Road)
165	21778	Belt Loader	Electric	2015	60	HP	--
166	21884	Belt Loader	Electric	2015	60	HP	--
167	21885	Belt Loader	Electric	2015	60	HP	--
168	21886	Belt Loader	Electric	2015	60	HP	--

Table 3. 2024 GSE Fleet Average Emission Factor (Method B)

John Wayne Airport MOU
Santa Ana, California

Unit #	Equipment ID	GSE Type	Fuel Type	Engine Model Year	Engine Power Rating	Engine Power Rating Units	NOx EF ^{1,2,3} (g/bhp-hr)
169	21888	Push Back	Diesel	2015	74	HP	1.38
170	21889	Push Back	Diesel	2015	74	HP	1.38
171	21891	Bag Tug	Electric	2015	40	HP	--
172	21893	Bag Tug	Electric	2015	40	HP	--
173	21894	Bag Tug	Electric	2015	40	HP	--
174	21896	GPU	Diesel	2015	155	HP	0.27
175	21985	Golf Cart	Electric	2012	10	HP	--
176	21986	Golf Cart	Electric	2012	10	HP	--
177	22020	Service Truck	Gasoline	2016	320	HP	1.53
178	22047	Bag Tug	Diesel	2015	85	HP	2.91
179	22101	GPU	Diesel	2015	155	HP	0.27
180	22495	Air Start	Diesel	2015	333	HP	0.81
181	24565	Service Truck	Gasoline	2017	362	HP	1.50
182	26521	Bag Tug	Electric	2018	40	HP	--
183	26522	Bag Tug	Electric	2018	40	HP	--
184	26523	Bag Tug	Electric	2018	40	HP	--
185	26524	Bag Tug	Electric	2018	40	HP	--
186	26525	Bag Tug	Electric	2018	40	HP	--
187	26526	Bag Tug	Electric	2018	40	HP	--
188	26527	Bag Tug	Electric	2018	40	HP	--
189	26528	Bag Tug	Electric	2018	40	HP	--
190	26529	Bag Tug	Electric	2018	40	HP	--
191	26530	Bag Tug	Electric	2018	40	HP	--
192	26531	Bag Tug	Electric	2018	40	HP	--
193	26532	Bag Tug	Electric	2018	40	HP	--
194	26533	Bag Tug	Electric	2018	40	HP	--
195	26534	Bag Tug	Electric	2018	40	HP	--
196	26535	Bag Tug	Electric	2018	40	HP	--
197	26536	Bag Tug	Electric	2018	40	HP	--
198	26537	Bag Tug	Electric	2018	40	HP	--
199	26538	Bag Tug	Electric	2018	40	HP	--
200	26539	Bag Tug	Electric	2018	40	HP	--
201	26868	Push Back	Diesel	2018	74	HP	1.36
202	28286	Lavatory Truck	Gasoline	2018	200	HP	1.96
203	38586	Bag Tug	Electric	2024	40	HP	--
204	42064	Belt Loader	Electric	2024	18	HP	--
205	42066	Belt Loader	Electric	2024	18	HP	--
206	42068	Belt Loader	Electric	2024	18	HP	--
207	42070	Belt Loader	Electric	2024	18	HP	--
208	42072	Belt Loader	Electric	2024	18	HP	--
209	42074	Belt Loader	Electric	2024	18	HP	--
210	42076	Belt Loader	Electric	2024	18	HP	--

Table 3. 2024 GSE Fleet Average Emission Factor (Method B)

John Wayne Airport MOU
Santa Ana, California

Unit #	Equipment ID	GSE Type	Fuel Type	Engine Model Year	Engine Power Rating	Engine Power Rating Units	NOx EF ^{1,2,3} (g/bhp-hr)
211	42078	Belt Loader	Electric	2024	18	HP	--
212	42080	Belt Loader	Electric	2024	18	HP	--
213	42082	Belt Loader	Electric	2024	18	HP	--
214	270936	Aircraft Tug	Diesel	2020	136	HP	0.26
215	PB271075	Aircraft Tug	Diesel	2022	130	HP	0.62
216	172283	Bag Tug	Gasoline	2000	86	HP	5.37
217	174451	Bag Tug	Gasoline	2000	86	HP	5.37
218	BT176147	Bag Tug	Gasoline	2022	86	HP	3.49
219	BT176148	Bag Tug	Gasoline	2022	86	HP	3.49
220	BL570386	Belt Loader	Gasoline	2022	86	HP	3.45
221	522297	Belt Loader	Diesel	1999	14	HP	N/A (< 25 HP)
222	BL570375	Belt Loader	Diesel	2022	83	HP	1.35
223	BL570418	Belt Loader	Gasoline	2023	62	HP	3.26
224	900289	GPU	Diesel	2020	155	HP	0.26
225	492255	Service Truck	Gasoline	2019	360	HP	N/A (On-Road)
226	LT480239	Lavatory Truck	Gasoline	2022	385	HP	1.73
227	AL0426	Lift	Diesel	2016	67	HP	1.39
228	AS0999	Air Start	Diesel	2018	450	HP	0.13
229	AU0253	Service Truck	Gasoline	2017	N/A - On-Road	N/A - On-Road	N/A (On-Road)
230	BL0843	Belt Loader	Electric	2001	84	HP	--
231	BL0878	Belt Loader	Electric	2002	84	HP	--
232	BL1756	Belt Loader	Electric	2002	59	HP	--
233	BL1757	Belt Loader	Electric	2002	59	HP	--
234	BL1849	Belt Loader	Electric	2007	59	HP	--
235	BL1851	Belt Loader	Electric	2007	59	HP	--
236	BL1854	Belt Loader	Electric	2007	59	HP	--
237	BL1855	Belt Loader	Electric	2007	59	HP	--
238	CB0054	Other GSE	Electric	2019	55	HP	--
239	CT1262	Cargo Tractor	Electric	2001	93	HP	--
240	CT1263	Cargo Tractor	Electric	2001	93	HP	--
241	CT1467	Cargo Tractor	Electric	2008	93	HP	--
242	CT3251	Cargo Tractor	Electric	2008	93	HP	--
243	CT3252	Cargo Tractor	Electric	2008	93	HP	--
244	CT5846	Cargo Tractor	Electric	2008	55	HP	--
245	CT5847	Cargo Tractor	Electric	2008	55	HP	--
246	CT5848	Cargo Tractor	Electric	2008	55	HP	--
247	CT5856	Cargo Tractor	Electric	2008	55	HP	--
248	CT8321	Cargo Tractor	Electric	1999	93	HP	--
249	CT8360	Cargo Tractor	Electric	1999	93	HP	--
250	CT8361	Cargo Tractor	Electric	1999	93	HP	--
251	CT8362	Cargo Tractor	Electric	1999	93	HP	--
252	FL0151	Fork Lift	Electric	2013	80	HP	--

Table 3. 2024 GSE Fleet Average Emission Factor (Method B)

John Wayne Airport MOU
Santa Ana, California

Unit #	Equipment ID	GSE Type	Fuel Type	Engine Model Year	Engine Power Rating	Engine Power Rating Units	NOx EF ^{1,2,3} (g/bhp-hr)
253	GC1696	Golf Cart	Electric	2006	14	HP	--
254	GC2373	Golf Cart	Electric	2015	14	HP	--
255	GC3597	Golf Cart	Electric	2007	14	HP	--
256	GC3598	Golf Cart	Electric	2007	14	HP	--
257	GP1907	GPU	Gasoline	2018	229	HP	5.54
258	GP1908	GPU	Gasoline	2018	229	HP	5.54
259	GP1911	GPU	Gasoline	2018	229	HP	5.54
260	GP1912	GPU	Gasoline	2018	229	HP	5.54
261	GP2004	GPU	Gasoline	2019	229	HP	5.33
262	PI0820	Service Truck	Gasoline	1998	N/A - On-Road	N/A - On-Road	N/A (On-Road)
263	PI1694	Service Truck	Gasoline	2013	N/A - On-Road	N/A - On-Road	N/A (On-Road)
264	PI2123	Service Truck	Gasoline	2019	N/A - On-Road	N/A - On-Road	N/A (On-Road)
265	PT0645	Aircraft Tug	Diesel	2001	88	HP	7.63
266	PT0726	Aircraft Tug	Electric	2018	74	HP	--
267	PT0727	Aircraft Tug	Electric	2018	74	HP	--
268	PT0730	Aircraft Tug	Electric	2018	74	HP	--
269	PT7648	Aircraft Tug	Diesel	1998	88	HP	7.49
270	UL1043	Lift	Diesel	2012	67	HP	2.47
271	UL3368	Lift	Electric	2009	114	HP	--
272	VC0156	Service Truck	Gasoline	2019	N/A - On-Road	N/A - On-Road	N/A (On-Road)
273	BL3448	Belt Loader	Electric	2023	59	HP	--
274	BL3449	Belt Loader	Electric	2023	59	HP	--
275	CB0088	Other GSE	Electric	2023	55	HP	--
276	GC2679	Golf Cart	Electric	2020	14	HP	--
277	GC2680	Golf Cart	Electric	2020	14	HP	--
278	GC2681	Golf Cart	Electric	2020	14	HP	--
279	BL3547	Belt Loader	Electric	2023	59	HP	--
280	CT4155	Cargo Tractor	Electric	2024	40	HP	--
281	CT4156	Cargo Tractor	Electric	2024	40	HP	--
282	CT4354	Cargo Tractor	Electric	2024	40	HP	--
283	CT4355	Cargo Tractor	Electric	2024	40	HP	--
284	CT4356	Cargo Tractor	Electric	2024	40	HP	--
285	AC5412	Air Conditioner	Diesel	2023	172	HP	0.12
286	BL3581	Belt Loader	Electric	2023	59	HP	--
287	411986	Air Start	Diesel	2016	675	HP	1.50
288	412127	Service Truck	Gasoline	2017	300	HP	1.50
289	414625	Cargo Loader	Gasoline	2018	152	HP	4.05
290	415069	Other GSE	Diesel	2018	21	HP	N/A (< 25 HP)
291	416263	Other GSE	Diesel	2019	21	HP	N/A (< 25 HP)
292	419058	Belt Loader	Gasoline	2019	84	HP	4.01
293	419165	GPU	Diesel	2019	173	HP	0.27
294	423668	Belt Loader	Gasoline	2022	86	HP	3.45

Table 3. 2024 GSE Fleet Average Emission Factor (Method B)

John Wayne Airport MOU
Santa Ana, California

Unit #	Equipment ID	GSE Type	Fuel Type	Engine Model Year	Engine Power Rating	Engine Power Rating Units	NOx EF ^{1,2,3} (g/bhp-hr)
295	423669	Belt Loader	Gasoline	2022	86	HP	3.45
296	770627	Cargo Loader	Gasoline	2015	21	HP	N/A (< 25 HP)
297	770873	Cargo Tractor	Gasoline	2015	21	HP	N/A (< 25 HP)
298	770874	Cargo Tractor	Gasoline	2015	21	HP	N/A (< 25 HP)
299	770875	Cargo Tractor	Gasoline	2015	21	HP	N/A (< 25 HP)
300	835319	Lift	Diesel	2011	21	HP	N/A (< 25 HP)
301	424164	Push Back	Diesel	2022	175	HP	0.26
302	414543	Air Start	Diesel	2018	675	HP	0.49
303	#1	Lavatory Truck	Gasoline	2015	360	HP	2.12
304	#2	Lavatory Truck	Gasoline	2014	360	HP	2.19
305	Green	Lavatory Truck	Diesel	1997	135	HP	N/A (On-Road)
306	Dodge Van	Service Truck	Gasoline	2012	135	HP	N/A (On-Road)
307	Ram Truck	Service Truck	Gasoline	2021	220	HP	1.38
Fleet Averaged Emission Factor (g/bhp-hr)							1.66

Notes:

¹ GSE load factors were taken from OFFROAD2017 in CY 2024.

² Model year-specific emission factors were derived from OFFROAD2017 for diesel-fueled equipment by dividing total emissions by the total annual horsepower-hours and load factor for each equipment type based on equipment model year and horsepower bin. Where an exact model year and/or horsepower bin match did not exist, an alternate model year/horsepower bin combination was selected to look up emission factors. Electric units are assigned an EF of 0.

³ Equipment that do not meet criteria for GSE as specified in the MOU were not included in the fleet-averaged emission factor calculations. These pieces of equipment are shown in this table, but do not have emissions calculations as shown by "N/A". Examples of equipment that do not meet MOU GSE criteria include vehicles licensed by the DMV for on-road usage (designated as "N/A - Onroad"), equipment with a rating less than 25 horsepower (designated as "N/A - < 25 horsepower"), and equipment exempt as part of a low-usage exemption (designated as "N/A - Low Use Exemption"). Regulatory guidance for these examples are cited below.

^a The CARB LSI regulation's definition for airport GSE does not include those categories of GSE equipment that are designated and licensed for on-road use. These pieces of equipment are not subject to the requirements of the LSI regulation. Available at: <https://ww2.arb.ca.gov/sites/default/files/classic/msprog/offroad/orspark/faqs/lsifaqagse.pdf>. Accessed: June 2025

^b The CARB Offroad Diesel (ORD) regulation exempts permanent and year-by-year low-use vehicles as defined in CCR § 2449 (e)(7). Available at: <https://ww2.arb.ca.gov/sites/default/files/2019-03/finalregorder-dec2011.pdf>. Accessed: June 2025.

^c The CARB LSI regulation's definition for airport GSE does not include those categories of GSE equipment that are less than 25 horsepower, per CCR § 2775 (a)(1). Available at: <https://ww2.arb.ca.gov/sites/default/files/classic/msprog/offroad/orspark/largesparkappa-clean.pdf>. Accessed: June 2025.

Table 4. JWA 2017 and 2024 GSE Inventory

John Wayne Airport MOU

Santa Ana, California

Fuel Type	Breakdown	2017	2024 GSE Inventory³
Diesel ^{1,4}	Tier 0	11	2
	Tier 1	21	5
	Tier 2	4	1
	Tier 3	7	5
	Tier 4 Interim	3	4
	Tier 4 Final	11	50
	Total Count	57	67
Electric	Total Count	96	157
Gasoline/Propane ²	MY <2001	12	5
	MY 2001 - 2006	2	2
	MY 2007 - 2009	1	3
	MY >=2010	16	38
	Total Count	31	48
Total Equipment		184	272

Notes:

¹ If diesel engine tier information was not provided by the owner/operator, tier was assumed to be in line with CARB's Non-road Diesel Engine Certification Tier Chart based on MY and HP. Available at: <https://ww2.arb.ca.gov/resources/documents/non-road-diesel-engine-certification-tier-chart>.

² Gasoline/propane-fueled equipment are broken down according to model years specified in the Off-Road Large Spark-Ignition (LSI) Engine regulations. Available at: <https://ww2.arb.ca.gov/large-spark-ignition-engine-regulatory-and-certification-documents>.

³ These counts reflect GSE equipment items that remain in use as of 12/31/2024. On-road equipment units are excluded from these counts.

⁴ Equipment with an engine power rating lower than 50 HP were previously reported as Tier 0. However, for CY 2024 they have been assigned tiers based on EPA Nonroad Compression-Ignition Engines: Exhaust Emission Standards. Available at: <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockkey=P100OA05.pdf>.

Table 5. Commercial Jet Fuel Delivery Truck Reporting Data

John Wayne Airport MOU

Santa Ana, California

MOU Obligation ^{1,2}	Description	Quantity	Units
B.1	Total Number of Routine and Non-Routine Truck Trips in 2024	66	trips
B.2	Total Amount of Jet Fuel Delivered by Truck in 2024	449,841	gallons
	Total Amount of Jet Fuel Delivered by Pipeline in 2024	72,520,276	gallons
B.3	Total Fuel Delivery Truck VMT in 2024	3,960	vehicle-miles
B.4	Annual NOx Running Exhaust Emissions	21.3	lb/yr
	Annual VOC Running Exhaust Emissions	0.2	lb/yr
	Daily NOx Running Exhaust Emissions ³	0.1	lb/day
	Daily VOC Running Exhaust Emissions ³	0.0	lb/day

Notes:¹ Additional calculation details for MOU obligations B.1, B.3, and B.4 are included in Table 5.² Additional calculation details for MOU obligations B.2 are included in Table 4.³ Average daily emissions were calculated assuming operation for 365 days in a year. Note that deliveries by truck for the Commercial Fuel Farm did not occur during all months in 2024 as the facility fully transitioned to delivery by pipeline starting in September 2020.

Table 6. Commercial Jet Fuel Delivery Truck Fuel Delivery Inventory

John Wayne Airport MOU

Santa Ana, California

Month	Commercial Fuel Farm Fuel		Fixed Base Operator Fuel¹
	Total Fuel Delivered by Pipeline (gallons)	Total Fuel Delivered by Truck (gallons)	Total Fuel Delivered by Truck (gallons)
January	5,614,444	0	30,128
February	5,316,405	0	30,669
March	6,661,789	0	25,480
April	6,405,904	0	21,081
May	6,064,147	0	28,025
June	6,205,128	0	49,621
July	6,499,707	0	55,164
August	7,038,002	0	50,693
September	5,666,138	0	46,069
October	5,585,164	0	42,516
November	5,792,976	0	38,332
December	5,670,472	0	32,063
Total	72,520,276	0	449,841

Notes:

¹ The volume of fuel for Fixed Base Operator Fuel reflects the volume of fuel actually sold to the commercial airline for use in commercial passenger aviation operations.

Table 7a. Commercial Jet Fuel Delivery Truck Emissions Inventory
 John Wayne Airport MOU
 Santa Ana, California

Commercial Fuel Farm Fuel Delivery Truck Information ¹						Total Round Trips	One-Way Trip Length (mi/trip)	Total Annual VMT (mi)	Running Exhaust Emissions (lbs/year)	
Month	Make/Model	Year	Fuel Type	NOx Emission Factor (g/mile)	ROG Emission Factor (g/mile)				NOx	ROG
January	NO TRUCKS	N/A	N/A	0.00	0.00	0	0	0	0.0	0.0
February	NO TRUCKS	N/A	N/A	0.00	0.00	0	0	0	0.0	0.0
March	NO TRUCKS	N/A	N/A	0.00	0.00	0	0	0	0.0	0.0
April	NO TRUCKS	N/A	N/A	0.00	0.00	0	0	0	0.0	0.0
May	NO TRUCKS	N/A	N/A	0.00	0.00	0	0	0	0.0	0.0
June	NO TRUCKS	N/A	N/A	0.00	0.00	0	0	0	0.0	0.0
July	NO TRUCKS	N/A	N/A	0.00	0.00	0	0	0	0.0	0.0
August	NO TRUCKS	N/A	N/A	0.00	0.00	0	0	0	0.0	0.0
September	NO TRUCKS	N/A	N/A	0.00	0.00	0	0	0	0.0	0.0
October	NO TRUCKS	N/A	N/A	0.00	0.00	0	0	0	0.0	0.0
November	NO TRUCKS	N/A	N/A	0.00	0.00	0	0	0	0.0	0.0
December	NO TRUCKS	N/A	N/A	0.00	0.00	0	0	0	0.0	0.0
Total						0		0	0.0	0.0

Notes:
¹ Data is based on information provided by fuel providers. There were no commercial truck deliveries to JWA in 2024.

Constants:
 0 Commercial Fuel Farm One-Way Delivery Trip Length (mi)

Abbreviations:
 HHDT - heavy heavy-duty truck ROG - reactive organic gases
 lb - pound VMT - vehicle miles travelled
 NO_x - oxides of Nitrogen

Table 7b. Fixed Base Operator Jet Fuel Delivery Truck Emissions Inventory

John Wayne Airport MOU
Santa Ana, California

Fixed Base Operator (FBO) Fuel Delivery Truck Information ¹						Total Round Trips for Commercial Operation Fuel Delivery ³	One-Way Trip Length (mi/trip) ⁴	Total Annual VMT ⁴ (mi)	Running Exhaust Emissions ⁵ (lbs/year)	
Month	Make/Model	Year	Fuel Type	NOx Emission Factor ² (g/mile)	ROG Emission Factor ² (g/mile)				NOx	ROG
January	PETERBILT DS TRACTOR	Varies (2018, 2016, 2013, etc.)	Diesel	2.44	0.02	4	30	240	1.3	0.0
February	PETERBILT DS TRACTOR	Varies (2018, 2016, 2013, etc.)	Diesel	2.44	0.02	5	30	300	1.6	0.0
March	PETERBILT DS TRACTOR	Varies (2018, 2016, 2013, etc.)	Diesel	2.44	0.02	4	30	240	1.3	0.0
April	PETERBILT DS TRACTOR	Varies (2018, 2016, 2013, etc.)	Diesel	2.44	0.02	3	30	180	1.0	0.0
May	PETERBILT DS TRACTOR	Varies (2018, 2016, 2013, etc.)	Diesel	2.44	0.02	4	30	240	1.3	0.0
June	PETERBILT DS TRACTOR	Varies (2018, 2016, 2013, etc.)	Diesel	2.44	0.02	7	30	420	2.3	0.0
July	PETERBILT DS TRACTOR	Varies (2018, 2016, 2013, etc.)	Diesel	2.44	0.02	8	30	480	2.6	0.0
August	PETERBILT DS TRACTOR	Varies (2018, 2016, 2013, etc.)	Diesel	2.44	0.02	7	30	420	2.3	0.0
September	PETERBILT DS TRACTOR	Varies (2018, 2016, 2013, etc.)	Diesel	2.44	0.02	7	30	420	2.3	0.0
October	PETERBILT DS TRACTOR	Varies (2018, 2016, 2013, etc.)	Diesel	2.44	0.02	6	30	360	1.9	0.0
November	PETERBILT DS TRACTOR	Varies (2018, 2016, 2013, etc.)	Diesel	2.44	0.02	6	30	360	1.9	0.0
December	PETERBILT DS TRACTOR	Varies (2018, 2016, 2013, etc.)	Diesel	2.44	0.02	5	30	300	1.6	0.0
Total						66	-	3,960	21.3	0.2

Notes:

¹ Data is based on information provided by fuel providers.

² Fleet-averaged emission factors for Calendar Year 2024 were obtained from EMFAC2017 for HHDT trucks in Orange County for truck deliveries that did not have a model year specified. If the fuel provider provided details on the model year (e.g., 2016-2021), the fleet-averaged emission factors were obtained from EMFAC2017 for those specified model years in the calendar year 2024.

³ The number of round trips associated with fuel truck delivery for commercial airline operations supported by the FBO is calculated as the number of monthly fuel deliveries received by the FBO multiplied by the monthly percentage of fuel volume sold by the FBO to the commercial airline (rounded up for conservativeness).

⁴ VMT was calculated based on the total number of round trips that occurred in 2024 and the supplier-specific trip length. One-way trip distances to/from JWA are provided by the fuel providers. The VMT was calculated assuming two one-way trips for every single round trip to account for travel to/from the airport.

⁵ Emissions were calculated using annual VMT and EMFAC2017 emission factors in g/mile for HHDT.

Constants:

30 Fixed Base Operator One-Way Delivery Trip Length (mi)

Abbreviations:

FBO - Fixed Base Operator

HHDT - heavy heavy-duty truck

lb - pound

NO_x - oxides of Nitrogen

ROG - reactive organic gases

VMT - vehicle miles travelled

Table 8. Parking Shuttle Bus Electrification Reporting Data

John Wayne Airport MOU Update
Santa Ana, California

Shuttle Bus Inventory (B.1)								
B.1.a	B.1.b	B.1.c	B.1.d	B.1.e	B.1.f	B.1.g	B.1.g	B.1.h
Vehicle Identification Number ¹	Vehicle Model Year	Vehicle GVWR	Bus Engine Model Year	Power Rating (hp)	Fuel Type	Odometer Reading Start (January 2024) ²	Odometer Reading Finish (June 2024) ²	Vehicle Miles Travelled ²
1FDGF5GY5GEC05215	2017	21,206	2017	362	CNG	215,646	232,304	16,658
1FDGF5GY7GEC05216	2017	21,206	2017	362	CNG	204,425	227,020	22,595
1FDGF5GYXGEC05226	2017	21,206	2017	362	CNG	224,789	251,679	26,890
1FDGF5GY1GEC05227	2017	21,206	2017	362	CNG	231,533	259,951	28,418
1FDGF5GY3GEC05228	2017	21,206	2017	362	CNG	244,999	269,379	24,380
1FDGF5GY5GEC05229	2017	21,206	2017	362	CNG	145,431	145,431	0
1FDFE4FSHHDC49188	2017	14,600	2017	362	CNG	185,280	213,336	28,056
1FDFE4FS1HDC49189	2017	14,600	2017	362	CNG	186,508	209,550	23,042
1FDFE4FSXHDC49191	2017	14,600	2017	362	CNG	161,542	181,012	19,470
1FDFE4FS1HDC49192	2017	14,600	2017	362	CNG	164,486	187,916	23,430
1FDFE4FS3HDC49193	2017	14,600	2017	362	CNG	133,600	145,830	12,230
1FDFE4FS9HDC49196	2017	14,600	2017	362	CNG	159,664	175,841	16,177
1FDFE4FS0DDA89364	2013	14,600	2013	362	CNG	128,335	130,752	2,417
Vehicle Identification Number ¹	Vehicle Model Year	Vehicle GVWR	Bus Engine Model Year	Power Rating (hp)	Fuel Type	Odometer Reading Start (July 2024) ²	Odometer Reading Finish (April 2025) ²	Scaled Vehicle Miles Travelled ²
15GGD2717D1182947	2013	42,540	2013	280	CNG	542,200	577,316	21,070
15GGD2714E1182972	2013	42,540	2013	280	CNG	494,011	531,096	22,251
15GGD2713D1182962	2013	42,540	2013	280	CNG	538,096	574,900	22,082
1FDAF5GY1HEE21960	2017	18,000	2017	362	CNG	187,300	206,739	11,663
1FDAF5GY5HEE21959	2017	18,000	2017	362	CNG	192,412	210,412	10,800
1FDFE4FS2DDA28825	2013	14,500	2013	255	Propane	239,467	257,467	10,800
7JZTG13J3ML000518	2021	38,000	2021	338	ELECTRIC	0	2,010	1,206
7JZTG13J5ML000519	2021	38,000	2021	338	ELECTRIC	50	636	352
7JZTG13J1ML000520	2021	38,000	2021	338	ELECTRIC	0	5,390	3,234
7JZTG13J2NL000673	2021	38,000	2021	338	ELECTRIC	100	9,582	5,689
7JZTG13J4NL000674	2021	38,000	2021	338	ELECTRIC	200	8,380	4,908
Total VMT (miles/year)³								357,818

Shuttle Bus Emissions Inventory (B.2) ⁴	
NOx Running Exhaust Emissions (lbs/year)	333.8
ROG Running Exhaust Emissions (lbs/year)	62.4
NOx Running Exhaust Emissions (lbs/day)	0.9
ROG Running Exhaust Emissions (lbs/day)	0.2

Table 8. Parking Shuttle Bus Electrification Reporting Data

John Wayne Airport MOU Update
Santa Ana, California

Shuttle Bus Replacement (B.3) ⁵								
Replacement Category (Replaced Bus or Replacement Bus)	Vehicle Identification Number	Vehicle Model Year	Vehicle GVWR	Bus Engine Model Year	Power Rating (HP or kW)	Fuel Type	Odometer Reading	Vehicle Miles Travelled
Replaced Bus	1FDGF5GY5GEC05215	2017	21,206	2017	362	CNG	232,304	16,658
Replaced Bus	1FDGF5GY7GEC05216	2017	21,206	2017	362	CNG	227,020	22,595
Replaced Bus	1FDGF5GYXGEC05226	2017	21,206	2017	362	CNG	251,679	26,890
Replaced Bus	1FDGF5GY1GEC05227	2017	21,206	2017	362	CNG	259,951	28,418
Replaced Bus	1FDGF5GY3GEC05228	2017	21,206	2017	362	CNG	269,379	24,380
Replaced Bus	1FDGF5GY5GEC05229	2017	21,206	2017	362	CNG	145,431	0
Replaced Bus	1FDFE4FSHHDC49188	2017	14,600	2017	362	CNG	213,336	28,056
Replaced Bus	1FDFE4FS1HDC49189	2017	14,600	2017	362	CNG	209,550	23,042
Replaced Bus	1FDFE4FSXHDC49191	2017	14,600	2017	362	CNG	181,012	19,470
Replaced Bus	1FDFE4FS1HDC49192	2017	14,600	2017	362	CNG	187,916	23,430
Replaced Bus	1FDFE4FS3HDC49193	2017	14,600	2017	362	CNG	145,830	12,230
Replaced Bus	1FDFE4FS9HDC49196	2017	14,600	2017	362	CNG	175,841	16,177
Replaced Bus	1FDFE4FS0DDA89364	2013	14,600	2013	362	CNG	130,752	2,417
Replacement Bus	15GGD2717D1182947	2013	42,540	2013	280	CNG	577,316	21,070
Replacement Bus	15GGD2714E1182972	2013	42,540	2013	280	CNG	531,096	22,251
Replacement Bus	15GGD2713D1182962	2013	42,540	2013	280	CNG	574,900	22,082
Replacement Bus	1FDAF5GY1HEE21960	2017	18,000	2017	362	CNG	206,739	11,663
Replacement Bus	1FDAF5GY5HEE21959	2017	18,000	2017	362	CNG	210,412	10,800
Replacement Bus	1FDFE4FS2DDA28825	2013	14,500	2013	255	Propane	257,467	10,800
Replacement Bus	7JZTG13J3ML000518	2021	38,000	2021	338	ELECTRIC	2,010	1,206
Replacement Bus	7JZTG13J5ML000519	2021	38,000	2021	338	ELECTRIC	636	352
Replacement Bus	7JZTG13J1ML000520	2021	38,000	2021	338	ELECTRIC	5,390	3,234
Replacement Bus	7JZTG13J2NL000673	2021	38,000	2021	338	ELECTRIC	9,582	5,689
Replacement Bus	7JZTG13J4NL000674	2021	38,000	2021	338	ELECTRIC	8,380	4,908

Notes:

¹ Shuttles reported in the shuttle bus inventory represent shuttles that were in operation at JWA in CY 2024.

² In CY 2024, the shuttle bus vendor contract expired and a new vendor began operation on July 1, 2024. Mileage for the previous shuttle bus vendor represents the mileage driven between January 1st, 2024 through June 30th, 2024. Mileage for the new shuttle bus vendor is calculated based on the odometer start readings on July 1st, 2024 through end readings taken in April 2025, as end-of-year odometer readings were not recorded. Mileage recorded in this period was scaled to estimate mileage traveled through December 31st, 2024.

³ In CY 2024, electric buses purchased by John Wayne Airport and operated by the new shuttle bus vendor were periodically ran for maintenance and warranty purposes. No mileage incurred in CY 2024 is associated with standard shuttling operations due to bus charging limitations on-site.

⁴ Additional calculation details for the shuttle bus emissions inventory can be referenced in Table 9.

⁵ Replaced buses indicate buses that were operated by the previous shuttle bus vendor, and replacement buses indicate those which were brought in and operated by the new shuttle bus vendor.

Table 9. Parking Shuttle Bus Electrification Emissions Inventory Summary

John Wayne Airport MOU Update

Santa Ana, California

	Quantity
Total Shuttle Bus VMT in 2024 ¹	342,429
NOx Emission factor (g/mile) ²	0.442
ROG Emission factor (g/mile) ²	0.083
NOx Running Exhaust Emissions (lbs/year)	333.8
ROG Running Exhaust Emissions (lbs/year)	62.4
NOx Running Exhaust Emissions (lbs/day) ³	0.91
ROG Running Exhaust Emissions (lbs/day) ³	0.171

Notes:

¹ Annual Shuttle Bus VMT in 2024 is provided by JWA and does not include VMT from electric vehicles.

² Exhaust Emission Factors are obtained from EMFAC2017 assuming a vehicle category of Urban Bus with CNG fuel and an average travel speed of 25 mph. CNG fuel was also used as an approximation for propane emission factors. NOx and ROG emission factors are calculated based on the average emission factor of all shuttle buses operated in 2024. Emission factor is weighted based on the vehicle miles travelled by each respective model year. Idling, starting, hotsoak, running, resting, and diurnal loss emission factors were zero in EMFAC2017 for Urban Bus.

³ Average daily emissions were calculated assuming operation for 365 days in a year.

Abbreviations:

CNG - compressed natural gas

EMFAC - California Air Resources Board Emissions Factor Model

g - gram

lb - pound

mph - miles per hour

NOX - oxides of nitrogen

ROG - Reactive organic gas

VMT - vehicle miles traveled