

Appendix A

Air Quality and Greenhouse Gas

Air Quality and Greenhouse Gas Modeling Inputs

Modeling Assumptions for Benicia

Construction Period: Construction is anticipated to begin in June 2019 and is anticipated to last for 9 months. Construction would occur 5 days per week, generally from 7 a.m. to 5 p.m. The City intends to complete the project by March 2020.

Phases:

| Phase | Days | Equipment | Duration of Use (hours per day) |
|---|------|--------------------------------|----------------------------------|
| Site Preparation (staging areas) | 5 | 1 backhoe/tractor/loader | 7 |
| | 5 | 1 grader | 7 |
| | 5 | 1 water truck for dust control | 2 |
| Tank Removal | 2 | 1 crane | 6 |
| | 2 | 1 backhoe/tractor/loader | 6 |
| | 2 | 1 water truck for dust control | 2 hours per day for dust control |
| Tank and other Structure Demolition | 5 | 1 concrete saw | 6 |
| | 5 | 1 backhoe/tractor/loader | 2 |
| | 5 | 1 water truck for dust control | 2 hours per day for dust control |
| Trenching | 10 | 1 excavator | 6 |
| | 10 | 1 front-end loader | 7 |
| | 10 | 1 backhoe | 6 |
| | 10 | 1 vibratory compactor | 6 |
| | 10 | 1 water truck for dust control | 2 hours per day for dust control |
| Tank Installation | 30 | 1 concrete mixer truck | 2 |
| | 30 | 1 crane | 6 |
| | 30 | 1 welder | 8 |
| Total | | | |

Vehicle Trips:

Assuming up to 8 construction workers each day. Assumed a small amount of engineered fill required (4 truck trips)

- ▲ Worker: Up to 8 workers on site = 8 roundtrips or 16 trips
- ▲ Vendor: Assumed 1 roundtrip per day for vendor equipment delivery. For tank installation, added 6 additional for tank delivery
- ▲ Haul: 10 trips for tank removal, 4 for concrete tank removal (total cu yds demo material = 25.21), 80 truck trips for engineered fill during trenching

Maximum number of vehicle trips per day would occur during Trenching: 16 worker trips + 2 vendor trips + (80 haul truck trips/10 working days) = 16 + 2 + 8 = 26

Operational Activities (Qualitatively Analyzed):

- ▲ 8 truck trips per year for replacement of the three high-pressurized containers.
- ▲ The new metering pumps will be fractional horsepower, approximately $\frac{1}{2}$ - $\frac{3}{4}$ HP. Two of the three metering pumps will run continuously. These pumps are replacing existing equipment that consumes approximately the same amount of power. There is also a 1-HP recirculation pump being installed that will operate approximately 12 hours per month. In, general none of the equipment associated with this project should cause a significant increase in power consumption.

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1.0 Project Characteristics

1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|-----------|------|--------|-------------|--------------------|------------|
| City Park | 0.00 | Acre | 0.00 | 0.00 | 0 |

1.2 Other Project Characteristics

| | | | | | |
|---------------------------------|--------------------------------|---------------------------------|-------|----------------------------------|-------|
| Urbanization | Urban | Wind Speed (m/s) | 2.2 | Precipitation Freq (Days) | 56 |
| Climate Zone | 4 | | | Operational Year | 2020 |
| Utility Company | Pacific Gas & Electric Company | | | | |
| CO2 Intensity (lb/MW hr) | 641.35 | CH4 Intensity (lb/MW hr) | 0.029 | N2O Intensity (lb/MW hr) | 0.006 |

1.3 User Entered Comments & Non-Default Data

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Project Characteristics -

Land Use - Land use is a proxy since this project is mostly construction-only impacts

Construction Phase - Project-specific info

Off-road Equipment - Project-specific info

Off-road Equipment - Project-specific info

Off-road Equipment - Project-specific info

Off-road Equipment - Project-specific info

Off-road Equipment -

Grading - Up to 0.5 acres graded for staging areas

Demolition - Below-grade concrete tank dimensions are 17*17*8.5 ft.

Trips and VMT - Worker: Up to 8 workers on site = 8 roundtrips or 16 trips

Vendor: Assumed 1 roundtrip per day for vendor equipment delivery. For tank installation, added 6 additional for tank delivery

Haul: 10 trips for tank removal, 4 for concrete tank removal (total cu yds demo material = 25.21), 80 truck trips for engineered fill during trenching

| Table Name | Column Name | Default Value | New Value |
|----------------------|----------------|---------------|-----------|
| tblConstructionPhase | NumDays | 0.00 | 30.00 |
| tblConstructionPhase | NumDays | 0.00 | 2.00 |
| tblConstructionPhase | NumDays | 0.00 | 5.00 |
| tblConstructionPhase | NumDays | 0.00 | 5.00 |
| tblConstructionPhase | PhaseEndDate | 5/31/2019 | 8/13/2019 |
| tblConstructionPhase | PhaseEndDate | 5/31/2019 | 6/11/2019 |
| tblConstructionPhase | PhaseEndDate | 5/31/2019 | 6/7/2019 |
| tblConstructionPhase | PhaseStartDate | 6/1/2019 | 7/3/2019 |
| tblConstructionPhase | PhaseStartDate | 6/1/2019 | 6/8/2019 |
| tblGrading | AcresOfGrading | 2.19 | 0.50 |
| tblOffRoadEquipment | LoadFactor | 0.29 | 0.29 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |

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| | | | |
|---------------------|----------------------------|------|---------------------------|
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.37 | 0.37 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | OffRoadEquipmentType | | Cranes |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Cement and Mortar Mixers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Welders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Excavators |
| tblOffRoadEquipment | OffRoadEquipmentType | | Tractors/Loaders/Backhoes |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rollers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | UsageHours | 8.00 | 6.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 2.00 |
| tblOffRoadEquipment | UsageHours | 4.00 | 6.00 |
| tblOffRoadEquipment | UsageHours | 8.00 | 7.00 |
| tblOffRoadEquipment | UsageHours | 8.00 | 7.00 |

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| | | | |
|----------------|-------------------|-------|-------|
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 10.00 |
| tblTripsAndVMT | HaulingTripNumber | 11.00 | 4.00 |
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 80.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 2.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 2.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 8.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 2.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 2.00 |
| tblTripsAndVMT | WorkerTripNumber | 8.00 | 16.00 |
| tblTripsAndVMT | WorkerTripNumber | 8.00 | 16.00 |
| tblTripsAndVMT | WorkerTripNumber | 0.00 | 16.00 |
| tblTripsAndVMT | WorkerTripNumber | 8.00 | 16.00 |
| tblTripsAndVMT | WorkerTripNumber | 13.00 | 16.00 |

2.0 Emissions Summary

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2.2 Overall Operational

Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|-------------------|------|------|------|------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|------|------|------|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

3.0 Construction Detail

Construction Phase

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| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|--------------|-------------------------------|-----------------------|------------|-----------|---------------|----------|-------------------|
| 1 | Tank Removal | Demolition | 6/8/2019 | 6/11/2019 | 5 | 2 | |
| 2 | Site Preparation | Site Preparation | 6/1/2019 | 6/7/2019 | 5 | 5 | |
| 3 | Tank Installation | Building Construction | 7/3/2019 | 8/13/2019 | 5 | 30 | |
| 4 | Demo (tank, other structures) | Demolition | 6/12/2019 | 6/18/2019 | 5 | 5 | |
| 5 | Trenching | Trenching | 6/19/2019 | 7/2/2019 | 5 | 10 | |

Acres of Grading (Site Preparation Phase): 0.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

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| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|-------------------------------|---------------------------|--------|-------------|-------------|-------------|
| Demo (tank, other structures) | Concrete/Industrial Saws | 1 | 6.00 | 81 | 0.73 |
| Demo (tank, other structures) | Rubber Tired Dozers | 0 | 1.00 | 247 | 0.40 |
| Tank Removal | Concrete/Industrial Saws | 0 | 8.00 | 81 | 0.73 |
| Demo (tank, other structures) | Tractors/Loaders/Backhoes | 1 | 2.00 | 97 | 0.37 |
| Tank Installation | Cranes | 1 | 6.00 | 231 | 0.29 |
| Tank Installation | Forklifts | 0 | 6.00 | 89 | 0.20 |
| Site Preparation | Graders | 1 | 7.00 | 187 | 0.41 |
| Tank Removal | Cranes | 1 | 6.00 | 231 | 0.29 |
| Tank Removal | Off-Highway Trucks | 1 | 2.00 | 402 | 0.38 |
| Tank Removal | Rubber Tired Dozers | 0 | 1.00 | 247 | 0.40 |
| Site Preparation | Off-Highway Trucks | 1 | 2.00 | 402 | 0.38 |
| Tank Installation | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Tank Removal | Tractors/Loaders/Backhoes | 1 | 6.00 | 97 | 0.37 |
| Tank Installation | Cement and Mortar Mixers | 1 | 2.00 | 9 | 0.56 |
| Tank Installation | Welders | 1 | 8.00 | 46 | 0.45 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 7.00 | 97 | 0.37 |
| Demo (tank, other structures) | Off-Highway Trucks | 1 | 2.00 | 402 | 0.38 |
| Trenching | Excavators | 1 | 6.00 | 158 | 0.38 |
| Trenching | Tractors/Loaders/Backhoes | 2 | 7.00 | 97 | 0.37 |
| Trenching | Rollers | 1 | 6.00 | 80 | 0.38 |
| Trenching | Off-Highway Trucks | 1 | 2.00 | 402 | 0.38 |

Trips and VMT

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| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|-------------------------------|-------------------------|--------------------|--------------------|---------------------|--------------------|--------------------|---------------------|----------------------|----------------------|-----------------------|
| Tank Removal | 3 | 16.00 | 2.00 | 10.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 3 | 16.00 | 2.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Demo (tank, other structures) | 3 | 16.00 | 2.00 | 4.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Tank Installation | 3 | 16.00 | 8.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Trenching | 5 | 16.00 | 2.00 | 80.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |

3.1 Mitigation Measures Construction

3.2 Tank Removal - 2019

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|--------------------|--------------------|--------------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 7.3000e-004 | 8.0400e-003 | 4.4400e-003 | 1.0000e-005 | | 3.7000e-004 | 3.7000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 0.8934 | 0.8934 | 2.8000e-004 | 0.0000 | 0.9005 |
| Total | 7.3000e-004 | 8.0400e-003 | 4.4400e-003 | 1.0000e-005 | | 3.7000e-004 | 3.7000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 0.8934 | 0.8934 | 2.8000e-004 | 0.0000 | 0.9005 |

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3.2 Tank Removal - 2019

Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 4.0000e-005 | 1.4800e-003 | 2.5000e-004 | 0.0000 | 9.0000e-005 | 1.0000e-005 | 9.0000e-005 | 2.0000e-005 | 1.0000e-005 | 3.0000e-005 | 0.0000 | 0.3877 | 0.3877 | 2.0000e-005 | 0.0000 | 0.3881 |
| Vendor | 1.0000e-005 | 2.5000e-004 | 7.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 2.0000e-005 | 0.0000 | 0.0000 | 1.0000e-005 | 0.0000 | 0.0549 | 0.0549 | 0.0000 | 0.0000 | 0.0549 |
| Worker | 6.0000e-005 | 5.0000e-005 | 4.5000e-004 | 0.0000 | 1.3000e-004 | 0.0000 | 1.3000e-004 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 0.0000 | 0.1194 | 0.1194 | 0.0000 | 0.0000 | 0.1195 |
| Total | 1.1000e-004 | 1.7800e-003 | 7.7000e-004 | 0.0000 | 2.3000e-004 | 1.0000e-005 | 2.4000e-004 | 5.0000e-005 | 1.0000e-005 | 7.0000e-005 | 0.0000 | 0.5619 | 0.5619 | 2.0000e-005 | 0.0000 | 0.5624 |

Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|--------------------|--------------------|--------------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 7.3000e-004 | 8.0400e-003 | 4.4400e-003 | 1.0000e-005 | | 3.7000e-004 | 3.7000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 0.8934 | 0.8934 | 2.8000e-004 | 0.0000 | 0.9005 |
| Total | 7.3000e-004 | 8.0400e-003 | 4.4400e-003 | 1.0000e-005 | | 3.7000e-004 | 3.7000e-004 | | 3.4000e-004 | 3.4000e-004 | 0.0000 | 0.8934 | 0.8934 | 2.8000e-004 | 0.0000 | 0.9005 |

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3.2 Tank Removal - 2019

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 4.0000e-005 | 1.4800e-003 | 2.5000e-004 | 0.0000 | 9.0000e-005 | 1.0000e-005 | 9.0000e-005 | 2.0000e-005 | 1.0000e-005 | 3.0000e-005 | 0.0000 | 0.3877 | 0.3877 | 2.0000e-005 | 0.0000 | 0.3881 |
| Vendor | 1.0000e-005 | 2.5000e-004 | 7.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 2.0000e-005 | 0.0000 | 0.0000 | 1.0000e-005 | 0.0000 | 0.0549 | 0.0549 | 0.0000 | 0.0000 | 0.0549 |
| Worker | 6.0000e-005 | 5.0000e-005 | 4.5000e-004 | 0.0000 | 1.3000e-004 | 0.0000 | 1.3000e-004 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 0.0000 | 0.1194 | 0.1194 | 0.0000 | 0.0000 | 0.1195 |
| Total | 1.1000e-004 | 1.7800e-003 | 7.7000e-004 | 0.0000 | 2.3000e-004 | 1.0000e-005 | 2.4000e-004 | 5.0000e-005 | 1.0000e-005 | 7.0000e-005 | 0.0000 | 0.5619 | 0.5619 | 2.0000e-005 | 0.0000 | 0.5624 |

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 2.7000e-004 | 0.0000 | 2.7000e-004 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.0200e-003 | 0.0240 | 0.0116 | 3.0000e-005 | | 9.7000e-004 | 9.7000e-004 | | 8.9000e-004 | 8.9000e-004 | 0.0000 | 2.6605 | 2.6605 | 8.4000e-004 | 0.0000 | 2.6816 |
| Total | 2.0200e-003 | 0.0240 | 0.0116 | 3.0000e-005 | 2.7000e-004 | 9.7000e-004 | 1.2400e-003 | 3.0000e-005 | 8.9000e-004 | 9.2000e-004 | 0.0000 | 2.6605 | 2.6605 | 8.4000e-004 | 0.0000 | 2.6816 |

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3.3 Site Preparation - 2019

Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 3.0000e-005 | 6.3000e-004 | 1.8000e-004 | 0.0000 | 3.0000e-005 | 0.0000 | 4.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.1372 | 0.1372 | 1.0000e-005 | 0.0000 | 0.1374 |
| Worker | 1.6000e-004 | 1.2000e-004 | 1.1300e-003 | 0.0000 | 3.2000e-004 | 0.0000 | 3.2000e-004 | 8.0000e-005 | 0.0000 | 9.0000e-005 | 0.0000 | 0.2984 | 0.2984 | 1.0000e-005 | 0.0000 | 0.2986 |
| Total | 1.9000e-004 | 7.5000e-004 | 1.3100e-003 | 0.0000 | 3.5000e-004 | 0.0000 | 3.6000e-004 | 9.0000e-005 | 0.0000 | 1.0000e-004 | 0.0000 | 0.4356 | 0.4356 | 2.0000e-005 | 0.0000 | 0.4360 |

Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 2.7000e-004 | 0.0000 | 2.7000e-004 | 3.0000e-005 | 0.0000 | 3.0000e-005 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.0200e-003 | 0.0240 | 0.0116 | 3.0000e-005 | | 9.7000e-004 | 9.7000e-004 | | 8.9000e-004 | 8.9000e-004 | 0.0000 | 2.6605 | 2.6605 | 8.4000e-004 | 0.0000 | 2.6816 |
| Total | 2.0200e-003 | 0.0240 | 0.0116 | 3.0000e-005 | 2.7000e-004 | 9.7000e-004 | 1.2400e-003 | 3.0000e-005 | 8.9000e-004 | 9.2000e-004 | 0.0000 | 2.6605 | 2.6605 | 8.4000e-004 | 0.0000 | 2.6816 |

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3.3 Site Preparation - 2019

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 3.0000e-005 | 6.3000e-004 | 1.8000e-004 | 0.0000 | 3.0000e-005 | 0.0000 | 4.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.1372 | 0.1372 | 1.0000e-005 | 0.0000 | 0.1374 |
| Worker | 1.6000e-004 | 1.2000e-004 | 1.1300e-003 | 0.0000 | 3.2000e-004 | 0.0000 | 3.2000e-004 | 8.0000e-005 | 0.0000 | 9.0000e-005 | 0.0000 | 0.2984 | 0.2984 | 1.0000e-005 | 0.0000 | 0.2986 |
| Total | 1.9000e-004 | 7.5000e-004 | 1.3100e-003 | 0.0000 | 3.5000e-004 | 0.0000 | 3.6000e-004 | 9.0000e-005 | 0.0000 | 1.0000e-004 | 0.0000 | 0.4356 | 0.4356 | 2.0000e-005 | 0.0000 | 0.4360 |

3.4 Tank Installation - 2019

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0117 | 0.0933 | 0.0541 | 1.1000e-004 | | 4.4100e-003 | 4.4100e-003 | | 4.1800e-003 | 4.1800e-003 | 0.0000 | 8.8248 | 8.8248 | 2.3300e-003 | 0.0000 | 8.8832 |
| Total | 0.0117 | 0.0933 | 0.0541 | 1.1000e-004 | | 4.4100e-003 | 4.4100e-003 | | 4.1800e-003 | 4.1800e-003 | 0.0000 | 8.8248 | 8.8248 | 2.3300e-003 | 0.0000 | 8.8832 |

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3.4 Tank Installation - 2019

Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 6.5000e-004 | 0.0152 | 4.3100e-003 | 3.0000e-005 | 7.9000e-004 | 1.1000e-004 | 9.0000e-004 | 2.3000e-004 | 1.1000e-004 | 3.4000e-004 | 0.0000 | 3.2918 | 3.2918 | 1.9000e-004 | 0.0000 | 3.2966 |
| Worker | 9.6000e-004 | 6.9000e-004 | 6.7600e-003 | 2.0000e-005 | 1.9100e-003 | 1.0000e-005 | 1.9200e-003 | 5.1000e-004 | 1.0000e-005 | 5.2000e-004 | 0.0000 | 1.7905 | 1.7905 | 5.0000e-005 | 0.0000 | 1.7917 |
| Total | 1.6100e-003 | 0.0159 | 0.0111 | 5.0000e-005 | 2.7000e-003 | 1.2000e-004 | 2.8200e-003 | 7.4000e-004 | 1.2000e-004 | 8.6000e-004 | 0.0000 | 5.0823 | 5.0823 | 2.4000e-004 | 0.0000 | 5.0883 |

Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0117 | 0.0933 | 0.0541 | 1.1000e-004 | | 4.4100e-003 | 4.4100e-003 | | 4.1800e-003 | 4.1800e-003 | 0.0000 | 8.8248 | 8.8248 | 2.3300e-003 | 0.0000 | 8.8832 |
| Total | 0.0117 | 0.0933 | 0.0541 | 1.1000e-004 | | 4.4100e-003 | 4.4100e-003 | | 4.1800e-003 | 4.1800e-003 | 0.0000 | 8.8248 | 8.8248 | 2.3300e-003 | 0.0000 | 8.8832 |

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3.4 Tank Installation - 2019

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 6.5000e-004 | 0.0152 | 4.3100e-003 | 3.0000e-005 | 7.9000e-004 | 1.1000e-004 | 9.0000e-004 | 2.3000e-004 | 1.1000e-004 | 3.4000e-004 | 0.0000 | 3.2918 | 3.2918 | 1.9000e-004 | 0.0000 | 3.2966 |
| Worker | 9.6000e-004 | 6.9000e-004 | 6.7600e-003 | 2.0000e-005 | 1.9100e-003 | 1.0000e-005 | 1.9200e-003 | 5.1000e-004 | 1.0000e-005 | 5.2000e-004 | 0.0000 | 1.7905 | 1.7905 | 5.0000e-005 | 0.0000 | 1.7917 |
| Total | 1.6100e-003 | 0.0159 | 0.0111 | 5.0000e-005 | 2.7000e-003 | 1.2000e-004 | 2.8200e-003 | 7.4000e-004 | 1.2000e-004 | 8.6000e-004 | 0.0000 | 5.0823 | 5.0823 | 2.4000e-004 | 0.0000 | 5.0883 |

3.5 Demo (tank, other structures) - 2019

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 1.2100e-003 | 0.0000 | 1.2100e-003 | 1.8000e-004 | 0.0000 | 1.8000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 1.4600e-003 | 0.0127 | 0.0109 | 2.0000e-005 | | 6.9000e-004 | 6.9000e-004 | | 6.7000e-004 | 6.7000e-004 | 0.0000 | 1.9277 | 1.9277 | 3.6000e-004 | 0.0000 | 1.9367 |
| Total | 1.4600e-003 | 0.0127 | 0.0109 | 2.0000e-005 | 1.2100e-003 | 6.9000e-004 | 1.9000e-003 | 1.8000e-004 | 6.7000e-004 | 8.5000e-004 | 0.0000 | 1.9277 | 1.9277 | 3.6000e-004 | 0.0000 | 1.9367 |

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3.5 Demo (tank, other structures) - 2019

Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 2.0000e-005 | 5.9000e-004 | 1.0000e-004 | 0.0000 | 3.0000e-005 | 0.0000 | 4.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.1551 | 0.1551 | 1.0000e-005 | 0.0000 | 0.1552 |
| Vendor | 3.0000e-005 | 6.3000e-004 | 1.8000e-004 | 0.0000 | 3.0000e-005 | 0.0000 | 4.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.1372 | 0.1372 | 1.0000e-005 | 0.0000 | 0.1374 |
| Worker | 1.6000e-004 | 1.2000e-004 | 1.1300e-003 | 0.0000 | 3.2000e-004 | 0.0000 | 3.2000e-004 | 8.0000e-005 | 0.0000 | 9.0000e-005 | 0.0000 | 0.2984 | 0.2984 | 1.0000e-005 | 0.0000 | 0.2986 |
| Total | 2.1000e-004 | 1.3400e-003 | 1.4100e-003 | 0.0000 | 3.8000e-004 | 0.0000 | 4.0000e-004 | 1.0000e-004 | 0.0000 | 1.1000e-004 | 0.0000 | 0.5906 | 0.5906 | 3.0000e-005 | 0.0000 | 0.5912 |

Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---------------|--------------------|---------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 1.2100e-003 | 0.0000 | 1.2100e-003 | 1.8000e-004 | 0.0000 | 1.8000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 1.4600e-003 | 0.0127 | 0.0109 | 2.0000e-005 | | 6.9000e-004 | 6.9000e-004 | | 6.7000e-004 | 6.7000e-004 | 0.0000 | 1.9277 | 1.9277 | 3.6000e-004 | 0.0000 | 1.9367 |
| Total | 1.4600e-003 | 0.0127 | 0.0109 | 2.0000e-005 | 1.2100e-003 | 6.9000e-004 | 1.9000e-003 | 1.8000e-004 | 6.7000e-004 | 8.5000e-004 | 0.0000 | 1.9277 | 1.9277 | 3.6000e-004 | 0.0000 | 1.9367 |

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3.5 Demo (tank, other structures) - 2019

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|--------------------|--------------------|--------------------|---------------|--------------------|---------------|--------------------|--------------------|---------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 2.0000e-005 | 5.9000e-004 | 1.0000e-004 | 0.0000 | 3.0000e-005 | 0.0000 | 4.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.1551 | 0.1551 | 1.0000e-005 | 0.0000 | 0.1552 |
| Vendor | 3.0000e-005 | 6.3000e-004 | 1.8000e-004 | 0.0000 | 3.0000e-005 | 0.0000 | 4.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.1372 | 0.1372 | 1.0000e-005 | 0.0000 | 0.1374 |
| Worker | 1.6000e-004 | 1.2000e-004 | 1.1300e-003 | 0.0000 | 3.2000e-004 | 0.0000 | 3.2000e-004 | 8.0000e-005 | 0.0000 | 9.0000e-005 | 0.0000 | 0.2984 | 0.2984 | 1.0000e-005 | 0.0000 | 0.2986 |
| Total | 2.1000e-004 | 1.3400e-003 | 1.4100e-003 | 0.0000 | 3.8000e-004 | 0.0000 | 4.0000e-004 | 1.0000e-004 | 0.0000 | 1.1000e-004 | 0.0000 | 0.5906 | 0.5906 | 3.0000e-005 | 0.0000 | 0.5912 |

3.6 Trenching - 2019

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|--------------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 4.7400e-003 | 0.0478 | 0.0445 | 7.0000e-005 | | 2.7200e-003 | 2.7200e-003 | | 2.5000e-003 | 2.5000e-003 | 0.0000 | 6.5415 | 6.5415 | 2.0700e-003 | 0.0000 | 6.5932 |
| Total | 4.7400e-003 | 0.0478 | 0.0445 | 7.0000e-005 | | 2.7200e-003 | 2.7200e-003 | | 2.5000e-003 | 2.5000e-003 | 0.0000 | 6.5415 | 6.5415 | 2.0700e-003 | 0.0000 | 6.5932 |

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3.6 Trenching - 2019

Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|--------------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 3.6000e-004 | 0.0119 | 2.0000e-003 | 3.0000e-005 | 6.8000e-004 | 5.0000e-005 | 7.3000e-004 | 1.9000e-004 | 5.0000e-005 | 2.3000e-004 | 0.0000 | 3.1012 | 3.1012 | 1.3000e-004 | 0.0000 | 3.1044 |
| Vendor | 5.0000e-005 | 1.2600e-003 | 3.6000e-004 | 0.0000 | 7.0000e-005 | 1.0000e-005 | 8.0000e-005 | 2.0000e-005 | 1.0000e-005 | 3.0000e-005 | 0.0000 | 0.2743 | 0.2743 | 2.0000e-005 | 0.0000 | 0.2747 |
| Worker | 3.2000e-004 | 2.3000e-004 | 2.2500e-003 | 1.0000e-005 | 6.4000e-004 | 0.0000 | 6.4000e-004 | 1.7000e-004 | 0.0000 | 1.7000e-004 | 0.0000 | 0.5968 | 0.5968 | 2.0000e-005 | 0.0000 | 0.5972 |
| Total | 7.3000e-004 | 0.0134 | 4.6100e-003 | 4.0000e-005 | 1.3900e-003 | 6.0000e-005 | 1.4500e-003 | 3.8000e-004 | 6.0000e-005 | 4.3000e-004 | 0.0000 | 3.9724 | 3.9724 | 1.7000e-004 | 0.0000 | 3.9763 |

Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|--------------------|---------------|---------------|--------------------|---------------|--------------------|--------------------|----------------|--------------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 4.7400e-003 | 0.0478 | 0.0445 | 7.0000e-005 | | 2.7200e-003 | 2.7200e-003 | | 2.5000e-003 | 2.5000e-003 | 0.0000 | 6.5415 | 6.5415 | 2.0700e-003 | 0.0000 | 6.5932 |
| Total | 4.7400e-003 | 0.0478 | 0.0445 | 7.0000e-005 | | 2.7200e-003 | 2.7200e-003 | | 2.5000e-003 | 2.5000e-003 | 0.0000 | 6.5415 | 6.5415 | 2.0700e-003 | 0.0000 | 6.5932 |

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3.6 Trenching - 2019

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|--------------------|---------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------|---------------|---------------|--------------------|---------------|---------------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 3.6000e-004 | 0.0119 | 2.0000e-003 | 3.0000e-005 | 6.8000e-004 | 5.0000e-005 | 7.3000e-004 | 1.9000e-004 | 5.0000e-005 | 2.3000e-004 | 0.0000 | 3.1012 | 3.1012 | 1.3000e-004 | 0.0000 | 3.1044 |
| Vendor | 5.0000e-005 | 1.2600e-003 | 3.6000e-004 | 0.0000 | 7.0000e-005 | 1.0000e-005 | 8.0000e-005 | 2.0000e-005 | 1.0000e-005 | 3.0000e-005 | 0.0000 | 0.2743 | 0.2743 | 2.0000e-005 | 0.0000 | 0.2747 |
| Worker | 3.2000e-004 | 2.3000e-004 | 2.2500e-003 | 1.0000e-005 | 6.4000e-004 | 0.0000 | 6.4000e-004 | 1.7000e-004 | 0.0000 | 1.7000e-004 | 0.0000 | 0.5968 | 0.5968 | 2.0000e-005 | 0.0000 | 0.5972 |
| Total | 7.3000e-004 | 0.0134 | 4.6100e-003 | 4.0000e-005 | 1.3900e-003 | 6.0000e-005 | 1.4500e-003 | 3.8000e-004 | 6.0000e-005 | 4.3000e-004 | 0.0000 | 3.9724 | 3.9724 | 1.7000e-004 | 0.0000 | 3.9763 |

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|-------------|---------|--------|--------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|--------|--------|--------|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

4.2 Trip Summary Information

| Land Use | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|-----------|-------------------------|----------|--------|-------------|------------|
| | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| City Park | 0.00 | 0.00 | 0.00 | | |
| Total | 0.00 | 0.00 | 0.00 | | |

4.3 Trip Type Information

| Land Use | Miles | | | Trip % | | | Trip Purpose % | | |
|-----------|------------|------------|-------------|------------|------------|-------------|----------------|----------|---------|
| | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| City Park | 9.50 | 7.30 | 7.30 | 33.00 | 48.00 | 19.00 | 66 | 28 | 6 |

4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| City Park | 0.579245 | 0.037675 | 0.174898 | 0.116107 | 0.020475 | 0.005588 | 0.009509 | 0.042408 | 0.003213 | 0.002343 | 0.006812 | 0.000608 | 0.001119 |

5.0 Energy Detail

Historical Energy Use: N

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5.2 Energy by Land Use - Natural Gas

Mitigated

| | Natural Gas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|-----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| City Park | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

5.3 Energy by Land Use - Electricity

Unmitigated

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|--------------|-----------------|---------------|---------------|---------------|---------------|
| Land Use | kWh/yr | MT/yr | | | |
| City Park | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

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6.2 Area by SubCategory

Unmitigated

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|-----------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

Mitigated

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|-----------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

7.0 Water Detail

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7.1 Mitigation Measures Water

| | Total CO2 | CH4 | N2O | CO2e |
|-------------|-----------|--------|--------|--------|
| Category | MT/yr | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

7.2 Water by Land Use

Unmitigated

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|--------------|--------------------|---------------|---------------|---------------|---------------|
| Land Use | Mgal | MT/yr | | | |
| City Park | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

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7.2 Water by Land Use

Mitigated

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|--------------|--------------------|---------------|---------------|---------------|---------------|
| Land Use | Mgal | MT/yr | | | |
| City Park | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

| | Total CO2 | CH4 | N2O | CO2e |
|-------------|-----------|--------|--------|--------|
| | MT/yr | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

Benicia - Solano-San Francisco County, Annual

8.2 Waste by Land Use

Unmitigated

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|--------------|----------------|---------------|---------------|---------------|---------------|
| Land Use | tons | MT/yr | | | |
| City Park | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

Mitigated

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|--------------|----------------|---------------|---------------|---------------|---------------|
| Land Use | tons | MT/yr | | | |
| City Park | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total | | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|-----------|-------------|-------------|-----------|
|----------------|--------|-----------|-----------|-------------|-------------|-----------|

Benicia - Solano-San Francisco County, Annual

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|------------|-------------|-------------|-----------|
|----------------|--------|-----------|------------|-------------|-------------|-----------|

Boilers

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|----------------|--------|----------------|-----------------|---------------|-----------|
|----------------|--------|----------------|-----------------|---------------|-----------|

User Defined Equipment

| Equipment Type | Number |
|----------------|--------|
|----------------|--------|

11.0 Vegetation

CalEEMod Summer Emissions

Benicia - Solano-San Francisco County, Summer

Benicia
Solano-San Francisco County, Summer

1.0 Project Characteristics

1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|-----------|------|--------|-------------|--------------------|------------|
| City Park | 0.00 | Acre | 0.00 | 0.00 | 0 |

1.2 Other Project Characteristics

| | | | | | |
|---------------------------------|--------------------------------|---------------------------------|-------|----------------------------------|-------|
| Urbanization | Urban | Wind Speed (m/s) | 2.2 | Precipitation Freq (Days) | 56 |
| Climate Zone | 4 | | | Operational Year | 2020 |
| Utility Company | Pacific Gas & Electric Company | | | | |
| CO2 Intensity (lb/MW hr) | 641.35 | CH4 Intensity (lb/MW hr) | 0.029 | N2O Intensity (lb/MW hr) | 0.006 |

1.3 User Entered Comments & Non-Default Data

Benicia - Solano-San Francisco County, Summer

Project Characteristics -

Land Use - Land use is a proxy since this project is mostly construction-only impacts

Construction Phase - Project-specific info

Off-road Equipment - Project-specific info

Off-road Equipment - Project-specific info

Off-road Equipment - Project-specific info

Off-road Equipment - Project-specific info

Off-road Equipment -

Grading - Up to 0.5 acres graded for staging areas

Demolition - Below-grade concrete tank dimensions are 17*17*8.5 ft.

Trips and VMT - Worker: Up to 8 workers on site = 8 roundtrips or 16 trips

Vendor: Assumed 1 roundtrip per day for vendor equipment delivery. For tank installation, added 6 additional for tank delivery

Haul: 10 trips for tank removal, 4 for concrete tank removal (total cu yds demo material = 25.21), 80 truck trips for engineered fill during trenching

| Table Name | Column Name | Default Value | New Value |
|----------------------|----------------|---------------|-----------|
| tblConstructionPhase | NumDays | 0.00 | 30.00 |
| tblConstructionPhase | NumDays | 0.00 | 2.00 |
| tblConstructionPhase | NumDays | 0.00 | 5.00 |
| tblConstructionPhase | NumDays | 0.00 | 5.00 |
| tblConstructionPhase | PhaseEndDate | 5/31/2019 | 8/13/2019 |
| tblConstructionPhase | PhaseEndDate | 5/31/2019 | 6/11/2019 |
| tblConstructionPhase | PhaseEndDate | 5/31/2019 | 6/7/2019 |
| tblConstructionPhase | PhaseStartDate | 6/1/2019 | 7/3/2019 |
| tblConstructionPhase | PhaseStartDate | 6/1/2019 | 6/8/2019 |
| tblGrading | AcresOfGrading | 2.19 | 0.50 |
| tblOffRoadEquipment | LoadFactor | 0.29 | 0.29 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |

Benicia - Solano-San Francisco County, Summer

| | | | |
|---------------------|----------------------------|------|---------------------------|
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.37 | 0.37 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | LoadFactor | 0.38 | 0.38 |
| tblOffRoadEquipment | OffRoadEquipmentType | | Cranes |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Cement and Mortar Mixers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Welders |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentType | | Excavators |
| tblOffRoadEquipment | OffRoadEquipmentType | | Tractors/Loaders/Backhoes |
| tblOffRoadEquipment | OffRoadEquipmentType | | Rollers |
| tblOffRoadEquipment | OffRoadEquipmentType | | Off-Highway Trucks |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 0.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 2.00 | 1.00 |
| tblOffRoadEquipment | UsageHours | 8.00 | 6.00 |
| tblOffRoadEquipment | UsageHours | 6.00 | 2.00 |
| tblOffRoadEquipment | UsageHours | 4.00 | 6.00 |
| tblOffRoadEquipment | UsageHours | 8.00 | 7.00 |
| tblOffRoadEquipment | UsageHours | 8.00 | 7.00 |

Benicia - Solano-San Francisco County, Summer

| | | | |
|----------------|-------------------|-------|-------|
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 10.00 |
| tblTripsAndVMT | HaulingTripNumber | 11.00 | 4.00 |
| tblTripsAndVMT | HaulingTripNumber | 0.00 | 80.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 2.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 2.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 8.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 2.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 2.00 |
| tblTripsAndVMT | WorkerTripNumber | 8.00 | 16.00 |
| tblTripsAndVMT | WorkerTripNumber | 8.00 | 16.00 |
| tblTripsAndVMT | WorkerTripNumber | 0.00 | 16.00 |
| tblTripsAndVMT | WorkerTripNumber | 8.00 | 16.00 |
| tblTripsAndVMT | WorkerTripNumber | 13.00 | 16.00 |

2.0 Emissions Summary

Benicia - Solano-San Francisco County, Summer

2.2 Overall Operational

Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|---------------|---------------|---------------|---------------|---------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Total | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|---------------|---------------|---------------|---------------|---------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Total | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

Benicia - Solano-San Francisco County, Summer

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N2O | CO2e |
|-------------------|------|------|------|------|---------------|--------------|------------|----------------|---------------|-------------|----------|----------|-----------|------|------|------|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

3.0 Construction Detail

Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|--------------|-------------------------------|-----------------------|------------|-----------|---------------|----------|-------------------|
| 1 | Tank Removal | Demolition | 6/8/2019 | 6/11/2019 | 5 | 2 | |
| 2 | Site Preparation | Site Preparation | 6/1/2019 | 6/7/2019 | 5 | 5 | |
| 3 | Tank Installation | Building Construction | 7/3/2019 | 8/13/2019 | 5 | 30 | |
| 4 | Demo (tank, other structures) | Demolition | 6/12/2019 | 6/18/2019 | 5 | 5 | |
| 5 | Trenching | Trenching | 6/19/2019 | 7/2/2019 | 5 | 10 | |

Acres of Grading (Site Preparation Phase): 0.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Benicia - Solano-San Francisco County, Summer

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|-------------------------------|---------------------------|--------|-------------|-------------|-------------|
| Demo (tank, other structures) | Concrete/Industrial Saws | 1 | 6.00 | 81 | 0.73 |
| Demo (tank, other structures) | Rubber Tired Dozers | 0 | 1.00 | 247 | 0.40 |
| Tank Removal | Concrete/Industrial Saws | 0 | 8.00 | 81 | 0.73 |
| Demo (tank, other structures) | Tractors/Loaders/Backhoes | 1 | 2.00 | 97 | 0.37 |
| Tank Installation | Cranes | 1 | 6.00 | 231 | 0.29 |
| Tank Installation | Forklifts | 0 | 6.00 | 89 | 0.20 |
| Site Preparation | Graders | 1 | 7.00 | 187 | 0.41 |
| Tank Removal | Cranes | 1 | 6.00 | 231 | 0.29 |
| Tank Removal | Off-Highway Trucks | 1 | 2.00 | 402 | 0.38 |
| Tank Removal | Rubber Tired Dozers | 0 | 1.00 | 247 | 0.40 |
| Site Preparation | Off-Highway Trucks | 1 | 2.00 | 402 | 0.38 |
| Tank Installation | Tractors/Loaders/Backhoes | 0 | 8.00 | 97 | 0.37 |
| Tank Removal | Tractors/Loaders/Backhoes | 1 | 6.00 | 97 | 0.37 |
| Tank Installation | Cement and Mortar Mixers | 1 | 2.00 | 9 | 0.56 |
| Tank Installation | Welders | 1 | 8.00 | 46 | 0.45 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 7.00 | 97 | 0.37 |
| Demo (tank, other structures) | Off-Highway Trucks | 1 | 2.00 | 402 | 0.38 |
| Trenching | Excavators | 1 | 6.00 | 158 | 0.38 |
| Trenching | Tractors/Loaders/Backhoes | 2 | 7.00 | 97 | 0.37 |
| Trenching | Rollers | 1 | 6.00 | 80 | 0.38 |
| Trenching | Off-Highway Trucks | 1 | 2.00 | 402 | 0.38 |

Trips and VMT

Benicia - Solano-San Francisco County, Summer

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|-------------------------------|-------------------------|--------------------|--------------------|---------------------|--------------------|--------------------|---------------------|----------------------|----------------------|-----------------------|
| Tank Removal | 3 | 16.00 | 2.00 | 10.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 3 | 16.00 | 2.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Demo (tank, other structures) | 3 | 16.00 | 2.00 | 4.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Tank Installation | 3 | 16.00 | 8.00 | 0.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Trenching | 5 | 16.00 | 2.00 | 80.00 | 10.80 | 7.30 | 20.00 | LD_Mix | HDT_Mix | HHDT |

3.1 Mitigation Measures Construction

3.2 Tank Removal - 2019

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------------|-----------------|---------------|-----|-----------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.7285 | 8.0351 | 4.4397 | 9.9500e-003 | | 0.3724 | 0.3724 | | 0.3427 | 0.3427 | | 984.8251 | 984.8251 | 0.3116 | | 992.6148 |
| Total | 0.7285 | 8.0351 | 4.4397 | 9.9500e-003 | | 0.3724 | 0.3724 | | 0.3427 | 0.3427 | | 984.8251 | 984.8251 | 0.3116 | | 992.6148 |

Benicia - Solano-San Francisco County, Summer

3.2 Tank Removal - 2019

Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------------|-----------------|---------------|-----|-----------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0442 | 1.4474 | 0.2384 | 4.1000e-003 | 0.0876 | 5.8600e-003 | 0.0934 | 0.0240 | 5.6000e-003 | 0.0296 | | 431.2962 | 431.2962 | 0.0168 | | 431.7153 |
| Vendor | 0.0106 | 0.2485 | 0.0674 | 5.9000e-004 | 0.0136 | 1.8600e-003 | 0.0154 | 3.9000e-003 | 1.7800e-003 | 5.6800e-003 | | 61.2900 | 61.2900 | 3.3400e-003 | | 61.3735 |
| Worker | 0.0687 | 0.0412 | 0.4969 | 1.4300e-003 | 0.1314 | 9.1000e-004 | 0.1323 | 0.0349 | 8.4000e-004 | 0.0357 | | 142.4907 | 142.4907 | 3.9400e-003 | | 142.5891 |
| Total | 0.1235 | 1.7370 | 0.8027 | 6.1200e-003 | 0.2326 | 8.6300e-003 | 0.2412 | 0.0628 | 8.2200e-003 | 0.0710 | | 635.0769 | 635.0769 | 0.0240 | | 635.6778 |

Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|---------------|-----------------|-----------------|---------------|-----|-----------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.7285 | 8.0351 | 4.4397 | 9.9500e-003 | | 0.3724 | 0.3724 | | 0.3427 | 0.3427 | 0.0000 | 984.8251 | 984.8251 | 0.3116 | | 992.6148 |
| Total | 0.7285 | 8.0351 | 4.4397 | 9.9500e-003 | | 0.3724 | 0.3724 | | 0.3427 | 0.3427 | 0.0000 | 984.8251 | 984.8251 | 0.3116 | | 992.6148 |

Benicia - Solano-San Francisco County, Summer

3.2 Tank Removal - 2019

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------------|-----------------|---------------|-----|-----------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0442 | 1.4474 | 0.2384 | 4.1000e-003 | 0.0876 | 5.8600e-003 | 0.0934 | 0.0240 | 5.6000e-003 | 0.0296 | | 431.2962 | 431.2962 | 0.0168 | | 431.7153 |
| Vendor | 0.0106 | 0.2485 | 0.0674 | 5.9000e-004 | 0.0136 | 1.8600e-003 | 0.0154 | 3.9000e-003 | 1.7800e-003 | 5.6800e-003 | | 61.2900 | 61.2900 | 3.3400e-003 | | 61.3735 |
| Worker | 0.0687 | 0.0412 | 0.4969 | 1.4300e-003 | 0.1314 | 9.1000e-004 | 0.1323 | 0.0349 | 8.4000e-004 | 0.0357 | | 142.4907 | 142.4907 | 3.9400e-003 | | 142.5891 |
| Total | 0.1235 | 1.7370 | 0.8027 | 6.1200e-003 | 0.2326 | 8.6300e-003 | 0.2412 | 0.0628 | 8.2200e-003 | 0.0710 | | 635.0769 | 635.0769 | 0.0240 | | 635.6778 |

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-------------------|-------------------|---------------|-----|-------------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.1061 | 0.0000 | 0.1061 | 0.0115 | 0.0000 | 0.0115 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.8080 | 9.6087 | 4.6273 | 0.0119 | | 0.3870 | 0.3870 | | 0.3560 | 0.3560 | | 1,173.0904 | 1,173.0904 | 0.3712 | | 1,182.3693 |
| Total | 0.8080 | 9.6087 | 4.6273 | 0.0119 | 0.1061 | 0.3870 | 0.4930 | 0.0115 | 0.3560 | 0.3675 | | 1,173.0904 | 1,173.0904 | 0.3712 | | 1,182.3693 |

Benicia - Solano-San Francisco County, Summer

3.3 Site Preparation - 2019

Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------------|-----------------|--------------------|-----|-----------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0106 | 0.2485 | 0.0674 | 5.9000e-004 | 0.0136 | 1.8600e-003 | 0.0154 | 3.9000e-003 | 1.7800e-003 | 5.6800e-003 | | 61.2900 | 61.2900 | 3.3400e-003 | | 61.3735 |
| Worker | 0.0687 | 0.0412 | 0.4969 | 1.4300e-003 | 0.1314 | 9.1000e-004 | 0.1323 | 0.0349 | 8.4000e-004 | 0.0357 | | 142.4907 | 142.4907 | 3.9400e-003 | | 142.5891 |
| Total | 0.0793 | 0.2896 | 0.5643 | 2.0200e-003 | 0.1450 | 2.7700e-003 | 0.1478 | 0.0388 | 2.6200e-003 | 0.0414 | | 203.7807 | 203.7807 | 7.2800e-003 | | 203.9625 |

Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|---------------|-------------------|-------------------|---------------|-----|-------------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.1061 | 0.0000 | 0.1061 | 0.0115 | 0.0000 | 0.0115 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.8080 | 9.6087 | 4.6273 | 0.0119 | | 0.3870 | 0.3870 | | 0.3560 | 0.3560 | 0.0000 | 1,173.0904 | 1,173.0904 | 0.3712 | | 1,182.3693 |
| Total | 0.8080 | 9.6087 | 4.6273 | 0.0119 | 0.1061 | 0.3870 | 0.4930 | 0.0115 | 0.3560 | 0.3675 | 0.0000 | 1,173.0904 | 1,173.0904 | 0.3712 | | 1,182.3693 |

Benicia - Solano-San Francisco County, Summer

3.3 Site Preparation - 2019

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------------|-----------------|--------------------|-----|-----------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0106 | 0.2485 | 0.0674 | 5.9000e-004 | 0.0136 | 1.8600e-003 | 0.0154 | 3.9000e-003 | 1.7800e-003 | 5.6800e-003 | | 61.2900 | 61.2900 | 3.3400e-003 | | 61.3735 |
| Worker | 0.0687 | 0.0412 | 0.4969 | 1.4300e-003 | 0.1314 | 9.1000e-004 | 0.1323 | 0.0349 | 8.4000e-004 | 0.0357 | | 142.4907 | 142.4907 | 3.9400e-003 | | 142.5891 |
| Total | 0.0793 | 0.2896 | 0.5643 | 2.0200e-003 | 0.1450 | 2.7700e-003 | 0.1478 | 0.0388 | 2.6200e-003 | 0.0414 | | 203.7807 | 203.7807 | 7.2800e-003 | | 203.9625 |

3.4 Tank Installation - 2019

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------------|-----------------|---------------|-----|-----------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.7779 | 6.2216 | 3.6041 | 7.0600e-003 | | 0.2942 | 0.2942 | | 0.2790 | 0.2790 | | 648.5147 | 648.5147 | 0.1715 | | 652.8032 |
| Total | 0.7779 | 6.2216 | 3.6041 | 7.0600e-003 | | 0.2942 | 0.2942 | | 0.2790 | 0.2790 | | 648.5147 | 648.5147 | 0.1715 | | 652.8032 |

Benicia - Solano-San Francisco County, Summer

3.4 Tank Installation - 2019

Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------------|-----------------|---------------|-----|-----------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0425 | 0.9938 | 0.2694 | 2.3400e-003 | 0.0542 | 7.4300e-003 | 0.0617 | 0.0156 | 7.1100e-003 | 0.0227 | | 245.1601 | 245.1601 | 0.0134 | | 245.4938 |
| Worker | 0.0687 | 0.0412 | 0.4969 | 1.4300e-003 | 0.1314 | 9.1000e-004 | 0.1323 | 0.0349 | 8.4000e-004 | 0.0357 | | 142.4907 | 142.4907 | 3.9400e-003 | | 142.5891 |
| Total | 0.1112 | 1.0350 | 0.7663 | 3.7700e-003 | 0.1857 | 8.3400e-003 | 0.1940 | 0.0505 | 7.9500e-003 | 0.0584 | | 387.6508 | 387.6508 | 0.0173 | | 388.0829 |

Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|---------------|-----------------|-----------------|---------------|-----|-----------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.7779 | 6.2216 | 3.6041 | 7.0600e-003 | | 0.2942 | 0.2942 | | 0.2790 | 0.2790 | 0.0000 | 648.5147 | 648.5147 | 0.1715 | | 652.8032 |
| Total | 0.7779 | 6.2216 | 3.6041 | 7.0600e-003 | | 0.2942 | 0.2942 | | 0.2790 | 0.2790 | 0.0000 | 648.5147 | 648.5147 | 0.1715 | | 652.8032 |

Benicia - Solano-San Francisco County, Summer

3.4 Tank Installation - 2019**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------------|-----------------|---------------|-----|-----------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0425 | 0.9938 | 0.2694 | 2.3400e-003 | 0.0542 | 7.4300e-003 | 0.0617 | 0.0156 | 7.1100e-003 | 0.0227 | | 245.1601 | 245.1601 | 0.0134 | | 245.4938 |
| Worker | 0.0687 | 0.0412 | 0.4969 | 1.4300e-003 | 0.1314 | 9.1000e-004 | 0.1323 | 0.0349 | 8.4000e-004 | 0.0357 | | 142.4907 | 142.4907 | 3.9400e-003 | | 142.5891 |
| Total | 0.1112 | 1.0350 | 0.7663 | 3.7700e-003 | 0.1857 | 8.3400e-003 | 0.1940 | 0.0505 | 7.9500e-003 | 0.0584 | | 387.6508 | 387.6508 | 0.0173 | | 388.0829 |

3.5 Demo (tank, other structures) - 2019**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------------|-----------------|---------------|-----|-----------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.4836 | 0.0000 | 0.4836 | 0.0732 | 0.0000 | 0.0732 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.5831 | 5.0821 | 4.3565 | 8.7900e-003 | | 0.2768 | 0.2768 | | 0.2684 | 0.2684 | | 849.9523 | 849.9523 | 0.1596 | | 853.9415 |
| Total | 0.5831 | 5.0821 | 4.3565 | 8.7900e-003 | 0.4836 | 0.2768 | 0.7604 | 0.0732 | 0.2684 | 0.3416 | | 849.9523 | 849.9523 | 0.1596 | | 853.9415 |

Benicia - Solano-San Francisco County, Summer

3.5 Demo (tank, other structures) - 2019

Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------------|-----------------|--------------------|-----|-----------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 7.0700e-003 | 0.2316 | 0.0382 | 6.6000e-004 | 0.0140 | 9.4000e-004 | 0.0150 | 3.8400e-003 | 9.0000e-004 | 4.7400e-003 | | 69.0074 | 69.0074 | 2.6800e-003 | | 69.0745 |
| Vendor | 0.0106 | 0.2485 | 0.0674 | 5.9000e-004 | 0.0136 | 1.8600e-003 | 0.0154 | 3.9000e-003 | 1.7800e-003 | 5.6800e-003 | | 61.2900 | 61.2900 | 3.3400e-003 | | 61.3735 |
| Worker | 0.0687 | 0.0412 | 0.4969 | 1.4300e-003 | 0.1314 | 9.1000e-004 | 0.1323 | 0.0349 | 8.4000e-004 | 0.0357 | | 142.4907 | 142.4907 | 3.9400e-003 | | 142.5891 |
| Total | 0.0864 | 0.5212 | 0.6024 | 2.6800e-003 | 0.1590 | 3.7100e-003 | 0.1627 | 0.0426 | 3.5200e-003 | 0.0461 | | 272.7881 | 272.7881 | 9.9600e-003 | | 273.0370 |

Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|---------------|-----------------|-----------------|---------------|-----|-----------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.4836 | 0.0000 | 0.4836 | 0.0732 | 0.0000 | 0.0732 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.5831 | 5.0821 | 4.3565 | 8.7900e-003 | | 0.2768 | 0.2768 | | 0.2684 | 0.2684 | 0.0000 | 849.9523 | 849.9523 | 0.1596 | | 853.9415 |
| Total | 0.5831 | 5.0821 | 4.3565 | 8.7900e-003 | 0.4836 | 0.2768 | 0.7604 | 0.0732 | 0.2684 | 0.3416 | 0.0000 | 849.9523 | 849.9523 | 0.1596 | | 853.9415 |

Benicia - Solano-San Francisco County, Summer

3.5 Demo (tank, other structures) - 2019

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|--------------------|---------------|--------------------|---------------|----------------|--------------------|---------------|----------|-----------------|-----------------|--------------------|-----|-----------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 7.0700e-003 | 0.2316 | 0.0382 | 6.6000e-004 | 0.0140 | 9.4000e-004 | 0.0150 | 3.8400e-003 | 9.0000e-004 | 4.7400e-003 | | 69.0074 | 69.0074 | 2.6800e-003 | | 69.0745 |
| Vendor | 0.0106 | 0.2485 | 0.0674 | 5.9000e-004 | 0.0136 | 1.8600e-003 | 0.0154 | 3.9000e-003 | 1.7800e-003 | 5.6800e-003 | | 61.2900 | 61.2900 | 3.3400e-003 | | 61.3735 |
| Worker | 0.0687 | 0.0412 | 0.4969 | 1.4300e-003 | 0.1314 | 9.1000e-004 | 0.1323 | 0.0349 | 8.4000e-004 | 0.0357 | | 142.4907 | 142.4907 | 3.9400e-003 | | 142.5891 |
| Total | 0.0864 | 0.5212 | 0.6024 | 2.6800e-003 | 0.1590 | 3.7100e-003 | 0.1627 | 0.0426 | 3.5200e-003 | 0.0461 | | 272.7881 | 272.7881 | 9.9600e-003 | | 273.0370 |

3.6 Trenching - 2019

Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-------------------|-------------------|---------------|-----|-------------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9484 | 9.5611 | 8.8896 | 0.0146 | | 0.5442 | 0.5442 | | 0.5007 | 0.5007 | | 1,442.1475 | 1,442.1475 | 0.4563 | | 1,453.5545 |
| Total | 0.9484 | 9.5611 | 8.8896 | 0.0146 | | 0.5442 | 0.5442 | | 0.5007 | 0.5007 | | 1,442.1475 | 1,442.1475 | 0.4563 | | 1,453.5545 |

Benicia - Solano-San Francisco County, Summer

3.6 Trenching - 2019

Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------------|-----------------|---------------|-----|-----------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0708 | 2.3159 | 0.3815 | 6.5600e-003 | 0.1401 | 9.3700e-003 | 0.1495 | 0.0384 | 8.9700e-003 | 0.0474 | | 690.0739 | 690.0739 | 0.0268 | | 690.7445 |
| Vendor | 0.0106 | 0.2485 | 0.0674 | 5.9000e-004 | 0.0136 | 1.8600e-003 | 0.0154 | 3.9000e-003 | 1.7800e-003 | 5.6800e-003 | | 61.2900 | 61.2900 | 3.3400e-003 | | 61.3735 |
| Worker | 0.0687 | 0.0412 | 0.4969 | 1.4300e-003 | 0.1314 | 9.1000e-004 | 0.1323 | 0.0349 | 8.4000e-004 | 0.0357 | | 142.4907 | 142.4907 | 3.9400e-003 | | 142.5891 |
| Total | 0.1500 | 2.6055 | 0.9457 | 8.5800e-003 | 0.2851 | 0.0121 | 0.2973 | 0.0772 | 0.0116 | 0.0888 | | 893.8546 | 893.8546 | 0.0341 | | 894.7070 |

Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|---------------|-------------------|-------------------|---------------|-----|-------------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 0.9484 | 9.5611 | 8.8896 | 0.0146 | | 0.5442 | 0.5442 | | 0.5007 | 0.5007 | 0.0000 | 1,442.1475 | 1,442.1475 | 0.4563 | | 1,453.5545 |
| Total | 0.9484 | 9.5611 | 8.8896 | 0.0146 | | 0.5442 | 0.5442 | | 0.5007 | 0.5007 | 0.0000 | 1,442.1475 | 1,442.1475 | 0.4563 | | 1,453.5545 |

Benicia - Solano-San Francisco County, Summer

3.6 Trenching - 2019

Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|---------------|---------------|---------------|--------------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|-----------------|-----------------|---------------|-----|-----------------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0708 | 2.3159 | 0.3815 | 6.5600e-003 | 0.1401 | 9.3700e-003 | 0.1495 | 0.0384 | 8.9700e-003 | 0.0474 | | 690.0739 | 690.0739 | 0.0268 | | 690.7445 |
| Vendor | 0.0106 | 0.2485 | 0.0674 | 5.9000e-004 | 0.0136 | 1.8600e-003 | 0.0154 | 3.9000e-003 | 1.7800e-003 | 5.6800e-003 | | 61.2900 | 61.2900 | 3.3400e-003 | | 61.3735 |
| Worker | 0.0687 | 0.0412 | 0.4969 | 1.4300e-003 | 0.1314 | 9.1000e-004 | 0.1323 | 0.0349 | 8.4000e-004 | 0.0357 | | 142.4907 | 142.4907 | 3.9400e-003 | | 142.5891 |
| Total | 0.1500 | 2.6055 | 0.9457 | 8.5800e-003 | 0.2851 | 0.0121 | 0.2973 | 0.0772 | 0.0116 | 0.0888 | | 893.8546 | 893.8546 | 0.0341 | | 894.7070 |

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Benicia - Solano-San Francisco County, Summer

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|-------------|--------|--------|--------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|--------|-----|--------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |

4.2 Trip Summary Information

| Land Use | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|-----------|-------------------------|----------|--------|-------------|------------|
| | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| City Park | 0.00 | 0.00 | 0.00 | | |
| Total | 0.00 | 0.00 | 0.00 | | |

4.3 Trip Type Information

| Land Use | Miles | | | Trip % | | | Trip Purpose % | | |
|-----------|------------|------------|-------------|------------|------------|-------------|----------------|----------|---------|
| | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| City Park | 9.50 | 7.30 | 7.30 | 33.00 | 48.00 | 19.00 | 66 | 28 | 6 |

4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| City Park | 0.579245 | 0.037675 | 0.174898 | 0.116107 | 0.020475 | 0.005588 | 0.009509 | 0.042408 | 0.003213 | 0.002343 | 0.006812 | 0.000608 | 0.001119 |

5.0 Energy Detail

Historical Energy Use: N

Benicia - Solano-San Francisco County, Summer

5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|------------------------|--------|--------|--------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|--------|--------|--------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| NaturalGas Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

5.2 Energy by Land Use - NaturalGas

Unmitigated

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|---------------|---------------|---------------|---------------|---------------|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| City Park | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

Benicia - Solano-San Francisco County, Summer

5.2 Energy by Land Use - NaturalGas

Mitigated

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|--------------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|---------------|---------------|---------------|---------------|---------------|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| City Park | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Total | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

6.0 Area Detail

6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|-------------|--------|--------|--------|--------|---------------|--------------|------------|----------------|---------------|-------------|----------|-----------|-----------|--------|-----|--------|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |

Benicia - Solano-San Francisco County, Summer

6.2 Area by SubCategory

Unmitigated

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|-----------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|---------------|---------------|---------------|-----|---------------|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Landscaping | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Total | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |

Mitigated

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|-----------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|---------------|---------------|----------|---------------|---------------|---------------|-----|---------------|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Landscaping | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Total | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |

7.0 Water Detail

Benicia - Solano-San Francisco County, Summer

7.1 Mitigation Measures Water**8.0 Waste Detail****8.1 Mitigation Measures Waste****9.0 Operational Offroad**

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|-----------|-------------|-------------|-----------|
|----------------|--------|-----------|-----------|-------------|-------------|-----------|

10.0 Stationary Equipment**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|----------------|--------|-----------|------------|-------------|-------------|-----------|
|----------------|--------|-----------|------------|-------------|-------------|-----------|

Boilers

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|----------------|--------|----------------|-----------------|---------------|-----------|
|----------------|--------|----------------|-----------------|---------------|-----------|

User Defined Equipment

| Equipment Type | Number |
|----------------|--------|
|----------------|--------|

11.0 Vegetation

Appendix B

Biological Resources

Biological Constraints Analysis

Appendix C

Noise and Vibration

Construction Noise



Construction Source Noise Prediction Model: Maximum Noise Levels for Trenching

| Location | Distance to Nearest Receptor in feet | Combined Predicted Noise Level (L_{max} dBA) | Equipment | Reference Emission Noise Levels (L_{max}) at 50 feet ¹ | Usage Factor ¹ |
|---------------------|--------------------------------------|---|---|---|---------------------------|
| Threshold | 1,938 | 60.0 | Concrete Saw | 90 | 1 |
| Sensitive Receptors | 3000 | 56.2 | Tractor | 84 | 1 |
| | | | Dump Truck | 84 | 1 |
| | | | Ground Type | HARD | |
| | | | Source Height | 8 | |
| | | | Receiver Height | 5 | |
| | | | Ground Factor ² | 0.00 | |
| | | | Predicted Noise Level³ | L_{max} dBA at 50 feet³ | |
| | | | Concrete Saw | 90.0 | |
| | | | Tractor | 84.0 | |
| | | | Dump Truck | 84.0 | |
| | | | Combined Predicted Noise Level (L_{max} dBA at 50 feet) | 91.8 | |

Sources:

¹ Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

² Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

³ Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$$L_{eq}(\text{equip}) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$$

Where: E.L. = Emission Level;

U.F. = Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.



Noise Prediction Model: Maximum Noise Levels for Pump Operation

| Location | Distance to Nearest Receptor in feet | Combined Predicted Noise Level (L_{max} dBA) | Equipment | Reference Emission Noise Levels (L_{max}) at 50 feet ¹ | Usage Factor ¹ |
|---------------------|--------------------------------------|---|-----------|---|---------------------------|
| Threshold | 354 | 60.0 | Pumps | 77 | 1 |
| Sensitive Receptors | 3000 | 41.4 | | | |

| | |
|----------------------------|------|
| Ground Type | HARD |
| Source Height | 8 |
| Receiver Height | 5 |
| Ground Factor ² | 0.00 |

| Predicted Noise Level ³ | L_{max} dBA at 50 feet ³ |
|------------------------------------|---------------------------------------|
| Pumps | 77.0 |

| Combined Predicted Noise Level (L_{max} dBA at 50 feet) |
|--|
| 77.0 |

Sources:

¹ Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

² Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

³ Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$$L_{eq}(\text{equip}) = E.L. + 10 \cdot \log(U.F.) - 20 \cdot \log(D/50) - 10 \cdot G \cdot \log(D/50)$$

Where: E.L. = Emission Level;

U.F. = Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

| Equipment Description | Acoustical Usage Factor (%) | Spec 721.560 Lmax @ 50ft (dBA slow) | Actual Measured Lmax @ 50ft (dBA slow) | No. of Actual Data Samples (count) | Spec 721.560 LmaxCalc | Spec 721.560 Leq | Distance | Actual Measured LmaxCalc | Actual Measured Leq |
|-----------------------------|-----------------------------|-------------------------------------|--|------------------------------------|-----------------------|------------------|----------|--------------------------|---------------------|
| Auger Drill Rig | 20 | 85 | 84 | 36 | 79.0 | 72.0 | 100 | 78.0 | 71.0 |
| Backhoe | 40 | 80 | 78 | 372 | 74.0 | 70.0 | 100 | 72.0 | 68.0 |
| Bar Bender | 20 | 80 | na | 0 | 74.0 | 67.0 | 100 | | |
| Blasting | na | 94 | na | 0 | 88.0 | | 100 | | |
| Boring Jack Power Unit | 50 | 80 | 83 | 1 | 74.0 | 71.0 | 100 | 77.0 | 74.0 |
| Chain Saw | 20 | 85 | 84 | 46 | 79.0 | 72.0 | 100 | 78.0 | 71.0 |
| Clam Shovel (dropping) | 20 | 93 | 87 | 4 | 87.0 | 80.0 | 100 | 81.0 | 74.0 |
| Compactor (ground) | 20 | 80 | 83 | 57 | 74.0 | 67.0 | 100 | 77.0 | 70.0 |
| Compressor (air) | 40 | 80 | 78 | 18 | 74.0 | 70.0 | 100 | 72.0 | 68.0 |
| Concrete Batch Plant | 15 | 83 | na | 0 | 77.0 | 68.7 | 100 | | |
| Concrete Mixer Truck | 40 | 85 | 79 | 40 | 79.0 | 75.0 | 100 | 73.0 | 69.0 |
| Concrete Pump Truck | 20 | 82 | 81 | 30 | 76.0 | 69.0 | 100 | 75.0 | 68.0 |
| Concrete Saw | 20 | 90 | 90 | 55 | 84.0 | 77.0 | 100 | 84.0 | 77.0 |
| Crane | 16 | 85 | 81 | 405 | 79.0 | 71.0 | 100 | 75.0 | 67.0 |
| Dozer | 40 | 85 | 82 | 55 | 79.0 | 75.0 | 100 | 76.0 | 72.0 |
| Drill Rig Truck | 20 | 84 | 79 | 22 | 78.0 | 71.0 | 100 | 73.0 | 66.0 |
| Drum Mixer | 50 | 80 | 80 | 1 | 74.0 | 71.0 | 100 | 74.0 | 71.0 |
| Dump Truck | 40 | 84 | 76 | 31 | 78.0 | 74.0 | 100 | 70.0 | 66.0 |
| Excavator | 40 | 85 | 81 | 170 | 79.0 | 75.0 | 100 | 75.0 | 71.0 |
| Flat Bed Truck | 40 | 84 | 74 | 4 | 78.0 | 74.0 | 100 | 68.0 | 64.0 |
| Front End Loader | 40 | 80 | 79 | 96 | 74.0 | 70.0 | 100 | 73.0 | 69.0 |
| Generator | 50 | 82 | 81 | 19 | 76.0 | 73.0 | 100 | 75.0 | 72.0 |
| Generator (<25KVA, VMS si | 50 | 70 | 73 | 74 | 64.0 | 61.0 | 100 | 67.0 | 64.0 |
| Gradall | 40 | 85 | 83 | 70 | 79.0 | 75.0 | 100 | 77.0 | 73.0 |
| Grader | 40 | 85 | na | 0 | 79.0 | 75.0 | 100 | | |
| Grapple (on Backhoe) | 40 | 85 | 87 | 1 | 79.0 | 75.0 | 100 | 81.0 | 77.0 |
| Horizontal Boring Hydr. Jac | 25 | 80 | 82 | 6 | 74.0 | 68.0 | 100 | 76.0 | 70.0 |
| Hydra Break Ram | 10 | 90 | na | 0 | 84.0 | 74.0 | 100 | | |
| Impact Pile Driver | 20 | 95 | 101 | 11 | 89.0 | 82.0 | 100 | 95.0 | 88.0 |
| Jackhammer | 20 | 85 | 89 | 133 | 79.0 | 72.0 | 100 | 83.0 | 76.0 |
| Man Lift | 20 | 85 | 75 | 23 | 79.0 | 72.0 | 100 | 69.0 | 62.0 |
| Mounted Impact Hammer (| 20 | 90 | 90 | 212 | 84.0 | 77.0 | 100 | 84.0 | 77.0 |
| Pavement Scarafier | 20 | 85 | 90 | 2 | 79.0 | 72.0 | 100 | 84.0 | 77.0 |
| Paver | 50 | 85 | 77 | 9 | 79.0 | 76.0 | 100 | 71.0 | 68.0 |
| Pickup Truck | 40 | 55 | 75 | 1 | 49.0 | 45.0 | 100 | 69.0 | 65.0 |

| Equipment Description | Acoustical Usage Factor (%) | Spec 721.560 Lmax @ 50ft (dBA slow) | Actual Measured Lmax @ 50ft (dBA slow) | No. of Actual Data Samples (count) | Spec 721.560 LmaxCalc | Spec 721.560 Leq | Distance | Actual Measured LmaxCalc | Actual Measured Leq |
|-------------------------------|-----------------------------|-------------------------------------|--|------------------------------------|-----------------------|------------------|----------|--------------------------|---------------------|
| Pneumatic Tools | 50 | 85 | 85 | 90 | 79.0 | 76.0 | 100 | 79.0 | 76.0 |
| Pumps | 50 | 77 | 81 | 17 | 71.0 | 68.0 | 100 | 75.0 | 72.0 |
| Refrigerator Unit | 100 | 82 | 73 | 3 | 76.0 | 76.0 | 100 | 67.0 | 67.0 |
| Rivit Buster/chipping gun | 20 | 85 | 79 | 19 | 79.0 | 72.0 | 100 | 73.0 | 66.0 |
| Rock Drill | 20 | 85 | 81 | 3 | 79.0 | 72.0 | 100 | 75.0 | 68.0 |
| Roller | 20 | 85 | 80 | 16 | 79.0 | 72.0 | 100 | 74.0 | 67.0 |
| Sand Blasting (Single Nozzle) | 20 | 85 | 96 | 9 | 79.0 | 72.0 | 100 | 90.0 | 83.0 |
| Scraper | 40 | 85 | 84 | 12 | 79.0 | 75.0 | 100 | 78.0 | 74.0 |
| Shears (on backhoe) | 40 | 85 | 96 | 5 | 79.0 | 75.0 | 100 | 90.0 | 86.0 |
| Slurry Plant | 100 | 78 | 78 | 1 | 72.0 | 72.0 | 100 | 72.0 | 72.0 |
| Slurry Trenching Machine | 50 | 82 | 80 | 75 | 76.0 | 73.0 | 100 | 74.0 | 71.0 |
| Soil Mix Drill Rig | 50 | 80 | na | 0 | 74.0 | 71.0 | 100 | | |
| Tractor | 40 | 84 | na | 0 | 78.0 | 74.0 | 100 | | |
| Vacuum Excavator (Vac-tru) | 40 | 85 | 85 | 149 | 79.0 | 75.0 | 100 | 79.0 | 75.0 |
| Vacuum Street Sweeper | 10 | 80 | 82 | 19 | 74.0 | 64.0 | 100 | 76.0 | 66.0 |
| Ventilation Fan | 100 | 85 | 79 | 13 | 79.0 | 79.0 | 100 | 73.0 | 73.0 |
| Vibrating Hopper | 50 | 85 | 87 | 1 | 79.0 | 76.0 | 100 | 81.0 | 78.0 |
| Vibratory Concrete Mixer | 20 | 80 | 80 | 1 | 74.0 | 67.0 | 100 | 74.0 | 67.0 |
| Vibratory Pile Driver | 20 | 95 | 101 | 44 | 89.0 | 82.0 | 100 | 95.0 | 88.0 |
| Warning Horn | 5 | 85 | 83 | 12 | 79.0 | 66.0 | 100 | 77.0 | 64.0 |
| Welder / Torch | 40 | 73 | 74 | 5 | 67.0 | 63.0 | 100 | 68.0 | 64.0 |

Source:

FHWA Roadway Construction Noise Model, January 2006. Table 9.1

U.S. Department of Transportation

CA/T Construction Spec. 721.560

Construction Vibration

Distance Propagation Calculations for Stationary Sources of Ground Vibration



- KEY:** Orange cells are for input.
 Grey cells are intermediate calculations performed by the model.
 Green cells are data to present in a written analysis (output).

STEP 1: Determine units in which to perform calculation.

- If vibration decibels (VdB), then use Table A and proceed to Steps 2A and 3A.
- If peak particle velocity (PPV), then use Table B and proceed to Steps 2B and 3B.

STEP 2A: Identify the vibration source and enter the reference vibration level (VdB) and distance.

Table A. Propagation of vibration decibels (VdB) with distance

| Noise Source/ID | Reference Noise Level | | |
|-----------------|-----------------------|---|---------------|
| | vibration level (VdB) | @ | distance (ft) |
| Loaded trucks | 86.0 | @ | 25 |

STEP 3A: Select the distance to the receiver.

| Attenuated Noise Level at Receptor | | |
|------------------------------------|---|---------------|
| vibration level (VdB) | @ | distance (ft) |
| 79.9 | @ | 40 |

STEP 2B: Identify the vibration source and enter the reference peak particle velocity (PPV) and distance.

Table B. Propagation of peak particle velocity (PPV) with distance

| Noise Source/ID | Reference Noise Level | | |
|-----------------|-----------------------|---|---------------|
| | vibration level (PPV) | @ | distance (ft) |
| Loaded trucks | 0.076 | @ | 25 |

STEP 3B: Select the distance to the receiver.

| Attenuated Noise Level at Receptor | | |
|------------------------------------|---|---------------|
| vibration level (PPV) | @ | distance (ft) |
| 0.181 | @ | 14 |

Notes:

Computation of propagated vibration levels is based on the equations presented on pg. 12-11 of FTA 2006. Estimates of attenuated vibration levels do not account for reductions from intervening underground barriers or other underground structures of any type, or changes in soil type.

Sources:

Federal Transit Association (FTA). 2006 (May). Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. Washington, D.C. Available: <http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf>. Accessed: September 24, 2010.