**DRAFT Engineering Evaluation**
**San Mateo Water Quality Control Plant**
**2050 Detroit Drive, San Mateo, California 94404**
**Plant No. 861**
**Application No. 28996**
**Project Description: New Stationary Emergency Diesel Engine-Generator Sets & Publicly Owned Treatment Works Upgrade**

## BACKGROUND

San Mateo Water Quality Control Plant (City of San Mateo) has applied to obtain an Authority to Construct (A/C) and/or Permit to Operate (P/O) for the following equipment:

***New Sources***:

**S-30 Stationary Emergency Diesel Engine-Generator Set**
**Make: Caterpillar, Model: C27, Model Year: 2016**
**1,141 BHp, 7.5 MMBtu/Hr; *Or*,**

**Stationary Emergency Diesel Engine-Generator Set**
**Make: Cummins, Model: QST30, Model Year: 2017**
**1,490 BHp, 7.4 MMBtu/Hr**

**S-31 Stationary Emergency Diesel Engine-Generator Set**
**Make: Caterpillar, Model: C27, Model Year: 2016**
**1,141 BHp, 7.5 MMBtu/Hr; *Or*,**

**Stationary Emergency Diesel Engine-Generator Set**
**Make: Cummins, Model: QST30, Model Year: 2017**
**1,490 BHp, 7.4 MMBtu/Hr**

**S-32 Stationary Emergency Diesel Engine-Generator Set**
**Make: Caterpillar, Model: C27, Model Year: 2016**
**1,141 BHp, 7.5 MMBtu/Hr; *Or*,**

**Stationary Emergency Diesel Engine-Generator Set**
**Make: Cummins, Model: QST30, Model Year: 2017**
**1,490 BHp, 7.4 MMBtu/Hr**

**S-33 Stationary Emergency Diesel Engine-Generator Set**
**Make: Caterpillar, Model: C27, Model Year: 2016**
**1,141 BHp, 7.5 MMBtu/Hr; *Or*,**

**Stationary Emergency Diesel Engine-Generator Set**
**Make: Cummins, Model: QST30, Model Year: 2017**
**1,490 BHp, 7.4 MMBtu/Hr**

**S-110 Preliminary Treatment**
**Influent Injunction Box, Preliminary Screens, Grit Removal, & Fine Screens**
**Dry Weather Effluent Flow Rate: 15.7 Million Gallon Per Day**
**(Averaged Over 3 Consecutive Months During May 1 to October 31)**
**Peak Wet Weather Effluent Flow Rate: 78 Million Gallon Per Day**
**Enclosed and Abated by Odor Control System, A-20**

**S-190 Flow Equalization**
**Flow Equalization Basin, 4.8 Million Gallon Capacity**
**Abated by Iron Salts Dosing System #2, A-21**

***Altered Sources***:

**S-120 Primary Treatment**
**Three (3) 110' Diameter Clarifiers (Common to Secondary Clarifier, S-140)**
**Dry Weather Effluent Flow Rate: 15.7 Million Gallon Per Day**
**(Averaged Over 3 Consecutive Months During May 1 to October 31)**
**Peak Wet Weather Effluent Flow Rate: 78 Million Gallon Per Day**
**Enclosed and Abated by Odor Control System, A-20**

**S-130 Secondary Treatment**
**Biological Nutrient Removal, Dual Use Contact Tank, & Membrane Bioreactor**
**Dry Weather Effluent Flow Rate: 15.7 Million Gallon Per Day**
**(Averaged Over 3 Consecutive Months During May 1 to October 31)**
**Peak Wet Weather Effluent Flow Rate: 78 Million Gallon Per Day**

**S-140 Secondary Clarifier**
**Two (2) 110' Diameter Clarifiers (Common to Primary Treatment, S-120)**
**Operating Only During Wet Weather Conditions**
**Peak Wet Weather Effluent Flow Rate: 78 Million Gallon Per Day**
**Enclosed and Abated by Odor Control System, A-20**

**S-160 Disinfection**
**Chlorine Contact Basin, 60 Million Gallon Per Day Capacity**

***Abatement Devices***:

**A-20 Odor Control System**
**Two (2) Parallel Trains of Bioscrubbers and Carbon Adsorbers**
**Each Train Consisting of One (1) Bioscrubber and One (1) Carbon Adsorber**
**Bioscrubber: 12' Diameter x 27' Height, 49,100 Lb Operating Weight**
**Carbon Adsorber: 12' Diameter x 14' Height, 17,500 lb Total Media Weight**
**29,800 Cubic Feet Per Minute Capacity**

## A-21 Iron Salts Dosing System #2 Consisting of Iron Salt Solution Tank and Injection Metering Pump Minimum Iron Salt Dosing Rate of 20 mg/L

Wastewater Treatment Plant

The City of San Mateo intends to upgrade the facility's wastewater treatment plant (WWTP) by replacing aging systems with more advanced infrastructure. The proposed changes would increase the overall capacity of the WWTP during wet weather conditions, from 40 million gallons per day to 78 million gallons per day, with the overall goal of limiting the discharge of untreated wastewater into the San Francisco Bay. The WWTP dry weather condition capacity will remain the same, at a flowrate of 15.7 million gallon per day determined from 3 consecutive dry weather months from May 1- to October 31. The WWTP upgrade project will include the following:

- Install a new preliminary treatment (S-110), which consists of an influent junction box, preliminary screens, grit removal, and fine screens.

- Upgrade the existing primary treatment (S-120) and secondary clarifier (S-140). S-120 and S-140 will have common clarifiers. During dry weather conditions, three (3) clarifiers will operate as primary treatment. However, during wet weather conditions, two (2) of the three (3) clarifiers will operate as secondary clarifiers.

- Update the existing secondary treatment (S-130). S-130 will consist of a biological nutrient removal system, dual use contact tank, and membrane bioreactor.

- Increase the capacity of the disinfection (S-160).

- Install a new flow equalization basin (S-190). S-190 will provide additional influent wastewater storage during wet weather conditions.

Most emissions from the WWTP are expected from S-110, S-120, and S-140. In order to minimize emissions from the WWTP, the City of San Mateo is proposing to cover S-110, S-120, and S-140 and route the exhaust to an odor control system (A-20). A-20 consists of two (2) parallel abatement trains. Each train consists of a bioscrubber and carbon adsorption vessel, which are configured in series. A-20 is designed to incorporate redundant abatement devices, in the event one of the abatement trains will require maintenance. A-20 can abate emissions through both abatement trains or one abatement train at a time. Although, A-20 will not exceed a maximum exhaust flowrate of 29,800 cfm.

Furthermore, the City of San Mateo is proposing to abate odors from S-190 with an iron salts dosing system (A-21). A-21 consists of an iron salts storage tank and injection metering pump. Dissolved sulfide analysis of the wastewater during dry weather conditions (an event assumed to yield the highest concentration of dissolved sulfides) show that the dissolved sulfide concentration ranges from 2 to 5.5 mg/L. The proposed dosing rate of iron salts will be a minimum of 20 mg/L. The stoichiometry ratio to neutralize dissolved sulfides with iron salts

ranges from 1 to 1.5. Moreover, S-190 will be utilized mainly during wet weather events, which will yield lower concentrations of dissolved sulfide due to dilution. The proposed dosage rate will be adequate to control dissolved sulfides from S-190.

The City of San Mateo has accepted an annual wastewater throughput of 5,730.50 million gallons per year.

Although the City of San Mateo intends to install new sources, update existing sources, and change the WWTP operation, overall emissions from the WWTP are expected to decrease due to the proposed abatement devices.

The criteria pollutants associated with the WWTP are precursor organic compounds (POC) and non-precursor organic compounds (NPOC).

The operation of the WWTP should not pose any health threat to the surrounding community or the public at large.

Emergency Engines

The City of San Mateo is proposing to install four (4) new emergency diesel engine-generator sets (S-30 through S-33). S-30 through S-33 will provide the facility auxiliary power during an emergency as defined by Regulation 9-8-230.

The engines will be able to operate unrestricted during emergency use event. However, the engines' annual maintenance and testing hours will be limited in accordance with the California Air Resources Board (CARB) *"Airborne Toxic Control Measure for Stationary Compression Ignition Engines"* (ATCM). The criteria pollutants associated with the source are nitrogen oxides ($NO_X$), POC, sulfur dioxide ($SO_2$), particulate matter 10 microns in size ($PM_{10}$), particulate matter 2.5 microns in size ($PM_{2.5}$), and carbon monoxide (CO).

The City of San Mateo has two (2) viable options for the emergency engines. Both options meet the Environmental Protection Agency (EPA) Tier 2 emission standards. The engines will burn commercially available CARB low sulfur diesel fuel. The sulfur content of the diesel shall not exceed 0.0015% by weight. The operation of the engines should not pose any health threat to the surrounding community or the public at large.

## WASTEWATER TREATMENT PLANT EMISSION CALCULATIONS

Existing emission calculations were performed using the existing WWTP design and emission factors obtained from the *"80$^{th}$ Percentile Emission Factors – POTW Liquid Processes Emission Factors"* found within *"Chapter 8.2 – Wastewater Treatment Facilities"* of the District's Permit Handbook.

Proposed emission calculations were performed using the new WWTP design, proposed throughput limitations, 2014 influent volatile organic compound (VOC) concentrations, and a provided abatement device efficiency of 85 percent by weight.

The following tables provide an emission summary of the WWTP before and after the completion of the proposed upgrades.

Existing Configuration

| Table 1. Existing Criteria Pollutant Emissions Review<br>Wastewater Treatment Plant, Dry Weather Conditions | | | | | | |
|---|---|---|---|---|---|---|
| **Pollutant** | **Emission Factor[1] (lb/yr) per (MGD)** | **Dry Weather Flowrate[2] (MGD)** | **Hourly Emission Rate[3] (lb/hr)** | **Daily Emission Rate[4] (lb/day)** | **Annual Emission Rate (lb/yr)** | **Annual Emission Rate (ton/yr)** |
| POC[5] | 120.7 | 15.7 | 0.22 | 5.19 | 1,894.99 | 0.947 |
| NPOC[6] | 242.0 | 15.7 | 0.43 | 10.41 | 3,799.40 | 1.900 |

[1] Emission factors are from the *"80th Percentile Emission Factors – POTW Liquid Processes Emission Factors"* obtained from *"Chapter 8.2 – Wastewater Treatment Facilities"* of the District's Permit Handbook.

[2] The initial application submittal identifies that the existing maximum dry weather flowrate is 15.7 MMgal per day (MGD).

[3] Hourly emission rates are based on a 24 hour per day operation.

[4] Daily emission rates are based on a 365 day per year operation.

[5] POC includes Benzene, Chloroform, 1,4-Dichlorobenzene, Toluene, Trichloroethylene, and Xylenes.

[6] NPOC includes Methyl Chloroform, Methylene Chloride, and Perchloroethylene.

| Table 2. Existing Criteria Pollutant Emissions Review<br>Wastewater Treatment Plant, Wet Weather Conditions | | | | | | |
|---|---|---|---|---|---|---|
| **Pollutant** | **Emission Factor[1] (lb/yr) per (MGD)** | **Wet Weather Flowrate[2] (MGD)** | **Hourly Emission Rate[3] (lb/hr)** | **Daily Emission Rate[4] (lb/day)** | **Annual Emission Rate (lb/yr)** | **Annual Emission Rate (ton/yr)** |
| POC[5] | 120.7 | 40 | 0.55 | 13.23 | 4,828.00 | 2.414 |
| NPOC[6] | 242.0 | 40 | 1.11 | 26.52 | 9,680.00 | 4.840 |

[1] Emission factors are from the *"80th Percentile Emission Factors – POTW Liquid Processes Emission Factors"* obtained from *"Chapter 8.2 – Wastewater Treatment Facilities"* of the District's Permit Handbook.

[2] The wet weather flowrate was obtained from the National Pollutant Discharge Elimination System (NPDES) Permit #CA0037541, issued by the San Francisco Bay Regional Water Quality Control Board.

[3] Hourly emission rates are based on a 24 hour per day operation.

[4] Daily emission rates are based on a 365 day per year operation.

[5] POC includes Benzene, Chloroform, 1,4-Dichlorobenzene, Toluene, Trichloroethylene, and Xylenes.

[6] NPOC includes Methyl Chloroform, Methylene Chloride, and Perchloroethylene.

**Table 3. Existing Toxic Air Contaminant Pollutant Emissions Review Wastewater Treatment Plant, Dry Weather Conditions**

| Pollutant (CAS #) | Emission Factor[1] (lb/yr) Per [MGD] | Dry Weather Flowrate[2] (MGD) | Hourly Emission Rate[3] (lb/hr) | Annual Emission Rate (lb/yr) |
|---|---|---|---|---|
| Benzene (71-43-2) | 3.7 | 15.7 | 6.6E-03 | 5.8E+01 |
| Chloroform (67-66-3) | 40 | 15.7 | 7.2E-02 | 6.3E+02 |
| 1,4-Dichlorobenzene (106-46-7) | 5 | 15.7 | 9.0E-03 | 7.9E+01 |
| Methyl Chloroform (71-55-6) | 110 | 15.7 | 2.0E-01 | 1.7E+03 |
| Methylene Chloride (75-09-2) | 95 | 15.7 | 1.7E-01 | 1.5E+03 |
| Perchloroethylene (127-18-4) | 37 | 15.7 | 6.6E-02 | 5.8E+02 |
| Toluene (108-88-3) | 28 | 15.7 | 5.0E-02 | 4.4E+02 |
| Trichloroethylene (79-01-6) | 11 | 15.7 | 2.0E-02 | 1.7E+02 |
| Xylene (1330-20-7) | 33 | 15.7 | 5.9E-02 | 5.2E+02 |
| Hydrogen Sulfide[4] (7783-06-4) | -- | -- | 1.2E+00 | 1.1E+04 |

[1] Emission factors are from the *"80th Percentile Emission Factors – POTW Liquid Processes Emission Factors"* obtained from *"Chapter 8.2 – Wastewater Treatment Facilities"* of the District's Permit Handbook.

[2] The initial application submittal identifies that the existing maximum dry weather flowrate is 15.7 MGD.

[3] Hourly emission rates are based on a 24-hour per day, 365-day per year operation.

[4] Information is based on a reported maximum uncontrolled hydrogen sulfide ($H_2S$) volumetric concentration of 125 ppmv, which was obtained from a March 6, 2018 correspondence, and a maximum combined design flowrate of 37,300 cfm from the facility's biofilters, which was obtained from an April 10, 2018 correspondence.

Furthermore, Part 4 of Condition #25494, within New Source Review (NSR) Permit Application #25083, limits the $H_2S$ abatement device to a control efficiency of at least 95% by weight.

**Table 4. Existing Toxic Air Contaminant Pollutant Emissions Review Wastewater Treatment Plant, Wet Weather Conditions**

| Pollutant (CAS #) | Emission Factor[1] (lb/yr) Per [MGD] | Wet Weather Flowrate[2] (MGD) | Hourly Emission Rate[3] (lb/hr) | Annual Emission Rate (lb/yr) |
|---|---|---|---|---|
| Benzene (71-43-2) | 3.7 | 40.0 | 1.7E-02 | 1.5E+02 |
| Chloroform (67-66-3) | 40 | 40.0 | 1.8E-01 | 1.6E+03 |
| 1,4-Dichlorobenzene (106-46-7) | 5 | 40.0 | 2.3E-02 | 2.0E+02 |
| Methyl Chloroform (71-55-6) | 110 | 40.0 | 5.0E-01 | 4.4E+03 |
| Methylene Chloride (75-09-2) | 95 | 40.0 | 4.3E-01 | 3.8E+03 |
| Perchloroethylene (127-18-4) | 37 | 40.0 | 1.7E-01 | 1.5E+03 |
| Toluene (108-88-3) | 28 | 40.0 | 1.3E-01 | 1.1E+03 |
| Trichloroethylene (79-01-6) | 11 | 40.0 | 5.0E-02 | 4.4E+02 |
| Xylene (1330-20-7) | 33 | 40.0 | 1.5E-01 | 1.3E+03 |
| Hydrogen Sulfide[4] (7783-06-4) | -- | -- | 1.2E+00 | 1.1E+04 |

[1] Emission factors are from the *"80th Percentile Emission Factors – POTW Liquid Processes Emission Factors"* obtained from *"Chapter 8.2 – Wastewater Treatment Facilities"* of the District's Permit Handbook.

[2] The wet weather flowrate was obtained from the NPDES Permit #CA0037541, issued by the San Francisco Bay Regional Water Quality Control Board.

[3] Hourly emission rates are based on a 24-hour per day, 365-day per year operation.

[4] Information is based on a reported maximum uncontrolled $H_2S$ volumetric concentration of 125 ppmv, which was obtained from a March 6, 2018 correspondence, and a maximum combined design flowrate of 37,300 cfm from the facility's biofilters, which was obtained from an April 10, 2018 correspondence. Furthermore, Part 4 of Condition #25494, within New Source Review (NSR) Permit Application #25083, limits the $H_2S$ abatement device to a control efficiency of at least 95% by weight.

Proposed Configuration

For regulatory purposes, wet weather conditions will be used to review hourly and daily emission rates. Furthermore, annual emission rates will be based on a throughput limit of 5,730.50 million gallons of wastewater per year which was accepted by the facility.

**Table 5. Daily Proposed Criteria Pollutant Emissions Review**

| Pollutant | Emission Factor[1] (lb/MG) | Highest Day Flowrate[2] (MGD) | Unabated Daily Emission Rate (lb/day) | Abatement Efficiency[3] (% w/w) | Abated Daily Emission Rate (lb/day) |
|---|---|---|---|---|---|
| POC | 0.18 | 78.0 | 14.04 | 85 | 2.11 |
| NPOC | 0.03 | 78.0 | 2.34 | 85 | 0.35 |

[1] Emission factors are from provided 2014 influent reports, which compile VOC influent concentration data. For VOC compounds not detected, half of the method detection limit was used to estimate emissions. For further information, please reference Appendix A – *"Hourly & Daily Wastewater Treatment Plant Emissions Estimate"* (Appendix A).

[2] The highest day flowrate is based on the facility's proposed peak wet weather flowrate.

[3] Within a correspondence dated March 6, 2018, the applicant has indicated that research on bioscrubbers demonstrate an abatement efficiency of 85% by weight of VOC.

**Table 6. Annual Proposed Criteria Pollutant Emissions Review**

| Pollutant | Emission Factor[1] (lb/MG) | Annual Flowrate[2] (MG/yr) | Unabated Annual Emission Rate (lb/yr) | Abatement Efficiency[3] (% w/w) | Abated Annual Emission Rate (lb/yr) | Abated Annual Emission Rate (ton/yr) |
|---|---|---|---|---|---|---|
| POC | 0.18 | 5,730.50 | 1,031.49 | 85 | 154.72 | 0.077 |
| NPOC | 0.03 | 5,730.50 | 171.92 | 85 | 25.79 | 0.013 |

[1] Emission factors are from provided 2014 influent reports, which compile VOC influent concentration data. For VOC compounds not detected, half of the method detection limit was used to estimate emissions. For further information, please reference Appendix B – *"Annual Wastewater Treatment Plant Emissions Estimate"* (Appendix B).

[2] The annual flowrate was proposed by the facility.

[3] Within a correspondence dated March 6, 2018, the applicant has indicated that research on bioscrubbers demonstrate an abatement efficiency of 85% by weight of VOC.

For toxic air contaminant (TAC) emissions review, it is assumed that S-110 will contribute most of the emissions. Therefore, the evaluation will review S-110 as the only source of TACs from the project. Wet weather conditions will be used to review acute emission rates. The annual throughput limit will be used to evaluate chronic emission rates. Hourly and annual $H_2S$ emissions will be based on the design capacity and limitations provided by the applicant.

The facility is proposing to abate $H_2S$ from S-110, S-120, and S-140 through A-20. The facility has proposed a maximum controlled $H_2S$ volumetric concentration of 1.5 ppmv and a maximum combined flowrate of 29,800 cfm from the outlet stack of A-20.

$$V = \frac{29{,}800\ scf}{min} \times \frac{60\ min}{hr} \times \frac{1.5\ scf\ H_2S}{10^6\ scf} = 2.682\ \ scf\ H_2S/hr$$

$$n_{mol-hr} = \frac{PV}{RT} = \frac{(1\ atm) \cdot \left(\frac{2.682\ scf\ H_2S}{hr}\right)}{\left(\frac{0.730241\ atm \cdot scf}{°R \cdot mol_{lb}}\right) \cdot (527.67°R)} = 7.0 \times 10^{-03}\ \ mol_{lb}\ H_2S/hr$$

$$n_{lb-hr} = \frac{7.0 \times 10^{-03}\ mol_{lb}\ H_2S}{hr} \times \frac{34.076\ lb\ H_2S}{mol_{lb}\ H_2S} = 2.4 \times 10^{-01}\ \ lb\ H_2S/hr$$

$$n_{lb-yr} = \frac{2.4 \times 10^{-01}\ lb\ H_2S}{hr} \times \frac{8{,}760\ hr}{yr} = 2.1 \times 10^{+03}\ \ lb\ H_2S/yr$$

The following table provides a summary of the TAC emissions from the wastewater treatment plant project.

| **Table 7. Proposed Toxic Air Contaminant Pollutant Emissions Review Wastewater Treatment Plant** | | | |
|---|---|---|---|
| **Pollutant (CAS #)** | **CAS#** | **Hourly Emission Rate[1, 2, 3] (lb/hr)** | **Annual Emission Rate[3, 4] (lb/yr)** |
| **Precursor Organic Compounds** | | | |
| Benzene | 71-43-2 | 1.8E-03 | 3.2E+00 |
| Bromomethane (Methyl Bromide) | 74-83-9 | 1.7E-03 | 3.0E+00 |
| Carbon Tetrachloride | 56-23-5 | 1.6E-03 | 2.9E+00 |
| Chlorobenzene | 108-90-7 | 1.8E-03 | 3.2E+00 |
| Chloroethane (Ethyl Chloride) | 75-00-3 | 3.9E-03 | 6.8E+00 |
| Chloroform | 67-66-3 | 1.3E-02 | 2.4E+01 |
| 1,4-Dichlorobenzene | 106-46-7 | 1.8E-03 | 3.2E+00 |
| 1,1-Dichloroethane | 75-34-3 | 1.9E-03 | 3.4E+00 |
| 1,2-Dichloroethane (EDC) | 107-06-2 | 1.8E-03 | 3.2E+00 |
| 1,1-Dichloroethene | 75-35-4 | 2.0E-03 | 3.6E+00 |
| Ethylbenzene | 100-41-4 | 2.6E-03 | 4.7E+00 |
| Methyl Tert-Butyl Ether (MTBE) | 1634-04-4 | 1.5E-03 | 2.7E+00 |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | 2.0E-03 | 3.6E+00 |
| Toluene | 108-88-3 | 1.4E-02 | 2.5E+01 |
| 1,1,2-Trichloroethane | 79-00-5 | 1.6E-03 | 2.9E+00 |
| Trichloroethene (TCE) | 79-01-6 | 2.0E-03 | 3.6E+00 |
| Vinyl Chloride | 75-01-4 | 2.4E-03 | 4.3E+00 |
| Xylenes, Total | 1330-20-7 | 2.6E-03 | 4.7E+00 |
| **Non-Precursor Organic Compounds** | | | |
| Methylene Chloride | 75-09-2 | 3.0E-03 | 5.4E+00 |
| Tetrachloroethene (PCE) | 127-18-4 | 1.9E-03 | 3.4E+00 |
| 1,1,1-Trichloroethane (TCA) | 71-55-6 | 1.9E-03 | 3.4E+00 |
| **Non-Metallic Inorganic Compounds** | | | |
| Hydrogen Sulfide[5] | 7783-06-4 | 2.4E-01 | 2.1E+03 |

[1] For further information, please reference Appendix A.

[2] Hourly emission rates are based on a 24 hour per day operation at peak wet weather flows.

[3] Except for $H_2S$, due to the abatement device, a control efficiency of 85% by weight has been included.

[4] For further information, please reference Appendix B.

[5] Information is based on a proposed maximum controlled $H_2S$ volumetric concentration of 1.5 ppmv, which was obtained within a March 6, 2018 correspondence, and a maximum combined flowrate of 29,800 cfm, which was obtained from an April 10, 2018 correspondence.

## EMERGENCY DIESEL ENGINE-GENERATOR SET EMISSION CALCULATIONS

The City of San Mateo is proposing to install four new emergency stationary diesel engine-generator sets, which will provide auxiliary power in the event of an emergency. There are two possible options for the engines. For regulatory review purposes, the highest engine emissions, between the two options, for each pollutant will be used to determine compliance.

The following information is from supporting documents, submitted by the applicant. Supporting documents include manufacturer specification and emissions data.

| **Table 8. Engine Specifications & Emission Factors, Option #1** | |
|---|---|
| **Engine Manufacturer** | Caterpillar |
| **Model** | C27 |
| **Model Year** | 2016 |
| **Family Name** | GCPXL27.0NZS |
| **Engine Power Rating (BHp)** | 1,141 |
| **Fuel Consumption (gal/hr)** | 53.6 |
| **Maximum Input Heat Rating (MMBtu/hr)** | 7.5 |
| **Displacement (L)** | 27.0 |
| **$NO_X$ (g/hp-hr)** | 3.84 |
| **POC (g/hp-hr)[1]** | 0.08 |
| **PM (g/hp-hr)[2]** | 0.07 |
| **CO (g/hp-hr)** | 0.9 |

[1] Manufacturer specification provides an emission factor for hydrocarbon (HC). It is assumed that HC = POC.

[2] It is assumed that particulate matter (PM) is equivalent to $PM_{10}$ and $PM_{2.5}$.

| **Table 9. Engine Specifications & Emission Factors, Option #2** | |
|---|---|
| **Engine Manufacturer** | Cummins |
| **Model** | QST30 |
| **Model Year** | 2017 |
| **Family Name** | HCEXL030.AAD |
| **Engine Power Rating (BHp)** | 1,490 |
| **Fuel Consumption (gal/hr)** | 52.6 |
| **Maximum Input Heat Rating (MMBtu/hr)** | 7.4 |
| **Displacement (L)** | 30.5 |
| **$NO_X$ (g/hp-hr)[1]** | 3.8 |
| **POC (g/hp-hr)[1,2]** | 0.2 |
| **PM (g/hp-hr)[3]** | 0.08 |
| **CO (g/hp-hr)** | 0.5 |

[1] The emission factor for $NO_X$ and POC are combined. It is assumed that 5% of the emission factor is POC and the remaining 95% is $NO_X$.

[2] Manufacturer specification provides an emission factor for non-methane hydrocarbon (NMHC). It is assumed that NMHC = POC.

[3] It is assumed that PM is equivalent to $PM_{10}$ and $PM_{2.5}$.

$SO_2$ emissions are estimated using an emission factor from EPA AP-42, Table 3.4-1, which is a function of the fuel sulfur content. Since, the engine will operate within California, the fuel consumed will most likely be CARB approved. Therefore, the sulfur content of the diesel fuel is expected to be 15 parts per million (ppm) by weight or 0.0015% sulfur by weight. The following review provides $SO_2$ emission factor details.

$$SO_2\ Emission\ Factor\ (lb/MMBtu) = 1.01 \cdot S_1$$

Where $S_1$ is the sulfur content of the fuel in percentage.

$$= 1.01 \cdot \left(\frac{15}{10^6} \times 100\%\right)$$

$$= 0.001515\ lb\ SO_2/MMBtu$$

Assuming that the heat content of the diesel fuel is 140 MMBtu per thousand gallons, the following are the $SO_2$ emission rate estimates for each engine.

Option #1

$$\frac{0.001515\ lbs\ SO_2}{\cancel{MMBtu}} \times \frac{53.6\ \cancel{gal\ diesel}}{\cancel{hr}} \times \frac{140\ \cancel{MMBtu}}{1{,}000\ \cancel{gal\ diesel}} \times \frac{24\ \cancel{hr}}{day} = 0.27\ lbs\ SO_2/day$$

$$\frac{0.001515\ lbs\ SO_2}{\cancel{MMBtu}} \times \frac{53.6\ \cancel{gal\ diesel}}{\cancel{hr}} \times \frac{140\ \cancel{MMBtu}}{1{,}000\ \cancel{gal\ diesel}} \times \frac{50\ \cancel{hr}}{yr} = 0.57\ lbs\ SO_2/yr$$

Option #2

$$\frac{0.001515\ lbs\ SO_2}{\cancel{MMBtu}} \times \frac{52.6\ \cancel{gal\ diesel}}{\cancel{hr}} \times \frac{140\ \cancel{MMBtu}}{1{,}000\ \cancel{gal\ diesel}} \times \frac{24\ \cancel{hr}}{day} = 0.27\ lbs\ SO_2/day$$

$$\frac{0.001515\ lbs\ SO_2}{\cancel{MMBtu}} \times \frac{52.6\ \cancel{gal\ diesel}}{\cancel{hr}} \times \frac{140\ \cancel{MMBtu}}{1{,}000\ \cancel{gal\ diesel}} \times \frac{50\ \cancel{hr}}{yr} = 0.56\ lbs\ SO_2/yr$$

The following tables provide a summary of the emissions from each possible engine and the overall highest emissions from all options combined.

| Table 10. Engine Option #1 Potential to Emit Emissions Review | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Pollutant** | **Emission Rate (g/hp-hr)** | **Power Rating (hp)** | **Daily Operation[1] (hr/day)** | **Daily Emissions (lb/day)** | **Annual Operation[2] (hr/yr)** | **Annual Emissions (lb/yr)** | **Annual Emissions (ton/yr)** |
| $NO_X$ | 3.84 | 1,141 | 24 | 231.62 | 50 | 482.54 | 0.241 |
| POC | 0.08 | 1,141 | 24 | 4.83 | 50 | 10.05 | 0.005 |
| $PM_{10}$ | 0.07 | 1,141 | 24 | 4.22 | 50 | 8.80 | 0.004 |
| $PM_{2.5}$ | 0.07 | 1,141 | 24 | 4.22 | 50 | 8.80 | 0.004 |
| $SO_2$ | -- | -- | -- | 0.27 | -- | 0.57 | 0.000 |
| CO | 0.90 | 1,141 | 24 | 54.29 | 50 | 113.09 | 0.057 |

[1] Maximum daily operation assumed to be 24 hours.

[2] Maximum annual operation will only include reliability-related activities as defined in Regulation 9-8-232.

| Table 11. Engine Option #2 Potential to Emit Emissions Review | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Pollutant** | **Emission Rate (g/hp-hr)** | **Power Rating (hp)** | **Daily Operation[1] (hr/day)** | **Daily Emissions (lb/day)** | **Annual Operation[2] (hr/yr)** | **Annual Emissions (lb/yr)** | **Annual Emissions (ton/yr)** |
| $NO_X$ | 3.8 | 1,490 | 24 | 299.31 | 50 | 623.57 | 0.312 |
| POC | 0.2 | 1,490 | 24 | 15.75 | 50 | 32.82 | 0.016 |
| $PM_{10}$ | 0.08 | 1,490 | 24 | 6.30 | 50 | 13.13 | 0.007 |
| $PM_{2.5}$ | 0.08 | 1,490 | 24 | 6.30 | 50 | 13.13 | 0.007 |
| $SO_2$ | -- | -- | -- | 0.27 | -- | 0.56 | 0.000 |
| CO | 0.5 | 1,490 | 24 | 39.38 | 50 | 82.05 | 0.041 |

[1] Maximum daily operation assumed to be 24 hours.

[2] Maximum annual operation will only include reliability-related activities as defined in Regulation 9-8-232.

| Table 12. Engine Highest Emissions Potential to Emit Review | | | | |
|---|---|---|---|---|
| **Pollutant** | **Hourly Emissions (lb/hr)** | **Daily Emissions (lb/day)** | **Annual Emissions (lb/yr)** | **Annual Emissions (ton/yr)** |
| $NO_X$ | 12.47 | 299.31 | 623.57 | 0.312 |
| POC | 0.66 | 15.75 | 32.82 | 0.016 |
| $PM_{10}$ | 0.26 | 6.30 | 13.13 | 0.007 |
| $PM_{2.5}$ | 0.26 | 6.30 | 13.13 | 0.007 |
| $SO_2$ | 0.01 | 0.27 | 0.57 | 0.000 |
| CO | 2.26 | 54.29 | 113.09 | 0.057 |

## PROJECT EMISSION CALCULATIONS

| Table 13. Application Daily Emission Rate Summary | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Source** | **Daily Emission Rate** | | | | | | |
| | **$NO_X$ (lb/day)** | **POC (lb/day)** | **NPOC (lb/day)** | **$PM_{10}$ (lb/day)** | **$PM_{2.5}$ (lb/day)** | **$SO_2$ (lb/day)** | **CO (lb/day)** |
| S-30 | 299.31 | 15.75 | -- | 6.30 | 6.30 | 0.27 | 54.29 |
| S-31 | 299.31 | 15.75 | -- | 6.30 | 6.30 | 0.27 | 54.29 |
| S-32 | 299.31 | 15.75 | -- | 6.30 | 6.30 | 0.27 | 54.29 |
| S-33 | 299.31 | 15.75 | -- | 6.30 | 6.30 | 0.27 | 54.29 |
| S-110 | -- | 2.11 | 0.35 | -- | -- | -- | -- |
| S-120 | -- | -- | -- | -- | -- | -- | -- |
| S-130 | -- | -- | -- | -- | -- | -- | -- |
| S-140 | -- | -- | -- | -- | -- | -- | -- |
| S-160 | -- | -- | -- | -- | -- | -- | -- |
| S-190 | -- | -- | -- | -- | -- | -- | -- |

| Table 14. Application Annual Emission Rate Summary | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Source** | **Annual Emission Rate** | | | | | | |
| | **$NO_X$ (lb/yr)** | **POC (lb/yr)** | **NPOC (lb/yr)** | **$PM_{10}$ (lb/yr)** | **$PM_{2.5}$ (lb/yr)** | **$SO_2$ (lb/yr)** | **CO (lb/yr)** |
| S-30 | 623.57 | 32.82 | -- | 13.13 | 13.13 | 0.57 | 113.09 |
| S-31 | 623.57 | 32.82 | -- | 13.13 | 13.13 | 0.57 | 113.09 |
| S-32 | 623.57 | 32.82 | -- | 13.13 | 13.13 | 0.57 | 113.09 |
| S-33 | 623.57 | 32.82 | -- | 13.13 | 13.13 | 0.57 | 113.09 |
| S-110 | -- | 154.72 | 25.79 | -- | -- | -- | -- |
| S-120 | -- | -- | -- | -- | -- | -- | -- |
| S-130 | -- | -- | -- | -- | -- | -- | -- |
| S-140 | -- | -- | -- | -- | -- | -- | -- |
| S-160 | -- | -- | -- | -- | -- | -- | -- |
| S-190 | -- | -- | -- | -- | -- | -- | -- |
| **Total** | **2,494.28** | **286.00** | **25.79** | **52.52** | **52.52** | **2.28** | **452.36** |

| Table 15. Application Annual Emission Rate Summary | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Source** | **Annual Emission Rate** | | | | | | |
| | **$NO_X$ (ton/yr)** | **POC (ton/yr)** | **NPOC (ton/yr)** | **$PM_{10}$ (ton/yr)** | **$PM_{2.5}$ (ton/yr)** | **$SO_2$ (ton/yr)** | **CO (ton/yr)** |
| S-30 | 0.312 | 0.016 | -- | 0.007 | 0.007 | 0.000 | 0.057 |
| S-31 | 0.312 | 0.016 | -- | 0.007 | 0.007 | 0.000 | 0.057 |
| S-32 | 0.312 | 0.016 | -- | 0.007 | 0.007 | 0.000 | 0.057 |
| S-33 | 0.312 | 0.016 | -- | 0.007 | 0.007 | 0.000 | 0.057 |
| S-110 | -- | 0.077 | 0.013 | -- | -- | -- | -- |
| S-120 | -- | -- | -- | -- | -- | -- | -- |
| S-130 | -- | -- | -- | -- | -- | -- | -- |
| S-140 | -- | -- | -- | -- | -- | -- | -- |
| S-160 | -- | -- | -- | -- | -- | -- | -- |
| S-190 | -- | -- | -- | -- | -- | -- | -- |
| **Total** | **1.248** | **0.141** | **0.013** | **0.028** | **0.028** | **0.000** | **0.228** |

| Table 16. Application Toxic Air Contaminant Pollutant Emissions Summary | | | | | | |
|---|---|---|---|---|---|---|
| **Pollutant (CAS #)** | **Hourly Emission Rate (lb/hr)** | **Acute Threshold (lb/hr)** | **Exceeds Acute Threshold? (Yes/No)** | **Annual Emission Rate (lb/yr)** | **Chronic Threshold (lb/yr)** | **Exceeds Chronic Threshold? (Yes/No)** |
| Benzene (71-43-2) | 1.8E-03 | 6.0E-02 | No | 3.2E+00 | 2.9E+00 | **Yes** |
| Bromomethane (74-83-9) | 1.7E-03 | 8.6E+00 | No | 3.0E+00 | 1.9E+02 | No |
| Carbon Tetrachloride (56-23-5) | 1.6E-03 | 4.2E+00 | No | 2.9E+00 | 1.9E+00 | **Yes** |
| Chlorobenzene (108-90-7) | 1.8E-03 | -- | No | 3.2E+00 | 3.9E+04 | No |
| Chloroethane (75-00-3) | 3.9E-03 | -- | No | 6.8E+00 | 1.2E+06 | No |
| Chloroform (67-66-3) | 1.3E-02 | 3.3E-01 | No | 2.4E+01 | 1.5E+01 | **Yes** |
| 1,4-Dichlorobenzene (106-46-7) | 1.8E-03 | -- | No | 3.2E+00 | 7.2E+00 | No |
| 1,1-Dichloroethane (75-34-3) | 1.9E-03 | -- | No | 3.4E+00 | 5.0E+01 | No |
| 1,2-Dichloroethane (107-06-2) | 1.8E-03 | -- | No | 3.2E+00 | 4.0E+00 | No |
| 1,1-Dichloroethene (75-35-4) | 2.0E-03 | -- | No | 3.6E+00 | 2.7E+03 | No |
| Ethylbenzene (100-41-4) | 2.6E-03 | -- | No | 4.7E+00 | 3.3E+01 | No |
| Methyl Tert-Butyl Ether (1634-04-4) | 1.5E-03 | -- | No | 2.7E+00 | 1.6E+02 | No |
| 1,1,2,2-Tetrachloroethane (79-34-5) | 2.0E-03 | -- | No | 3.6E+00 | 1.4E+00 | **Yes** |
| Toluene (108-88-3) | 1.4E-02 | 8.2E+01 | No | 2.5E+01 | 1.2E+04 | No |
| 1,1,2-Trichloroethane (79-00-5) | 1.6E-03 | -- | No | 2.9E+00 | 5.0E+00 | No |
| Trichloroethene (79-01-6) | 2.0E-03 | -- | No | 3.6E+00 | 4.1E+01 | No |
| Vinyl Chloride (75-01-4) | 2.4E-03 | 4.0E+02 | No | 4.3E+00 | 1.1E+00 | **Yes** |
| Xylenes, Total (1330-20-7) | 2.6E-03 | 4.9E+01 | No | 4.7E+00 | 2.7E+04 | No |
| Methylene Chloride (75-09-2) | 3.0E-03 | 3.1E+01 | No | 5.4E+00 | 8.2E+01 | No |
| Tetrachloroethene (127-18-4) | 1.9E-03 | 4.4E+01 | No | 3.4E+00 | 1.4E+01 | No |
| 1,1,1-Trichloroethane (71-55-6) | 1.9E-03 | 1.5E+02 | No | 3.4E+00 | 3.9E+04 | No |
| Hydrogen Sulfide (7783-06-4) | 2.4E-01 | 9.3E-02 | **Yes** | 2.1E+03 | 3.9E+02 | **Yes** |
| Diesel Exhaust Particulate Matter | 1.0E+00 | -- | No | 5.3E+01 | 2.6E-01 | **Yes** |

For Regulation 2-5, project emissions are reviewed against the trigger levels of Table 2-5-1. Pursuant to Regulation 2-5-216, a project will include new or modified sources of TACs which have been permitted within the last three years. The following tables provide the project hourly and annual emission rates for each TAC.

The City of San Mateo was previously granted an A/C for changes to the anaerobic digesters (S-180) and the installation of a BioCNG Gas Conditioning System (S-191), within NSR Application #27481 on May 23, 2016. S-180 and S-191 were granted a P/O August 31, 2017. However, due to unforeseen constraints, the City of San Mateo has requested for a throughput increase at S-180 and S-191 within NSR Application #28886. NSR Application #28886 includes all TAC emissions from S-180 and S-191.

| Table 17. Acute Project Toxic Air Contaminant Pollutant Emissions Summary | | | | | |
|---|---|---|---|---|---|
| **Pollutant (CAS #)** | **Application #27505 (lb/hr)** | **Application #28623 (lb/hr)** | **Application #28886 (lb/hr)** | **Application #28996 (lb/hr)** | **Project Total (lb/hr)** |
| Benzene (71-43-2) | 7.9E-06 | -- | 7.6E-05 | 1.8E-03 | 1.9E-03 |
| Bromomethane (74-83-9) | -- | -- | -- | 1.7E-03 | 1.7E-03 |
| Carbon Tetrachloride (56-23-5) | -- | -- | -- | 1.6E-03 | 1.6E-03 |
| Chlorobenzene (108-90-7) | -- | -- | -- | 1.8E-03 | 1.8E-03 |
| Chloroethane (75-00-3) | -- | -- | -- | 3.9E-03 | 3.9E-03 |
| Chloroform (67-66-3) | -- | -- | -- | 1.3E-02 | 1.3E-02 |
| 1,4-Dichlorobenzene (106-46-7) | -- | -- | -- | 1.8E-03 | 1.8E-03 |
| 1,1-Dichloroethane (75-34-3) | -- | -- | -- | 1.9E-03 | 1.9E-03 |
| 1,2-Dichloroethane (107-06-2) | -- | -- | -- | 1.8E-03 | 1.8E-03 |
| 1,1-Dichloroethene (75-35-4) | -- | -- | -- | 2.0E-03 | 2.0E-03 |
| Ethylbenzene (100-41-4) | -- | -- | -- | 2.6E-03 | 2.6E-03 |
| Methyl Tert-Butyl Ether (1634-04-4) | -- | -- | -- | 1.5E-03 | 1.5E-03 |
| 1,1,2,2-Tetrachloroethane (79-34-5) | -- | -- | -- | 2.0E-03 | 2.0E-03 |
| Toluene (108-88-3) | 1.3E-05 | -- | 1.2E-04 | 1.4E-02 | 1.4E-02 |
| 1,1,2-Trichloroethane (79-00-5) | -- | -- | -- | 1.6E-03 | 1.6E-03 |
| Trichloroethene (79-01-6) | -- | -- | -- | 2.0E-03 | 2.0E-03 |
| Vinyl Chloride (75-01-4) | -- | -- | -- | 2.4E-03 | 2.4E-03 |
| Xylenes, Total (1330-20-7) | -- | -- | -- | 2.6E-03 | 2.6E-03 |
| Methylene Chloride (75-09-2) | -- | -- | -- | 3.0E-03 | 3.0E-03 |
| Tetrachloroethene (127-18-4) | -- | -- | -- | 1.9E-03 | 1.9E-03 |
| 1,1,1-Trichloroethane (71-55-6) | -- | -- | -- | 1.9E-03 | 1.9E-03 |
| Hydrogen Sulfide (7783-06-4) | -- | -- | 3.2E-02 | 2.4E-01 | 2.7E-01 |
| Diesel Exhaust Particulate Matter | -- | 5.0E-02 | -- | 1.0E+00 | 1.1E+00 |
| Formaldehyde (50-00-0) | 2.9E-04 | -- | 2.7E-03 | -- | 3.0E-03 |

| Table 18. Chronic Project Toxic Air Contaminant Pollutant Emissions Summary | | | | | |
|---|---|---|---|---|---|
| **Pollutant (CAS #)** | **Application #27505 (lb/yr)** | **Application #28623 (lb/yr)** | **Application #28886 (lb/yr)** | **Application #28996 (lb/yr)** | **Project Total (lb/yr)** |
| Benzene (71-43-2) | 7.0E-02 | -- | 2.7E-01 | 3.2E+00 | 3.5E+00 |
| Bromomethane (74-83-9) | -- | -- | -- | 3.0E+00 | 3.0E+00 |
| Carbon Tetrachloride (56-23-5) | -- | -- | -- | 2.9E+00 | 2.9E+00 |
| Chlorobenzene (108-90-7) | -- | -- | -- | 3.2E+00 | 3.2E+00 |
| Chloroethane (75-00-3) | -- | -- | -- | 6.8E+00 | 6.8E+00 |
| Chloroform (67-66-3) | -- | -- | -- | 2.4E+01 | 2.4E+01 |
| 1,4-Dichlorobenzene (106-46-7) | -- | -- | -- | 3.2E+00 | 3.2E+00 |
| 1,1-Dichloroethane (75-34-3) | -- | -- | -- | 3.4E+00 | 3.4E+00 |
| 1,2-Dichloroethane (107-06-2) | -- | -- | -- | 3.2E+00 | 3.2E+00 |
| 1,1-Dichloroethene (75-35-4) | -- | -- | -- | 3.6E+00 | 3.6E+00 |
| Ethylbenzene (100-41-4) | -- | -- | -- | 4.7E+00 | 4.7E+00 |
| Methyl Tert-Butyl Ether (1634-04-4) | -- | -- | -- | 2.7E+00 | 2.7E+00 |
| 1,1,2,2-Tetrachloroethane (79-34-5) | -- | -- | -- | 3.6E+00 | 3.6E+00 |
| Toluene (108-88-3) | 1.1E-01 | -- | 4.3E-01 | 2.5E+01 | 2.6E+01 |
| 1,1,2-Trichloroethane (79-00-5) | -- | -- | -- | 2.9E+00 | 2.9E+00 |
| Trichloroethene (79-01-6) | -- | -- | -- | 3.6E+00 | 3.6E+00 |
| Vinyl Chloride (75-01-4) | -- | -- | -- | 4.3E+00 | 4.3E+00 |
| Xylenes, Total (1330-20-7) | -- | -- | -- | 4.7E+00 | 4.7E+00 |
| Methylene Chloride (75-09-2) | -- | -- | -- | 5.4E+00 | 5.4E+00 |
| Tetrachloroethene (127-18-4) | -- | -- | -- | 3.4E+00 | 3.4E+00 |
| 1,1,1-Trichloroethane (71-55-6) | -- | -- | -- | 3.4E+00 | 3.4E+00 |
| Hydrogen Sulfide (7783-06-4) | -- | -- | 1.1E+02 | 2.1E+03 | 2.2E+03 |
| Diesel Exhaust Particulate Matter | -- | 2.5E+00 | -- | 5.3E+01 | 5.6E+01 |
| Formaldehyde (50-00-0) | 2.5E+00 | -- | 9.5E+00 | -- | 1.2E+01 |

| Table 19. Project Toxic Air Contaminant Pollutant Emissions Summary | | | | | | |
|---|---|---|---|---|---|---|
| **Pollutant (CAS #)** | **Hourly Emission Rate (lb/hr)** | **Acute Threshold (lb/hr)** | **Exceeds Acute Threshold? (Yes/No)** | **Annual Emission Rate (lb/yr)** | **Chronic Threshold (lb/yr)** | **Exceeds Chronic Threshold? (Yes/No)** |
| Benzene (71-43-2) | 1.9E-03 | 6.0E-02 | No | 3.5E+00 | 2.9E+00 | **Yes** |
| Bromomethane (74-83-9) | 1.7E-03 | 8.6E+00 | No | 3.0E+00 | 1.9E+02 | No |
| Carbon Tetrachloride (56-23-5) | 1.6E-03 | 4.2E+00 | No | 2.9E+00 | 1.9E+00 | **Yes** |
| Chlorobenzene (108-90-7) | 1.8E-03 | -- | No | 3.2E+00 | 3.9E+04 | No |
| Chloroethane (75-00-3) | 3.9E-03 | -- | No | 6.8E+00 | 1.2E+06 | No |
| Chloroform (67-66-3) | 1.3E-02 | 3.3E-01 | No | 2.4E+01 | 1.5E+01 | **Yes** |
| 1,4-Dichlorobenzene (106-46-7) | 1.8E-03 | -- | No | 3.2E+00 | 7.2E+00 | No |
| 1,1-Dichloroethane (75-34-3) | 1.9E-03 | -- | No | 3.4E+00 | 5.0E+01 | No |
| 1,2-Dichloroethane (107-06-2) | 1.8E-03 | -- | No | 3.2E+00 | 4.0E+00 | No |
| 1,1-Dichloroethene (75-35-4) | 2.0E-03 | -- | No | 3.6E+00 | 2.7E+03 | No |
| Ethylbenzene (100-41-4) | 2.6E-03 | -- | No | 4.7E+00 | 3.3E+01 | No |
| Methyl Tert-Butyl Ether (1634-04-4) | 1.5E-03 | -- | No | 2.7E+00 | 1.6E+02 | No |
| 1,1,2,2-Tetrachloroethane (79-34-5) | 2.0E-03 | -- | No | 3.6E+00 | 1.4E+00 | **Yes** |
| Toluene (108-88-3) | 1.4E-02 | 8.2E+01 | No | 2.6E+01 | 1.2E+04 | No |
| 1,1,2-Trichloroethane (79-00-5) | 1.6E-03 | -- | No | 2.9E+00 | 5.0E+00 | No |
| Trichloroethene (79-01-6) | 2.0E-03 | -- | No | 3.6E+00 | 4.1E+01 | No |
| Vinyl Chloride (75-01-4) | 2.4E-03 | 4.0E+02 | No | 4.3E+00 | 1.1E+00 | **Yes** |
| Xylenes, Total (1330-20-7) | 2.6E-03 | 4.9E+01 | No | 4.7E+00 | 2.7E+04 | No |
| Methylene Chloride (75-09-2) | 3.0E-03 | 3.1E+01 | No | 5.4E+00 | 8.2E+01 | No |
| Tetrachloroethene (127-18-4) | 1.9E-03 | 4.4E+01 | No | 3.4E+00 | 1.4E+01 | No |
| 1,1,1-Trichloroethane (71-55-6) | 1.9E-03 | 1.5E+02 | No | 3.4E+00 | 3.9E+04 | No |
| Hydrogen Sulfide (7783-06-4) | 2.7E-01 | 9.3E-02 | **Yes** | 2.2E+03 | 3.9E+02 | **Yes** |
| Diesel Exhaust Particulate Matter | 1.1E+00 | -- | No | 5.6E+01 | 2.6E-01 | **Yes** |
| Formaldehyde (50-00-0) | 3.0E-03 | 1.2E-01 | No | 1.2E+01 | 1.4E+01 | No |

## TOXIC RISK SCREENING ANALYSIS

Pursuant to Regulation 2-5-110, the application is subject to the provisions of this rule since the project increase in TACs, from new/modified sources, exceed trigger levels listed in Table 2-5-1 of Regulation 2-5. The project includes TAC emissions from NSR Application #'s 27505, 27481, 28623, 28886, and 28996.

A health risk assessment (HRA) model was completed for this project. The model was performed using AERMOD air dispersion computer modeling software (version 16216r). The model used San Carlos AERMOD ready meteorological data, which was processed by BAAQMD staff. The model was referenced in North American Datum (NAD) 83. Model runs were made with rural dispersion coefficients based on the typing scheme proposed by Auer, which best represents land use around the facility. Stack and building parameters were provided by the applicant.

Estimates of residential risk assume potential exposure to annual average TAC concentrations occurring 350 days per year for 30 years. In addition, residential risk assumes 95$^{th}$ percentile breathing rate for age groups younger than two years and 80$^{th}$ percentile breathing rate for age groups older than or equal to two years.

Risk estimates for offsite workers assumed potential exposure occurring 8 hours a day, 250 days per year, for 25 years. 95$^{th}$ percentile 8-hour breathing rate based on moderate activity was assumed.

For students at school sites, exposure is assumed to be 180 days per year for 9 years. 95$^{th}$ percentile 8-hour breathing rate based on moderate activity was assumed.

Age sensitivity factors and fraction of time adjustments were used for residential and student cancer risks.

The project is below a hazard index of 1.0, at a maximum receptor value of 0.56. The chronic hazard index is also below 1.0, with the worker as the maximumly exposed receptor at a value of 0.02, followed by residents at 0.011 and students at 0.0066. The project cancer risk is below 10 in a million with the residents as the maximumly exposed receptor at a value of 3.6 in a million, followed by workers at 1.9 in a million and students at 1.5 in a million. Furthermore, each individual source has a cancer risk less than a million and a chronic hazard index less than 0.2. Therefore, Best Available Control Technology for toxics (TBACT) does not apply. The project and each new source meet the requirements of Regulation 2-5.

## PLANT CUMULATIVE EMISSIONS

The following table provides a summary of the facility's potential to emit (PTE).

| Table 20. Facility Potential to Emit Summary | | | |
|---|---|---|---|
| **Pollutant** | **Existing[1] (ton/yr)** | **New[1,2] (ton/yr)** | **Total (ton/yr)** |
| $NO_X$ | 11.038 | 1.248 | 12.286 |
| POC | 8.713 | 0.141 | 8.854 |
| $PM_{10}$ | 0.779 | 0.028 | 0.807 |
| $PM_{2.5}$ | 0.779 | 0.028 | 0.807 |
| $SO_2$ | 6.167 | 0.000 | 6.167 |
| CO | 29.213 | 0.228 | 29.441 |

[1] The existing PTE was obtained from NSR Application #27481. Within NSR Application #27481, an extensive review of all permitted sources was performed to estimate the facility's PTE. However, since an emergency engine-generator set (S-17) was removed from service, the emissions from S-17 were subtracted from the PTE from NSR Application #27481. Furthermore, since NSR Application #27481, an emergency engine-generator set (S-21) has been permitted, S-180 and S-191 are proposed to undergo a modification, and the WWTP will undergo a retrofit. As a result, emissions from the WWTP have been removed, the emissions from S-180 and S-191 have been adjusted to reflect the proposed modification, and the emissions from S-21 have been included.

[2] New emissions include releases from the WWTP and four (4) engines.

Pursuant to Regulations 2-2-302 and 2-2-303, offsets are required for a facility's cumulative increase, if the facility's PTE is greater than 10 tons per year for $NO_X$ and POC, and for any new $PM_{10}$, $PM_{2.5}$, or $SO_2$ emissions increase at a major facility. The cumulative increase includes all emissions increase since April 5, 1991. The following table provides a summary of the facility's PTE.

| Table 21. Facility Cumulative Increase Summary | | | |
|---|---|---|---|
| **Pollutant** | **Existing (ton/yr)** | **New (ton/yr)** | **Total (ton/yr)** |
| $NO_X$ | 8.183 | 1.248 | 9.431 |
| POC | 8.319 | 0.141 | 8.460 |
| $PM_{10}$ | 0.770 | 0.028 | 0.798 |
| $PM_{2.5}$ | 0.000 | 0.028 | 0.028 |
| $SO_2$ | 4.062 | 0.000 | 4.062 |
| CO | 22.304 | 0.228 | 22.532 |

## BEST AVAILABLE CONTROL TECHNOLOGY

Pursuant to Regulation 2-2-301, Best Available Control Technology (BACT) is required for any new or modified source with a PTE emission rate equal to or greater than 10 pounds of a regulated air pollutant per day.

According to Table 13 of the Project Emission Calculations Section of this evaluation, the operation of new sources S-110 and S-190 are not expected to emit 10 pounds or more of a

regulated air pollutant per day per source. However, S-30, S-31, S-32, and S-33 are expected to emit more than 10 pounds of $NO_X$, POC, and CO per day. Therefore, the BACT requirements of Regulation 2-2-301 apply to S-30, S-31, S-32, and S-33.

The following table provides the $NO_X$, POC, and CO BACT requirements for emergency engine-generator sets. These requirements were obtained from District's BACT Guideline *"IC Engine-Compression Ignition: Stationary Emergency, Non-Agricultural, Non-Direct Drive Fire Pump."*

**Table 22. Best Available Control Technology for Stationary Diesel Emergency Engine-Generator Sets**

| Pollutant | BACT Requirement[2] (g/hp-hr) | Option #1 Engine Data (g/hp-hr) | Compliance With BACT? | Option #2 Engine Data (g/hp-hr) | Compliance With BACT? |
|---|---|---|---|---|---|
| NMHC+$NO_X$[1] | 4.8 | 3.9 | Yes | 4.0 | Yes |
| CO | 2.6 | 0.9 | Yes | 0.5 | Yes |

[1] Non-methane hydrocarbons (NMHC) is assumed to be equivalent to POC.

[2] BACT is equivalent to the CARB ATCM standard at the applicable power rating.

S-30, S-31, S-32, and S-33 are expected to meet the BACT requirements of Regulation 2-2-301.

## OFFSETS

Pursuant to Regulation 2-2-302, offsets must be provided for any new or modified source at a facility that emits, or is permitted to emit, more than 10 tons per year of POC or $NO_X$.
The facility has a PTE greater than 10 tons per year, but less than 35 tons per year of $NO_X$. Offsets must be provided for the cumulative increase of $NO_X$. However, since the facility emits less than 35 tons per year of $NO_X$, the facility may be provided offsets from the District's Small Facility Banking Account. Although, per Regulation 2-2-302.1.2, if the District's Small Facility Banking Account is exhausted, or if the applicant owns or controls offsets, the applicant shall provide any required offsets.

Furthermore, pursuant to Regulation 2-2-303 offsets must be provided for any new or modified source at a major facility with a cumulative increase that exceeds 1.0 ton per year of $PM_{10}$ or $SO_2$. Pursuant to the definition of a "Major Facility" as defined in Regulation 2-6-212 and based upon Table 20 of the Plant Cumulative Emissions section of this evaluation, the facility is not defined as a major source and is not subject to the requirements of Regulation 2-2-303.

## NEW SOURCE PERFORMANCE STANDARDS

The following New Source Performance Standards (NSPS) apply to the facility.

### 40 CFR Part 60 Subpart O

Pursuant to §60.150, an affected facility is each incinerator that combusts wastes containing more than 10 percent sewage sludge (dry basis) produced by municipal sewage treatment plants, or each incinerator that charges more than 1000 kg (2205 lb) per day municipal sewage sludge (dry basis), which commenced construction or modification after June 11, 1973. The City of San

Mateo does not operate a sewage sludge incinerator and is not subject to the requirements of this subpart.

**40 CFR Part 60 Subpart QQQ**
Pursuant to §60.690 the provisions of this subpart apply to affected facilities located in petroleum refineries for which construction, modification, or reconstruction is commenced after May 4, 1987. Since the publicly owned treatment works (POTW) does not operate at a refinery, the POTW is not subject to the requirements of this subpart.

**40 CFR Part 60 Subpart IIII**
According to §60.4200(a)(1)(i), the emergency engine is subject to the requirements of 40 CFR Part 60 Subpart IIII, *"Standards of Performance of Stationary Compression Ignition Internal Combustion Engines."*

Pursuant to §60.4205(b), owners or operators of 2007 model year and later stationary emergency diesel engine-generator sets with a displacement of less than 30 liters per cylinder must comply with §60.4202. In accordance with §60.4202(a)(2), the emission standards must meet those established in 40 CFR 89.112 and 40 CFR 89.113. Pursuant to 40 CFR 89.112, engines with a rated power greater than 560 kW (750 hp) must meet the following emission standards.

**Table 23. Review of Standards for Engines Rated Greater Than 560 KW (750 Hp)**

| Pollutant | NSPS Emission Standard (g/kW-hr) | NSPS Emission Standard (g/hp-hr) | Manufacturer's Emission Rate (g/kW-hr) | Manufacturer's Emission Rate (g/hp-hr) |
|---|---|---|---|---|
| $NMHC+NO_X$ | 6.4 | 4.8 | $5.2^1/5.4^2$ | $3.9^1/4.0^2$ |
| CO | 3.5 | 2.6 | $1.2^1/0.7^2$ | $0.9^1/0.5^2$ |
| PM | 0.20 | 0.15 | $0.09^1/0.11^2$ | $0.07^1/0.08^2$ |

[1] Emission factor for Option #1, Caterpillar.

[2] Emission factor for Option #2, Cummins.

The emergency engine-generator sets are expected to meet the emission standards of 40 CFR 89.112. In addition, the emergency engine-generator sets are expected to meet the opacity standards of 40 CFR 89.113.

**Table 24. 40 CFR 89.113 Opacity Standards**

| Mode | Opacity (%) |
|---|---|
| Acceleration | 20 |
| Lugging | 15 |
| Peak (During acceleration or lugging modes) | 50 |

§60.4206 and §60.4211(a) require the owner or operator to maintain and operate the emergency engines according to the manufacturer's written instructions or owner/operator developed procedures approved by the manufacturer for the entire life of the emergency engine. The

emergency engines are expected to be maintained and operated in accordance with the requirements of §60.4206 and §60.4211(a).

§60.4207(b) requires diesel fuel consumed after October 1, 2010 to meet the requirements of 40 CFR 80.510(b), which is a maximum sulfur content of 15 ppm. The fuel consumed is expected to meet this requirement.

§60.4209(a) requires the installation of a non-resettable hour meter. This will be included as a permit requirement.

The emergency engines are certified to the requirements of 40 CFR Part 89 and are expected to comply with §60.4211(c).

Per §60.4211(f), the emergency engines will be allowed to operate unrestricted during emergencies. In addition, the emergency engines will be limited to less than 100 hours per calendar year for maintenance and testing. However, the requirements of the CARB ATCM may further limit the maintenance and testing hours.

## NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

The following National Emission Standards for Hazardous Air Pollutants (NESHAP) apply to the facility.

### 40 CFR Part 63 Subpart ZZZZ

Pursuant to §63.6585, engines located at an area source are subject to the requirements of 40 CFR Part 63 Subpart ZZZZ, *"National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines."*

However, according to §63.6590(a)(1)(iii) & §63.6590(c)(1), diesel engines that commenced construction on June 12, 2006 or later and that operate at a facility that emits or has the potential to emit any single hazardous air pollutant (HAP) at a rate of less than 10 tons per year or any combination of HAPs at a rate of less than 25 tons per year, comply with the standard by meeting the requirements of 40 CFR Part 60 Subpart IIII, *"Standards of Performance of Stationary Compression Ignition Internal Combustion Engines."* The emergency engines are expected to comply with the requirements of this subpart by meeting the standards of 40 CFR Part 60 Subpart IIII, *"Standards of Performance of Stationary Compression Ignition Internal Combustion Engines."*

## CARB AIRBORNE TOXIC CONTROL MEASURE FOR STATIONARY COMPRESSION IGNITION ENGINES

§93115.2 requires any person who purchases a stationary compression ignition engine to meet the requirements of the ATCM.

As of January 1, 2006, owners and operators of new engines are required to consume CARB diesel fuel in accordance with §93115.5.

According to §93115.6(a)(1), an engine located within 500 feet of school grounds shall not operate for non-emergency use between 7:30 A.M. and 3:30 P.M. on days when school is in session.

Pursuant to §93115.6(a)(3), a new engine must meet the following requirements as of January 1, 2005.

- ATCM *"Table 1 Emission Standards for New Stationary Emergency Standby Diesel-Fueled CI Engines"* for specific model year and maximum engine power, which is shown below;

| **Table 25. Airborne Toxic Control Measure for Stationary Emergency Diesel Engine-Generator Set** | | | | |
|---|---|---|---|---|
| **Maximum Engine Power** | **Model Year** | **PM (g/bhp-hr)** | **NMHC+$NO_X$ (g/bhp-hr)** | **CO (g/bhp-hr)** |
| hp > 750 | 2008+ | 0.15 | 4.8 | 2.6 |

- After December 31, 2008, be certified to the new non-road compression-ignition engine emission standard for all pollutants for 2007 and later model year engines as specified in 40 CFR, Part 60, Subpart IIII; and,

- Not operate more than 50 hours per year for maintenance and testing purposes, except as provided in §93115.6(a)(3)(A)(2). This regulation does not limit engine operation for emergency use and for emission testing to show compliance with §93115.6(a)(3).

The engine is expected to meet the emissions requirement and will be limited, through permit condition, to operate unrestricted only for emergencies and a maximum of 50 hours per year for maintenance and testing purposes. In addition, the permit will include near-school operating provisions that meet the requirements of §93115.6(a)(1).

Pursuant to §93115.10(d) (1) a non-resettable hour meter with a minimum display capability of 9,999 hours shall be installed upon engine installation. The owner/operator of the engine shall keep monthly records of the following for 36 months, with the prior 24 months readily accessible at the site and the prior 25 to 36 months available to the District within 5 working days from the request.

- Emergency use hours of operation;
- Maintenance and testing hours of operation;
- Hours of operation for emission testing to show compliance with §933115.6(a)(3) and §93115.6(b)(3);
- Initial start-up testing hours;
- If applicable, hours of operation to comply with the requirements of NFPA 25;
- Hours of operation for all uses other than those specified in §93115.10(g)(1)(A) through (D);
- If applicable, DRP engine hours of operation; and,
- The fuel used.

## STATEMENT OF COMPLIANCE

### Regulation 1

S-30, S-31, S-32, S-33, S-110, S-120, S-130, S-140, S-160, and S-190 will be subject to the public nuisance requirements of Regulation 1-301, which states the following:

*"No person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public; or which endangers the comfort, repose, health or safety of any such persons or the public, or which causes, or has a natural tendency to cause, injury or damage to business or property. For purposes of this section, three or more violation notices validly issued in a 30-day period to a facility for public nuisance shall give rise to a rebuttable presumption that the violations resulted from negligent conduct."*

The operation of S-30, S-31, S-32, S-33, S-110, S-120, S-130, S-140, S-160, and S-190 is expected to meet the requirement of Regulation 1-301.

### Regulation 2, Rule 1

The facility is proposing to install and operate new sources of air pollution, which are subject to the requirements of this rule. Therefore, the facility is subject to the permitting requirements of Regulations 2-1-301 and 2-1-302 for S-30, S-31, S-32, S-33, S-110, and S-190.

In addition, the facility is proposing to alter S-120, S-130, S-140, and S-160.

### Regulation 2, Rule 2

Pursuant to Regulation 2-2-301, BACT is required for any new or modified source with a PTE emission rate equal to or greater than 10 pounds of a regulated air pollutant per day. According to Table 13 of the Project Emission Calculations Section of this evaluation, the operation of S-30, S-31, S-32, and S-33 is expected to exceed 10 pounds per day of $NO_X$, POC, and CO. Therefore, BACT is required for S-30, S-31, S-32, and S-33. However, the proposed engines meet the BACT requirements for $NO_X$, POC, and CO.

Furthermore, S-110 and S-190 are not expected to exceed an emission rate equal to or greater than 10 pounds of a regulated air pollutant per day. Therefore, S-110 and S-190 are not required to meet the requirement of Regulation 2-2-301.

Moreover, since the proposed physical changes of S-120, S-130, S-140, and S-160 are not expected to result in an emission increase, these sources are considered alterations.

Pursuant to Regulation 2-2-302, offsets must be provided for an emission increase from any new or modified source at a facility that emits, or is permitted to emit, more than 10 tons per year of $NO_X$ or POC.

According to Table 20 of the Plant Cumulative Emissions Section of this evaluation, the facility is permitted to emit 12.286 tons of $NO_X$ per year and 8.854 tons of POC per year. Since the facility's $NO_X$ PTE is greater than 10 tons per year, but less than 35 tons per year, the $NO_X$ offset

requirements of Regulation 2-2-302 apply. However, the facility may be provided offsets from the District's Small Facility Banking Account. Although, per Regulation 2-2-302.1.2, if the District's Small Facility Banking Account is exhausted, or if the applicant owns or controls offsets, the applicant shall provide any required offsets. Since the facility's POC PTE is less than 10 tons per year, the facility is not subject to the POC offset requirements of Regulation 2-2-302.

Lastly, pursuant to Regulation 2-2-303, major facilities of $PM_{10}$, $PM_{2.5}$, or $SO_2$ are also required to provide offsets for any emission increases, from any new or modified source, that exceeds 1 ton per year of $PM_{10}$, $PM_{2.5}$, or $SO_2$. The facility is not expected to emit more than 100 tons per year of $PM_{10}$, $PM_{2.5}$, or $SO_2$, and is not identified as a major facility of $PM_{10}$, $PM_{2.5}$, or $SO_2$. Thus, the requirements of Regulation 2-2-303 do not apply to the facility.

**Regulation 2, Rule 5**
Pursuant to Regulation 2-5-110, the application is subject to the provisions of this rule since the project increase in TACs, from new/modified sources, exceed trigger levels listed in Table 2-5-1 of Regulation 2-5. The project includes TAC emissions from NSR Applications 27505, 27481, 28623, 28886, and 28996.

The project is below a hazard index of 1.0, at a maximum receptor value of 0.56. The chronic hazard index is also below 1.0, with the worker as the maximumly exposed receptor at a value of 0.02, followed by residents at 0.011 and students at 0.0066. The project cancer risk is below 10 in a million with the residents as the maximumly exposed receptor at a value of 3.6 in a million, followed by workers at 1.9 in a million and students at 1.5 in a million. Furthermore, each individual source has a cancer risk less than a million and a chronic hazard index less than 0.2. Therefore, TBACT does not apply. The project and each new source meet the requirements of Regulation 2-5.

**Regulation 2, Rule 6**
The City of San Mateo is not a major facility of any regulated air pollutants. Therefore, the requirements of Regulation 2-6 do not apply.

**Regulation 6, Rule 1**
Pursuant to Regulations 6-1-301 and 6-1-302, a person shall not emit from any source for a period or periods aggregating more than three minutes in any hour, a visible emission which is as dark or darker than No. 1 on the Ringelmann Chart, or of such opacity as to obscure an observer's view to an equivalent or greater degree and/or an emission equal to or greater than 20% opacity as perceived by an opacity sensing device, where such a device is required by District regulations. The project is expected to meet the requirements of Regulations 6-1-301 and 6-1-302.

**Regulation 8, Rule 8**
Pursuant to Regulation 8-8-115, the requirements of Sections 8-8-301 through 8-8-314 shall not apply to any publicly owned municipal wastewater treatment facility. The City of San Mateo's

wastewater treatment operation is not subject to the requirements of this rule since the facility is a POTW.

**Regulation 9, Rule 1**
The emergency engines are subject to the $SO_2$ limitations of Regulation 9-1-301 (Limitations on Ground Level Concentrations of Sulfur Dioxide), Regulation 9-1-302 (Limitations Sulfur Dioxide Emissions) and 9-1-304 (Burning of Solid and Liquid Sulfur Dioxide Fuel).

Pursuant to Regulation 9-1-301, the ground level concentrations of $SO_2$ shall not exceed 0.5 ppm continuously for 3 consecutive minutes or 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours. Pursuant to Regulation 9-1-302, a person shall not emit from any source, a gas stream containing $SO_2$ in excess of 300 ppm (dry). Lastly, pursuant to Regulation 9-1-304, a person shall not burn any liquid fuel having a sulfur content in excess of 0.5% by weight. Compliance with Regulation 9-1 is expected due to the use of CARB low sulfur diesel fuel with a sulfur content of 0.0015% by weight.

**Regulation 9, Rule 2**
Per Regulation 9-2-301, a person shall not emit during any 24-hour period, $H_2S$ in such quantities as to result in ground level concertation in excess of 0.06 ppm average over three consecutive minutes or 0.03 ppm averaged over any 60 consecutive minutes.

An HRA was performed. The estimated hourly ground level $H_2S$ concentration at the fence line is 0.016 ppm, which is less than the hourly threshold of 0.03 ppm. The facility is expected to be in compliance with this regulation.

**Regulation 9, Rule 8**
This rule limits $NO_X$ and CO emissions from stationary internal combustion engines with an output rated by the manufacturer at more than 50 brake horsepower. S-30, S-31, S-32, and S-33 are intended to operate at a specific site for more than one year and will be attached to a foundation at the site. Therefore, the requirements of this rule apply.

In addition, S-30, S-31, S-32, and S-33 will be used for emergency use at an essential public service as defined pursuant to Regulations 9-8-230 and 9-8-233.

Pursuant to Regulation 9-8-110.5, emergency standby engines are exempt from the requirements of Regulations 9-8-301 through 305, 9-8-501, and 9-8-503. However, emergency standby engines at an essential public service are subject to the requirements of Regulation 9-8-331.

Pursuant to Regulation 9-8-331, an emergency engine will be allowed to operate 100 hours per calendar year for reliability-related activities. The requirements of the CARB ATCM are more stringent than the allowed annual reliability-related activity hours of this rule. Therefore, S-30, S-31, S-32, and S-33 will only be allowed to operate 50 hours per calendar year for reliability-related activities.

According to Regulation 9-8-530, emergency engines shall be equipped with a non-resettable totalizing meter that measures hours of operation or fuel usage. Monthly records for the following shall be kept for at least 2 years and be made available to District staff upon request.

- Total hours of operation;
- Emergency hours of operation; and,
- The nature of the emergency condition for each emergency.

S-30, S-31, S-32, and S-33 are expected to meet the requirements of this regulation.

**California Environmental Quality Act**
The City of San Mateo prepared a Program Environmental Impact Report (PEIR) for the proposed project on April 2016. Furthermore, the City of San Mateo, serving as the Lead Agency under the California Environmental Quality Act (CEQA), adopted addendums within the PEIR on March 2018.

The main goal of the project is to address mending the recurring issue of wet-weather sanitary sewer overflows, which violate federal and state clean water standards. The project may include the following to accomplish the goal of meeting federal and state clean water standards:

- Upgrade collection systems;
- Install equalization basin upstream designated pump station;
- Install equalization basin at the WWTP;
- Install headworks at the WWTP;
- Upgrade and replace existing treatment processes at the WWTP;
- Increase the WWTP's wet weather capacity up to 78 million gallons per day;
- Install new odor control systems at the WWTP; and,
- Install four (4) 750 kW emergency diesel engine-generator sets.

The Lead Agency has determined that air quality impacts will be less than significant with mitigation incorporated. In addition, the project is not expected to exceed the District's Air Quality CEQA Thresholds of Significance. Furthermore, the project was reviewed in accordance with *"Chapter 2.3.1 – Stationary Diesel Engines"* and *"Chapter 8.2 – Wastewater Treatment Facilities"* of the District's Permit Handbook. Therefore, the project is ministerial exempt from CEQA pursuant to Regulation 2-1-311. Lastly, pursuant to a correspondence dated March 6, 2018, the facility's consultant has verified that the maximum peak wet weather flowrate will be 78 million gallons per day.

**California Health & Safety Code §42301.6 and Regulation 2-1-412**
Pursuant to California Health & Safety Code §42301.6(a), prior to approving an application for a permit to construct or modification of a source of hazardous air emissions, which is located within 1,000 feet from the outer boundary of a school site, the District shall prepare a public notice as detailed in §42301.6. §42301.9(a) defines a "school" as any public or private school used for the purposes of the education of more than 12 children in kindergarten or any grades 1

to 12, inclusive, but does not include any private school in which education is primarily conducted in private homes.

The applicant has proposed the addition of new sources of hazardous air emissions within 1,000 feet from the outer boundary of the following school site identified in the following table.

| Table 26. School Sites Located Within 1,000 Feet of the Facility | | | |
|---|---|---|---|
| **School Name** | **School Location** | **Grades** | **Description** |
| Bayside Middle School (Bayside STEM Academy) | 2025 Kehoe Avenue San Mateo, CA 94403 | 6-8 | Public |

The addition of S-30, S-31, S-32, S-33 will result in an increase in diesel exhaust particulate matter. Moreover, although the overall WWTP emissions are expected to decrease, S-110 and S-190 are new sources; with S-110 being a new source of hazardous air emissions.

The District will be required to prepare a public notice as detailed in §42301.6. The public notice will be distributed to the addresses within 1,000 feet of the source and to the parents or guardians of children attending schools within a quarter (¼) mile of the source. The following schools are within a quarter mile of the source.

| Table 27. School Sites Located Within ¼ Mile of the Facility | | | |
|---|---|---|---|
| **School Name** | **School Location** | **Grades** | **Description** |
| Bayside Middle School (Bayside STEM Academy) | 2025 Kehoe Avenue San Mateo, CA 94403 | 6-8 | Public |
| Lead Elementary School | 949 Ocean View Avenue San Mateo, CA 94401 | K-5 | Public |

## PERMIT CONDITIONS

The following permit condition is for the stationary emergency diesel engine-generator sets, S-30 through S-33.

**Permit Condition #22850**

1. The owner/operator shall not exceed 50 hours per year per engine for reliability-related testing. [Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

2. The owner/operator shall operate each emergency standby engine only for the following purposes: to mitigate emergency conditions, for emission testing to demonstrate compliance with a District, State or Federal emission limit, or for reliability-related activities (maintenance and other testing, but excluding emission testing). Operating while mitigating emergency conditions or while emission testing to show compliance with District, State or Federal emission limits is not limited. [Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

3. The owner/operator shall operate each emergency standby engine only when a non-resettable totalizing meter (with a minimum display capability of 9,999 hours) that measures the hours of operation for the engine is installed, operated and properly maintained. [Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

4. Records: The owner/operator shall maintain the following monthly records in a District-approved log for at least 36 months from the date of entry (60 months if the facility has been issued a Title V Major Facility Review Permit or a Synthetic Minor Operating Permit). Log entries shall be retained on-site, either at a central location or at the engine's location, and made immediately available to the District staff upon request.

    a. Hours of operation for reliability-related activities (maintenance and testing).
    b. Hours of operation for emission testing to show compliance with emission limits.
    c. Hours of operation (emergency).
    d. For each emergency, the nature of the emergency condition.
    e. Fuel usage for each engine(s).

    [Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

5. At School and Near-School Operation: If the emergency standby engine is located on school grounds or within 500 feet of any school grounds, the following requirements shall apply:

    The owner/operator shall not operate each stationary emergency standby diesel-fueled engine for non-emergency use, including maintenance and testing, during the following periods:

    a. Whenever there is a school sponsored activity (if the engine is located on school grounds).
    b. Between 7:30 a.m. and 3:30 p.m. on days when school is in session. "School" or "School Grounds" means any public or private school used for the purposes of the education of more than 12 children in kindergarten or any of grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in a private home(s). "School" or "School Grounds" includes any building or structure, athletic field, or other areas of school property but does not include unimproved school property.

    [Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

***End of Conditions***

The following permit condition is for sources related to the WWTP, which include the preliminary treatment, S-110, the primary treatment, S-120, the secondary treatment, S-130, the secondary clarifier, S-140, disinfection, S-160, and flow equalization, S-190.

**Permit Condition #26954**

GENERAL CONDITIONS

1. The owner/operator of the municipal wastewater treatment plant, S-100, shall not exceed the following design capacities:

   a. Total average dry weather effluent flow of 15.7 million gallons per day calculated as an average over three consecutive dry weather months from May 1 to October 31;
   b. Peak wet weather effluent flow of 78 million gallons per day; and,
   c. 5,730.50 million gallons per consecutive 12-month period.

   For the purposes of this part, dry weather season is typically from May 1 to October 31 and wet weather season is typically from November 1 to April 30. To determine compliance with this part, the owner/operator shall measure flow at Discharge Point 001, Monitoring Station EFF-001, as described in the Monitoring and Reporting Program of the facility's National Pollutant Discharge Elimination System permit. [Basis: Cumulative Increase]

2. To demonstrate compliance with Part 1 of this condition, the owner/operator shall record the following:

   a. Daily and monthly records of the quantity of effluent processed at this facility; and,
   b. Consecutive 12-month period quantity of effluent processed at this facility by totaling the monthly records of Part 2(a) of this condition.

   [Basis: Regulation 2-1-403]

3. The owner/operator of the preliminary treatment, S-110, the primary treatment, S-120, and the secondary clarifier, S-140, shall enclose those sources and abate emissions from those sources with the odor control system, A-20, at all times. [Basis: Cumulative Increase, Toxics, and Regulation 9-2]

4. The owner/operator of the odor control system, A-20, shall not exceed a combined total exhaust flowrate of 29,800 dry standard cubic feet per minute through A-20. [Basis: Cumulative Increase]

5. The owner/operator of the flow equalization, S-190, shall abate emission with the iron salts dosing system #2, A-21, at all times that the source is in operation. The dosing rate of the iron salts dosing system #2, A-21, shall be a minimum of 20 milligram of iron salts per liter of wastewater, which is based on a maximum anticipated total sulfide concentration in the influent wastewater to S-190 of 5 milligrams per liter. Operation of S-190 begins with the introduction of wastewater into S-190 in the empty condition and ends with the removal of wastewater from S-190 returning it to the empty condition. Each time S-190 is operated, the owner/operator will analyze a sample of wastewater influent to S-190 within 8 hours of the start of operation to document that the concentration of total sulfides is equal to or less than 5 milligrams per liter. In the event that the total sulfide concentration exceeds 5 milligrams per liter, the owner/operator will increase the iron salts dose to 50 milligrams of iron salts per

liter of wastewater. The owner/operator may continue to analyze samples of wastewater influent to S-190 for total sulfides and may reduce the iron salts dose to 20 milligrams per liter when the total sulfide concentration in the wastewater influent to S-190 is at or below 5 milligrams per liter. [Basis: Cumulative Increase]

PRECURSOR ORGANIC COMPOUND (POC)/NON-PRECURSOR ORGANIC COMPOUND (NPOC) REQUIREMENTS

6. The owner/operator of the odor control system, A-20, shall properly operate the device according to manufacturer specifications, to achieve a minimum POC and NPOC control efficiency of 85% by weight. The following limitations at the maximum flowrate, as specified in Part 4 of this condition, are presumed to be in compliance with this part.

   a. 1.3 ppmv combined POC and NPOC limit, measured as methane; or,
   b. Combined POC and NPOC emission rate of 0.10 lb/hr.
   [Basis: Cumulative Increase]

7. To demonstrate compliance with the requirements of Part 6 of this condition, the owner/operator shall monitor organic compounds, as methane, with a flame ionization detector (FID), or other District approved instrument, from the stack of the odor control system, A-20, at least once every calendar week. If the owner/operator can demonstrate 3 months of monitoring results equal to, or less than, half of the limits of Part 6 of this condition, monitoring may be reduced to once every calendar month. If any subsequent results, from the monthly monitoring, are above half of the limits of Part 6 of this condition, the owner/operator shall monitor every week until the owner/operator can demonstrate 3 months of monitoring results equal to, or less than, half of the limits of Part 6 of this condition, at which time the monitoring frequency may return to at least once every calendar month. [Basis: Cumulative Increase]

HYDROGEN SULFIDE (H2S) REQUIREMENTS

8. The H2S concentration from the odor control system, A-20, shall not exceed 1.5 ppmv. [Basis: Toxics and Regulation 9-2]

9. To demonstrate compliance with the standard in Part 8 of this condition, the owner/operator shall monitor and record the sulfur content from the stack of the odor control system, A-20, at least once every calendar week. If the owner/operator can demonstrate 3 months of sulfur results lower than 0.75 ppmv, the monitoring frequency for sulfur analysis may be reduced to at least once every calendar month. If any subsequent results, from monthly monitoring, are above the 0.75 ppmv, the owner/operator shall monitor every week until the owner/operator can demonstrate 3 months of sulfur results lower than 0.75 ppmv, at which time the monitoring frequency for sulfur analysis may return to at least once every calendar month. [Basis: Toxics and Regulation 9-2]

10. The owner/operator shall conduct the monitoring required by Part 9 of this condition in accordance with any of the following methodologies:

a. Draeger Tube Test Method: Draeger Tube tests capable of the following:

   i. The owner/operator shall use a Draeger Tube test, or equivalent, with an $H_2S$ range from 0.2 to 5 ppmv to demonstrate compliance with the above limit.
   ii. For measurements that are equal to or exceed the maximum range of the instrument specified in Part 10(a)(i) of this condition, the owner/operator shall use a Draeger Tube test, or equivalent, with an $H_2S$ range from 0.5 to 15 ppmv to detect higher concentrations than the above limit.
   iii. For measurements that are equal to or exceed the maximum range of the instrument specified in Part 10(a)(ii) of this condition, the owner/operator shall use a Draeger Tube test, or equivalent, with an $H_2S$ range up to 200 ppmv to detect higher concentrations than the above limit.

   For H2S measurements that are equal to or exceed 200 ppmv, the owner/operator shall detect higher concentrations than the above limit using the methods specified in Parts 10(b) and 10(c) of this condition.

b. Portable Instrument Method: A Draeger PAC-III (or equivalent) portable meter with an $H_2S$ sensor capable of measuring over 800 ppmv $H_2S$. In the event that $H_2S$ levels exceed 800 ppmv, the owner/operator shall commence to perform a source test using the method of Part 10(c) of this condition.

c. Chromatographic Method: The owner/operator may sample and test for sulfides according to BAAQMD Lab Method 44A (Manual of Procedures, Volume III), or by ASTM Method 5504, or by any other equivalent method, approved in advance by the District.

The owner/operator may use alternative methods other than those specified in this part, as long as it is deemed equivalent, accurate, and approved in advance by the District. [Basis: Regulation 2-1-403]

ABATEMENT DEVICE REQUIREMENTS

11. The odor control system, A-20, consists of two (2) parallel trains, each consisting of one (1) bioscrubber and one (1) carbon adsorption vessel. The owner/operator shall meet the following requirements for the specified event:

    a. In the event that monitoring of one (1) of the two (2) odor control system trains results in values at or above the limits specified in Parts 6 or 8 of this condition: Upon the discovery that the limits of Parts 6 or 8 of this condition have been exceeded, the owner/operator will tag or label the odor control system train out of service and adjust the system valves such that all emissions will flow through the second functioning odor control system train. The owner/operator must repair the out of service odor control system train and demonstrate compliance with Parts 6 and 8 of this condition within 10 days of the discovery of the exceedance of the limits within Parts 6 or 8 of this condition.

b. In the event that monitoring of both odor control system trains result in values at or above the permitted limits specified in Parts 6 or 8 of this condition: Upon the discovery that the limits of Parts 6 or 8 of this condition have been exceeded, the owner/operator shall service one of the odor control system trains, abate emissions to the serviced odor control system train, and demonstrate compliance with Parts 6 and 8 of this condition within an 8-hour period. The owner/operator must repair the other out of service odor control system train and demonstrate compliance with Parts 6 and 8 of this condition within 10 days of the discovery of the exceedance of the limits within Parts 6 or 8 of this condition. [Basis: Regulation 2-1-403]

RECORD KEEPING REQUIREMENTS
12. The owner/operator shall maintain the following records:

a. Daily, monthly, and annual records of the quantity of effluent processed at this facility as measured at Discharge Point 001, Monitoring Station EFF-001, as described in the Monitoring and Reporting Program of the facility's National Pollutant Discharge Elimination System permit;
b. POC/NPOC volumetric concentration measurements pursuant to Part 7 of this condition;
c. H2S volumetric concentration measurements pursuant to Parts 9 and 10 of this condition;
d. Operation of the flow equalization, S-190, and dosage of iron salts:
   i. Date S-190 and iron salts dosing system #2, A-21, are in operation;
   ii. Analysis of total sulfide concentration in the wastewater influent; and,
   iii. Iron salt dose administered; and,
e. Odor control system, A-20, service records:
   i. Initial date and time service is required pursuant to Part 11 of this condition;
   ii. Identification of the odor control system train that requires service;
   iii. Date and time of corrective action; and,
   iv. Compliance demonstration of Parts 6 and 8 of this condition associated with each event.

All records shall be retained onsite for two years from the date of entry, and made available for inspection by District staff upon request. These recordkeeping requirements do not replace the recordkeeping requirements contained in any applicable District regulation. [Basis: Recordkeeping]

***End of Conditions***

**RECOMMENDATION**

The District has reviewed the material contained in the permit application for the proposed 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 for the proposal of the new sources and alterations listed below. However, the proposed source will be located within 1,000 feet of a school, which triggers the public notification requirement of District Regulation 2-1-

412. After the comments are received and reviewed, 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 the issuance of a Permit to Operate for the following equipment:

***New Sources***:

**S-30 Stationary Emergency Diesel Engine-Generator Set**
**Make: Caterpillar, Model: C27, Model Year: 2016**
**1,141 BHp, 7.5 MMBtu/Hr; *Or*,**

**Stationary Emergency Diesel Engine-Generator Set**
**Make: Cummins, Model: QST30, Model Year: 2017**
**1,490 BHp, 7.4 MMBtu/Hr**

**S-31 Stationary Emergency Diesel Engine-Generator Set**
**Make: Caterpillar, Model: C27, Model Year: 2016**
**1,141 BHp, 7.5 MMBtu/Hr; *Or*,**

**Stationary Emergency Diesel Engine-Generator Set**
**Make: Cummins, Model: QST30, Model Year: 2017**
**1,490 BHp, 7.4 MMBtu/Hr**

**S-32 Stationary Emergency Diesel Engine-Generator Set**
**Make: Caterpillar, Model: C27, Model Year: 2016**
**1,141 BHp, 7.5 MMBtu/Hr; *Or*,**

**Stationary Emergency Diesel Engine-Generator Set**
**Make: Cummins, Model: QST30, Model Year: 2017**
**1,490 BHp, 7.4 MMBtu/Hr**

**S-33 Stationary Emergency Diesel Engine-Generator Set**
**Make: Caterpillar, Model: C27, Model Year: 2016**
**1,141 BHp, 7.5 MMBtu/Hr; *Or*,**

**Stationary Emergency Diesel Engine-Generator Set**
**Make: Cummins, Model: QST30, Model Year: 2017**
**1,490 BHp, 7.4 MMBtu/Hr**

**S-110 Preliminary Treatment**
**Influent Injunction Box, Preliminary Screens, Grit Removal, & Fine Screens**
**Dry Weather Effluent Flow Rate: 15.7 Million Gallon Per Day**
**(Averaged Over 3 Consecutive Months During May 1 to October 31)**
**Peak Wet Weather Effluent Flow Rate: 78 Million Gallon Per Day**
**Enclosed and Abated By Odor Control System, A-20**

**S-190 Flow Equalization**
**Flow Equalization Basin, 4.8 Million Gallon Capacity**
**Abated By Iron Salts Dosing System #2, A-21**

***Altered Sources***:

**S-120 Primary Treatment**
**Three (3) 110' Diameter Clarifiers (Common To Secondary Clarifier, S-140)**
**Dry Weather Effluent Flow Rate: 15.7 Million Gallon Per Day**
**(Averaged Over 3 Consecutive Months During May 1 to October 31)**
**Peak Wet Weather Effluent Flow Rate: 78 Million Gallon Per Day**
**Enclosed and Abated By Odor Control System, A-20**

**S-130 Secondary Treatment**
**Biological Nutrient Removal, Dual Use Contact Tank, & Membrane Bioreactor**
**Dry Weather Effluent Flow Rate: 15.7 Million Gallon Per Day**
**(Averaged Over 3 Consecutive Months During May 1 to October 31)**
**Peak Wet Weather Effluent Flow Rate: 78 Million Gallon Per Day**

**S-140 Secondary Clarifier**
**Two (2) 110' Diameter Clarifiers (Common To Primary Treatment, S-120)**
**Operating Only During Wet Weather Conditions**
**Peak Wet Weather Effluent Flow Rate: 78 Million Gallon Per Day**
**Enclosed and Abated By Odor Control System, A-20**

**S-160 Disinfection**
**Chlorine Contact Basin, 60 Million Gallon Per Day Capacity**

***Abatement Devices***:

**A-20 Odor Control System**
**Two (2) Parallel Trains of Bioscrubbers and Carbon Adsorbers**
**Each Train Consisting of One (1) Bioscrubber and One (1) Carbon Adsorber**
**Bioscrubber: 12' Diameter x 27' Height, 49,100 Lb Operating Weight**
**Carbon Adsorber: 12' Diameter x 14' Height, 17,500 lb Total Media Weight**
**29,800 Cubic Feet Per Minute Capacity**

**A-21 Iron Salts Dosing System #2**
**Consisting of Iron Salt Solution Tank and Injection Metering Pump**
**Minimum Iron Salt Dosing Rate of 20 mg/L**

By: _____ Date: _____

Alfonso Borja
Air Quality Engineer