DRAFT ENGINEERING EVALUATION

Facility ID 202754
Candlestick Point/Bayview Vehicle Triage Center
500 Hunters Point Expressway, San Francisco, CA 94124
Application No. 663096

Background

In October 2021, the City of San Francisco (City) approved the Candlestick Point/ Bayview Vehicle Triage Center (VTC). The City has been operating the VTC/Low Barrier Navigation Center since January 2022 to provide secure shelter and services to unhoused persons and support their moving to permanent housing. The site includes electrical utilities, but upgrades are needed to provide permanent power to the site. It is expected these upgrades will be completed in the Spring of 2023. To provide temporary power to the VTC, the San Francisco Department of Public Works and Department of Homelessness and Supportive Housing are applying for an Authority to Construct/Permit to Operate for the generators (engines) listed below. The City intends to cease operating the engines once permanent power is established.

S-1 Prime Diesel Engine
Make: John Deere, Model: 6068HFG05, Model Year: 2019
215 bhp, 1.22 MMBTU/hour,
w/ Integral Diesel Oxidation Catalyst & Selective Catalytic Reduction

S-2 Prime Diesel Engine
Make: Isuzu, Model: BR-4HK1X, Model Year: 2018
170.8 bhp, 0.98 MMBTU/hour
w/ Integral Diesel Oxidation Catalyst & Selective Catalytic Reduction

The engines will emit the following criteria pollutants: nitrogen oxides (NOx), carbon monoxide (CO), precursor organic compounds (POC) from unburned fuel, sulfur dioxide (SO_2) and particulate matter ($PM_{2.5}$/PM_{10}). The engines will also emit toxic air contaminants (TACs) as shown in Table 6. As discussed in more detail below, the project will comply with the Air District's project health risk limits in Regulation 2-5-302.

S-1 and S-2 meet the Environmental Protection Agency and California Air Resources Board (EPA/CARB) Final Tier 4 Off-road standard. The engines will burn commercially available California low sulfur diesel fuel. The sulfur content of the diesel fuel will not exceed 0.0015% by weight. Both S-1 and S-2 will be equipped with an integral diesel oxidation catalyst and integral selective catalytic reduction (SCR) to reduce emissions.

This evaluation report will discuss compliance of the project with all applicable rules and regulations.

Emissions

This section lays out the daily and annual emissions for each source. Table 1 below summarizes the daily operating hour limitations and the annual hour limitations for each engine. These operating hours will be used to calculate daily and annual emission rates for each engine.

Table 1. Operating Schedule for S-1 and S-2

Source ID	Maximum Daily Hours (hours/day)	Annual Operating Hours Limit (hours/year)
S-1	24	849
S-2	24	801

For S-1 and S-2, the emission factors for NOx, POC, CO, and Particulate Matter ($PM_{10}/PM_{2.5}$) were obtained from the EPA Annual Certification Data for Nonroad Compression Ignition Engines. The SO_2 emission factors are from AP-42, Fifth Edition, Volume I, Chapter 3: Stationary Internal Combustion Sources, Table 3.4-1 Gaseous Emission Factors for Large Stationary Diesel and All Stationary Dual-Fuel Engines.

Table 2. Annual and Daily Emissions from S-1

Pollutant	Emission Factor (g/kW-hour)	Emission Factor (g/bhp-hour)	Max Daily Emissions (lb/day)	Annual Emissions (lbs/year)	Annual Emissions (tons/year)
NOx	0.06	0.0447	0.51	18.01	0.0090
POC	0.02	0.0149	0.17	6.00	0.0030
CO	0.01	0.0075	0.085	3.00	0.0015
$PM_{10}/PM_{2.5}$[1]	0.02	0.0149	0.17	6.00	0.0030
SO_2	based on concentration[2]		0.062	2.21	0.0011

Basis:

- Annual emissions: Operation for 849 hours for S-1
- Max daily emissions: 24-hour operation
- Emissions from EPA Engine Family KJDXL06.8312 for S-1
- Emission factors for NOx, POC, CO, and PM are assumed to be after CARB certified abatement, per CARB Executive Order U-R-004-0580
- [1] Conservative Assumption: All PM emissions are $PM_{2.5}$
- [2] SO_2 emission factor from AP-42 Table 3.4-1, SO_2 (15 ppm) = 0.00809*0.0015 lb SO_2/bhp-hour

Table 3. Annual and Daily Emissions from S-2

Pollutant	**Emission Factor** (g/kW-hour)	**Emission Factor** (g/bhp-hour)	**Max Daily Emissions** (lb/day)	**Annual Emissions** (lbs/year)	**Annual Emissions** (tons/year)
NOx	0.12	0.0895	0.81	26.99	0.013
POC	0.01	0.0075	0.067	2.25	0.0011
CO	0.10	0.0746	0.67	22.49	0.011
$PM_{10}/PM_{2.5}$[1]	0.02	0.0149	0.13	4.50	0.0022
SO_2	based on concentration[2]		0.05	1.66	0.00083

Basis:

- Annual emissions: Operation for 801 hours for S-2
- Max daily emissions: 24-hour operation
- Emissions from EPA Engine Family JSZXL05.2RXB for S-2
- Emission factors for NOx, POC, CO, and PM are assumed to be after CARB certified abatement, per CARB Executive Order U-R-006-0454
- [1] Conservative Assumption: All PM emissions are $PM_{2.5}$
- [2] SO_2 emission factor from AP-42 Table 3.4-1, SO_2 (15 ppm) = 0.00809*0.0015 lb SO_2/bhp-hour

Both S-1 and S-2 will include an integral selective catalytic reduction (SCR), which will abate NO_X emissions. NO_x in the exhaust reacts with ammonia and oxygen in the presence of a catalyst to form nitrogen and water. However, there will be a small amount of ammonia that will not react and will slip through the SCR. Below are estimated Ammonia emissions from this project.

Table 4. Emissions from Ammonia Slip for S-1 & S-2

Source #	**Ammonia Slip Conc.** (ppmv @ 15% O_2)	**Ammonia Slip Conc.** (ppmv @ 0% O_2)	**Actual Temp.** (°F)	**Actual Exhaust Flow Rate** (acfm)	**Dry Standard Exhaust Flow Rate** (dscfm)	**Hourly Emission Rate** (lb/hour)	**Annual Emission Rate** (lbs/year)
S-1	10	35.42	685	812	171.46	0.016	13.68
S-2	10	35.42	658	512	110.73	0.010	8.33

Basis:

- Annual emissions: Operation for 849 hours for S-1 and 801 hours for S-2
- It is assumed that the exhaust water content is 12.5% by weight
- It is assumed that the exhaust is at standard pressure
- Volumetric concentrations were corrected to 0% O_2 from 15% O_2
- The exhaust flow rates were corrected to 0% O_2 from 10% O_2

Cumulative Increase

Table 5 summarizes the cumulative increase in criteria pollutant emissions that will result from this application.

Table 5. Cumulative Emissions Increase

Pollutant	**Existing Emissions Post 4/5/91** (tons/year)	**Application Emissions** (tons/year)	**Cumulative Emissions** (tons/year)
NOx	0.000	0.022	0.022
POC	0.000	0.004	0.004
CO	0.000	0.013	0.013
$PM_{10}/PM_{2.5}$	0.000	0.005	0.005
SO_2	0.000	0.002	0.002

Toxic Air Contaminant Emissions

The District's regulation of TACs is laid out in Regulation 2, Rule 5. As discussed in the following sections, this rule addresses requirements related to preparing health risk assessments, when Best Available Control Technology for Toxics (TBACT) is required, and project health risk limitations.

The relevant toxic air contaminants (TACs) for S-1 and S-2 are Diesel Particulate Matter (Diesel PM) and Ammonia. All PM_{10} emissions are assumed to be Diesel PM. Table 6 summarizes the TAC emissions from S-1 and S-2.

Table 6. Toxic Air Contaminant Review for Diesel Engines S-1 & S-2

Source #	**TAC**	**CAS**	**Hourly Emissions** (lb/hour)	**Acute Trigger Level** (lbs/hour)	**Annual Emissions** (lbs/year)	**Chronic Trigger Level** (lbs/year)	**Exceeds Trigger Level?**
S-1	**Diesel PM**	**N/A**	**-**	**-**	**6.00E+00**	**2.60E-01**	**Yes**
	Ammonia	7667-41-7	1.61E-02	1.40E+00	1.37E+01	7.70E+03	No
S-2	**Diesel PM**	**N/A**	**-**	**-**	**4.50E+00**	**2.60E-01**	**Yes**
	Ammonia	7667-41-7	1.04E-02	1.40E+00	8.33E+00	7.70E+03	No
Project	**Diesel PM**	**N/A**	**-**	**-**	**1.05E+01**	**2.60E-01**	**Yes**
	Ammonia	7667-41-7	2.65E-02	1.40E+00	2.20E+01	7.70E+03	No

Notes:

1. Annual emissions are based on a maximum of 849 hours per year for S-1 and 801 hours per year for S-2.

As shown in Table 6 above, the project emissions of Diesel PM exceed the chronic trigger level. Therefore, a health risk assessment (HRA) is required for this project.

Health Risk Assessment (HRA)

Due to project emissions of Diesel PM exceeding the chronic trigger level, an HRA is required for this project. There were no other related projects permitted in the last five

years. The project is located within an overburdened community (OBC) as defined in Regulation 2-1-243, and must therefore comply with a cancer risk limitation of no more than 6.0 in a million.

The site is expected to have permanent power in Spring of 2023, at which point the City intends to cease operating the engines. Pursuant to BAAQMD Air Toxics Control Programs Health Risk Assessment Guidelines, December 2021, Section 2.1.3.2, a three (3) year exposure period is the minimum exposure period recommended by the Air District for short-term projects lasting three years or less. Thus, due to the short duration of the project, the HRA was modeled with an exposure period of three (3) years. The results of the initial HRA found that cancer risk from the project would exceed 6.0 in a million. Air District staff then discussed other options with the applicant to find engine locations and stack outlet heights that would decrease the cancer risk to an acceptable level. The applicant also later accepted reduced annual hours limits for S-1 and S-2. The final HRA results are based upon 849 hours/year for S-1, 801 hours/year for S-2, relocating both diesel engines to the southern boundary of the East Lot, and raising each exhaust gas stack outlet (P-1 & P-2) to 15 feet above the ground. The final HRA results are summarized in Tables 7 & 8 below.

Table 7. Project HRA Results

Receptor	Cancer Risk	Chronic Hazard Index	Acute Hazard Index
Resident	1.6 in a million	0.00091	N/A
[1]PMI (1-hour)	N/A	N/A	0.0011

Note:
1. PMI stands for "Point of Maximum Impact".

Table 8. Source Health Risks

Source ID	Cancer Risk
S-1	0.98 in a million
S-2	0.95 in a million

The results from the health risk screening analysis indicate that the maximum project cancer risk (resident) is estimated at 1.6 in a million, the maximum project chronic hazard index (resident) is estimated at 0.00091, and the maximum acute hazard index (PMI) is 0.0011. Worker risk estimates were not included because the nearest offsite worker is located farther than 1,000 feet from the project. The sum of individual source cancer risks in Table 8 differs from the project cancer risk in Table 7 because each source's individual cancer risk is the maximum risk from that source at any receptor location, while the project cancer risk is the maximum risk at any receptor location from both sources operating simultaneously.

The HRA results deem the project is in compliance with project risk requirements as recommended, limiting operation by permit condition to 849 hours/year for S-1 and 801 hours/year for S-2. To ensure compliance with the project risk requirement, both S-1 and

S-2 will be conditioned to operate in the applicant-proposed locations on the southern boundary of the East Lot (see Attachment A for source locations). Both S-1 and S-2 will also be required to operate with a stack outlet height of 15 feet. Additionally, the two sources will be prohibited from operating any more than three (3) years. The three (3) year limit on operation will be implemented because the HRA was performed with emissions for a three (3) year exposure period, as described above. The three (3) year limit will be reflected in the permit conditions as a final operation date of three (3) years after the initial day of start-up. See HRA report. However, as stated, the City intends to cease operating the engines after permanent power is established, which is expected in Spring 2023.

TBACT

In accordance with the District's Regulation 2-5-301, TBACT is required for any new or modified source with a cancer risk greater than 1.0 in a million and/or a chronic hazard index greater than 0.20. As shown in Table 8, S-1 and S-2 do not require TBACT because the estimated source cancer risk for each source is less than 1.0 in a million. Additionally, the chronic hazard index does not exceed 0.20. As shown in Table 7, the maximum chronic hazard index for the project is 0.00091, therefore the chronic hazard index for each source would be well below 0.20.

Project Health Risk Limits

Pursuant to Regulation 2-5-302, a project's risk cannot exceed 6.0 in a million cancer risk in an overburdened community (OBC) or a chronic or acute hazard index of 1.0. As shown in Table 7, the project cancer risk is 1.6 in a million, the chronic hazard index is 0.00091, and the acute hazard index is 0.0011. Because these are all well below the risk limitations, the project complies with the District's Regulation 2-5-302 project health risk requirements.

Best Available Control Technology (BACT)

In accordance with Regulation 2-2-301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, NOx, CO, SO_2, PM_{10}, or $PM_{2.5}$.

The maximum daily emissions of any criteria pollutant from S-1 or S-2 will be below 10 lbs/day, as shown in Tables 2 and 3. Therefore, BACT is not required.

Offsets

Per Regulations 2-2-302 and 2-2-303, offsets must be provided if, after a new or modified source is constructed, a facility has the potential to emit (PTE) more than 10 tons/year of POC or NOx or 100 tons/year SO2, PM_{10}, or $PM_{2.5}$. As demonstrated by the summary of PTE in Table 9, offsets are not required for this application.

Table 9. Potential to Emit for Facility ID 202754

Pollutant	Existing Annual PTE Emissions (ton/year)	Application Annual PTE (ton/year)	Facility Annual PTE (ton/year)	Offset Requirement (ton/year)	Offset Required?
POC	0.000	0.004	0.004	10	N
NOx	0.000	0.022	0.022	10	N
$PM_{10}/PM_{2.5}$	0.000	0.005	0.005	100	N
SO2	0.000	0.002	0.002	100	N

Note:

1. $PM_{2.5}$ is a subset of PM_{10} and they have been included together since they are cumulatively under the offsets trigger level.

Since the facility permitted levels are below the offset trigger levels specified in Regulation 2-2, offsets are not required.

Statement of Compliance

The owner/operator is expected to comply with all applicable requirements. Key requirements are listed below:

Airborne Toxic Control Measure for Stationary Compression Ignition Engines
ATCM, 5/19/2011, section 93115, title 17, CA Code of Regulations

District Rules
Regulation 6-1-303 (*Ringelmann No. 2 Limitation*)
Regulation 6-1-310 *(Particulate Weight Limitation)*
Regulation 9-1-301 (*Limitations on Ground Level Concentrations of SO_2*)
Regulation 9-8 (*NOx and CO from Stationary Internal Combustion Engines*)
Section 9-8-304 – *Emission Limits – Compression-Ignited Engines (S-1 & S-2)*
Section 9-8-502 – *Recordkeeping*
Section 9-8-503 – *Quarterly Demonstration of Compliance*

Table 10. Regulation 9-8 Emissions Compliance Summary

Source #	Engine Ignition Type	Engine Output (bhp)	Applicable Reg 9-8 Section	Emission Factors (ppmv @ 15% O_2)		Reg 9-8 Emission Limit (ppm @ 15% O_2)		Complies with Reg 9-8?
				NOx	CO	NOx	CO	
1	Compression	215	9-8-304.2	4.5	1.2	110	310	Yes
2	Compression	170.8	9-8-304.1	8.9	12.2	180	440	Yes

As shown in Table 10, the EPA certified emission factors for the engines will meet the applicable emission limits in Regulation 9, Rule 8.

California Environmental Quality Act (CEQA)
In October 2021, the City approved the VTC and determined it is not subject to CEQA pursuant to Assembly Bill 101, California Government Code Sections 65660 – 65668 (AB 101).

The District finds that pursuant to AB 101, this project is a "use by right." It is an action the District is taking to "otherwise approve" a Low Barrier Navigation Center as provided in Government Code section 65660(b). The project is a necessary component of the VTC, which is a Low Barrier Navigation Center as defined by AB 101. It is needed to provide temporary power to the VTC to ensure the health, welfare, and safety of those sheltered by the VTC until Pacific Gas & Electric completes the necessary upgrades to existing electrical utilities at the site. Accordingly, the project is ministerial, and CEQA does not apply.

Further, the project is exempt from CEQA under CEQA Guidelines section 15301, which exempts projects involving a negligible expansion of an existing use. Since the beginning of the COVID-19 pandemic, unhoused people in approximately 100 to 150 vehicles lived in the vicinity of the Candlestick Point State Recreation Area, and since January 2022, the site has been operating as an authorized Low Barrier Navigation Center. The project would support and facilitate this existing use by enabling the City to provide temporary power to the VTC. This amounts to no more than a negligible expansion in the existing Low Barrier Navigation Center use because the ongoing operations, including providing shelter, security, sanitary facilities, and other critical services and resources, will not expand or change as a result of the project.

New Source Performance Standards (NSPS) for S-1 & S-2
40 CFR 60, Subpart IIII (*Stationary Compression Ignition Internal Combustion Engines*)

Both S-1 & S-2 have an engine displacement of less than 10 liters per cylinder and were manufactured after 2007. Therefore, per Section 60.4204(b), they must both meet the emission standards for new Compression Ignition (CI) in Section 60.4201, which references emission standards in 40 CFR 1039.

Section 1039.101(b) – *Emission Standards for steady-state testing (after 2014 model year)*

EPA certified emission standards for S-1 and S-2 comply with Section 1039.101(b) emission standards for the applicable engine power class. The following applicable standards for the power class for S-1 and S-2 apply:

S-1: Between 130 kW and 560 kW

PM:	0.02 g/kW-hr
NOx:	0.40 g/kW-hr
NMHC:	0.19 g/kW-hr
CO:	3.5 g/kW-hr

S-2: Between 56 kW and 130 kW
PM: 0.02 g/kW-hr
NOx: 0.40 g/kW-hr
NMHC: 0.19 g/kW-hr
CO: 5.0 g/kW-hr

Section 1039.105 – *Smoke standards*

Per Section 1039.105(a)(3), engines certified to PM emission standard of 0.07 g/kW-hr or lower are not subject to the smoke emissions standards of Section 1039.105.

Sections 60.4206 and 60.4211(a) require that the owner/operator operate and maintain the engine according to the manufacturer's written instructions or procedures developed by the owner or operator that are approved by the engine manufacturer, over the entire life of the engine. The owner/operator is expected to comply with this requirement.

Section 60.4207(b) requires that by October 1, 2010, the owner/operator must use fuel that complies with 40 CFR 80.510(b). This means that the fuel must have a maximum sulfur content of 15 ppm and the same cetane index or aromatic content as above. The owner/operator is expected to comply with this requirement because CARB diesel fuel, which meets this requirement, must be used in California.

The engines will comply with the requirements of Section 60.4211(c) because they have been certified to meet the emission standards specified in Section 60.4204(b).

National Emissions Standards for Hazardous Air Pollutants (NESHAP)

40 CFR 63, Subpart ZZZZ (*Stationary Reciprocating Internal Combustion Engines (RICE)*)

S-1 and S-2 are new engines at an area source of hazardous air pollutants (HAPs) and must meet the requirements in 40 CFR 60, Subpart IIII (as shown above).

No further requirements apply to these engines under this subpart according to Section 63.5690(c)(1).

Prevention of Significant Deterioration (PSD)
This application is not part of a PSD project as defined in Regulation 2-2.

Public Notification (Regulation 2-1-412)

This project is not within 1,000 feet from the nearest K-12 school, however it is located in an overburdened community (OBC). Therefore, this project is subject to a public notification. A public notice will be sent to all addresses within 1,000 feet of the facility and there will be a 30-day public comment period.

Permit Conditions

Permit Condition #27759 for S-1 & S-2

1. The owner/operator of S-1 and S-2 shall not operate these engines any more than the hours listed below in any consecutive 12-month period.
   S-1 (John Deere, 215 bhp) 849 hours
   S-2 (Isuzu, 170.8 bhp) 801 hours
   [Basis: Cumulative Increase, Regulation 2-5]

2. The owner/operator of S-1 and S-2 shall not operate the engines after three (3) years from their respective date of start-up.
   [Basis: Regulation 2-5]

3. The owner/operator of S-1 and S-2 shall only operate these engines in the locations agreed upon during the application process (the southern boundary of the East Lot) unless written approval is obtained from the Air District to operate the engines in an alternate location. Additionally, the owner/operator of S-1 and S-2 shall not operate these engines unless the exhaust stack outlet is at least 15 feet above the ground for both engines.
   [Basis: Regulation 2-5]

4. The owner/operator of S-1 and S-2 shall only operate these engines if each is equipped with a properly operated and properly maintained non-resettable totalizing meter (with a minimum display capability of 9,999 hours) that measures the hours of operation.
   [Basis: "Stationary Diesel Engine ATCM" section 93115.10(e), title 17, CA Code of Regulations]

5. The owner/operator of S-1 and S-2 shall only operate these engines when each is equipped with a properly maintained and properly operated Diesel Oxidation Catalyst/SCR.
   [Basis: Cumulative Increase]

6. The owner/operator of S-1 and S-2 shall fire these engines exclusively with diesel fuel with sulfur content no greater than 0.0015 wt%.
   [Basis: Cumulative increase; Regulation 9-1]

7. The owner/operator of S-1 and S-2 shall not exceed the following emission limits that are corrected to 15% oxygen, dry basis:
   S-1: 215 bhp diesel engine
   110 ppmv NOx
   310 ppmv CO

   S-2: 170.8 bhp diesel engine
   180 ppmv NOx
   440 ppmv CO

[Basis: Regulation 9-8-304.1, 304.2]

8. To demonstrate compliance with Part 7, the owner/operator shall use a portable analyzer to take NOx and CO emission readings to verify compliance with the applicable emission limits in Part 7 at least once during each calendar quarter in which a source test is not performed. All emission readings shall be taken with the engine operating either at conditions representative of normal operations or conditions specified in the permit to operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations.
   [Basis: Regulation 9-8-503]

9. To determine compliance with the above conditions for each S-1 and S-2, the owner/operator shall maintain the following records and provide all of the data necessary to evaluate compliance with the above conditions:
   a. Total hours of operation of each engine to demonstrate compliance with Part 1.
   b. Total consumption of diesel fuel at each source.
   c. Hours of operation in Part 9a and amount of diesel fuel in Part 9b shall be totaled on a rolling consecutive 12-month basis.
   d. Date of quarterly monitoring conducted per Part 8 and the measured NOx and CO concentration, corrected to 15% oxygen, dry basis.

   The owner/operator shall record all records in a District-approved log. The owner/operator shall retain the records with the equipment for two years, from the date of entry, and make them available for inspection by District staff upon request. These record-keeping requirements shall not replace the record-keeping requirements contained in any applicable District Regulations.
   [Basis: Recordkeeping]

End of Conditions

Recommendation

The District has reviewed the material contained in the permit application for the project and has made a preliminary determination that the project is expected to comply with all applicable requirements of District, state, and federal air quality-related regulations. The preliminary recommendation is to issue an Authority to Construct/Permit to Operate for the equipment listed below. However, the proposed source will be located in an overburdened community (OBC), which triggers the public notification requirements of District Regulation 2-1-412. After the comments are received and taken into consideration, the District will make a final determination on the permit.

I recommend that the District initiate a public notice and consider any comments received prior to taking any final action on issuance of an Authority to Construct/Permit to Operate for the following sources:

S-1 Prime Diesel Engine
Make: John Deere, Model: 6068HFG05, Model Year: 2019
215 bhp, 1.22 MMBTU/hour,
w/ Integral Diesel Oxidation Catalyst & Selective Catalytic Reduction
Permit Condition No. 27759

S-2 Prime Diesel Engine
Make: Isuzu, Model: BR-4HK1X, Model Year: 2018
170.8 bhp, 0.98 MMBTU/hour
w/ Integral Diesel Oxidation Catalyst & Selective Catalytic Reduction
Permit Condition No. 27759

Prepared by: Cameron Fee, Air Quality Engineer I

Date: January 12, 2022

Attachment A: Source Locations

Figure 1: Locations of Stack Outlets for S-1 and S-2