

Scenario 01 - All Engines (Tracked Changes)

Wednesday, June 2, 2021 8:35 AM

Scenario Info

Big Building, the casino

- ID: CASINO
- Base elevation: 0
- Tiers of Current Building
 1. 40 ft
- Type: Rectangular
- Reference Point: SW Corner
- X-Coordinate: 524056.64 m
- Y-Coordinate: 4245718.52 m
- X-Length: 570 ft
- Y-Length: 700 ft
- Rotation Angle: 0 deg

Smaller building/yard that contains engines

- ID: YARD
- Base elevation: 0
- Tiers of Current Building
 1. 25 ft
- Type: Rectangular
- Reference Point: SW Corner
- X-Coordinate: 524028.9 m
- Y-Coordinate: 4245790.36 m
- X-Length: 46 ft
- Y-Length: 136 ft
- Rotation Angle: 0 deg

Source Used for Run:

- Source ID: STCKALL
 - o Treating all 5 engines as 1
- X-Coordinate: 524036.4 m
- Y-Coordinate: 4245812.86 m
- Release Height: 15.67 ft
 - o 188.02 inches (Sheila emailed)
- Base Elevation: 27.0 m
 - o For location: 38.360393, -122.724930
 - o From <https://www.freemaptools.com/elevation-finder.htm>
- Release Type: Vertical
- Emission Rate: ~~0.0639 g/s~~ 0.3347 lb/hr
 - o ~~5.37 g/kw-hr~~ from <https://www.epa.gov/compliance-and-fuel-economy-data/annual-certification-data-vehicles-engines-and-equipment>
 - o ~~5.37*1500=8055~~
 - o ~~8055/3600=2.2375~~
 - o ~~5*2.2375=11.1875~~
 - o ~~11.1875*50/8760=0.0639~~
 - o $0.005753953821 * 2038 = 11.726557887198$ lb/hr
 - 0.005753953821 lb/hp-hr, 2038 hp (from Graton Calculations spreadsheet)
 - o $11.726557887198 * 50 / 8760 = 0.066932408032$ lb/hr

- Scaling for 50 hours of operation per year instead of 8760
- $0.066932408032 * 5 = 0.33466204016 \text{ lb/hr}$
 - 5 emergency engines total
- Fixed
- Gas Exit Temperature: 435 C
 - From specs, 435 C
- Stack Inside Diameter: 0.418 m
 - 14 inch diameter
 - Total area = $5 * \pi * (7)^2$
 - Total radius = $7 * \sqrt{5} = 15.65247584249853$
 - Total diameter = $15.6525 * 2 = 31.305 \text{ in}$
 - $31.305 / 12 = 2.6088$
- Gas Exit Velocity: 57.391 m/s
 - autopopulated
- Gas Exit Flow Rate: 28.5 m³/s
 - From specs, 342 m³/min
 - $342 / 60 = 5.7$
 - $5.7 * 5 = 28.5$

Other point sources

- Source ID: STCK1-5
 - EmGens 1-5
- X-Coordinate: 524036.4 m (constant)
- Y-Coordinate: 4245812.86, 4245806.86, 4245809.86, 4245815.86, 4245818.86 [m]
 - In order from 1 to 5
 - Spaced them 3 m apart, with STCK1 in the position of the STCKALL
- Release Height: 15.67 ft
 - 188.02 inches (Sheila emailed)
- Base Elevation: 27.0 m
 - For location: 38.360393, -122.724930
 - From <https://www.freemaptools.com/elevation-finder.htm>
- Release Type: Vertical
- Emission Rate: ~~0.0128 g/s~~ 0.0669 lb/hr
 - ~~5.37 g/kw hr~~ from <https://www.epa.gov/compliance-and-fuel-economy-data/annual-certification-data-vehicles-engines-and-equipment>
 - ~~$5.37 * 1500 = 8055$~~
 - ~~$8055 / 3600 = 2.2375$~~
 - ~~$2.2375 * 50 / 8760 = 0.0128 \text{ g/s}$~~
 - $0.005753953821 * 2038 = 11.726557887198 \text{ lb/hr}$
 - 0.005753953821 lb/hp-hr, 2038 hp (from Graton Calculations spreadsheet)
 - $11.726557887198 * 50 / 8760 = 0.066932408032 \text{ lb/hr}$
 - Scaling for 50 hours of operation per year instead of 8760
- Fixed
- Gas Exit Temperature: 435 C
 - From specs, 435 C
- Stack Inside Diameter: 1.1667 ft
 - 14 inch diameter
 - $14 / 12 = 1.1667$
- Gas Exit Velocity: 57.391 m/s
 - autopopulated
- Gas Exit Flow Rate: 28.5 m³/s
 - From specs, 342 m³/min

- $342/60 = 5.7$

Initial Baseline Source Scenario Inputs (All):

- Dispersion: Urban
- Population 42900
 - Google Search for Rohnert Park Population
- No Debug File
- Pollutant Emission Rate:
 - ~~0.0639 g/s~~ 0.3347 lb/hr NO2 (with Chemistry)
 - OLM
 - In-Stack NO2/NOx Ratio: 0.5
 - Ozone Concentration: 69.0 ppb
- Downwash: Include all Buildings (CASINO, YARD)
 - Note that checkmark is on CASINO but that shouldn't matter
- Meteorology Parameters
 - Min Temp: -9.67 F
 - Default value = 250 K
 - Max Temp: 115 F
 - Google search for highest recorded temp rohnert park, ca showed 113 F, with cloverdale at 115
 - Min Wind Speed: 0.5 m/s
 - Anemometer Height: 10.0 m
 - Do NOT adjust friction velocity
- Surface Characteristics:
 - Albedo: 0.29
 - Bowen Ratio: 0.925
 - Surface Roughness: 0.0403
- NO AERMET Seasonal Tables
- NO External File
- Include Terrain Effects and Force AERMAP Re-Run
 - Map Type: USGS DEM/CDED
 - The following autopopulated and I left them alone
 - SW Corner: (521527.32, 4243218.52)
 - Height: 5366.0
 - Width: 5120.32
 - Mesh Size: 40
- Source Base Elevation: AERMAP Calculated
- NO Flagpole Receptors
- Minimum Distance to Ambient Air: 9.14 m
- Maximum Distance of Downwind Receptors (Probe Distance): 2.0 km
- NO Additional Receptors
- Do NOT apply inverse break-up fumigation
- Do NOT apply shoreline fumigation