APPENDIX 4.3-2

Tetra Tech 2023 Air Quality Dispersion Modeling Evaluation

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Air Quality Dispersion Modeling Evaluation

Horse Heaven Wind Farm
Concrete Batch Plant and Stationary Engines
Benton County, Washington

June 2023

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TETRA TECH

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
μg/m^3	micrograms per cubic meter
AP-42	Compilation of Air Pollutant Emission Factors
AQCR	Air Quality Control Region
BCAA	Benton Clean Air Agency
bhp	brake horsepower
BMP	best management practice
BPIP	Building Profile Input Program
CBP	concrete batch plant
CFR	Code of Federal Regulations
CO	carbon monoxide
Ecology	Washington State Department of Ecology
EFSEC	Energy Facility Site Evaluation Council
GEP	Good Engineering Practice
HAP	hazardous air pollutant
hp	horsepower
km	kilometer
lb/hr	pounds per hour
N_2	nitrogen gas
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NO	nitrogen oxide
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NSPS	New Source Performance Standards
O_3	ozone
PAH	polycyclic aromatic hydrocarbons

Acronyms/Abbreviations	Definition
Pb	lead
PM	particulate matter
PM_{10}	particulate matter with aerodynamic diameter equal to or less than 10 micrometers
$PM_{2.5}$	particulate matter with aerodynamic diameter equal to or less than 2.5 micrometers
PTE	potential-to-emit
scf	standard cubic feet
SIA	Significant Impact Area
SIL	Significant Impact Level
SO_2	sulfur dioxide
SO_X	Sulfur oxides
tpd	tons per day
tph	tons per hour
tpy	tons per year
TSP	total suspended particulate matter
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VOC	volatile organic compounds
yd^3	cubic yards
WAAQS	Washington Ambient Air Quality Standard
WAC	Washington Administrative Code

1.0 INTRODUCTION

1.1 PURPOSE

Horse Heaven Wind Farm, LLC (Horse Heaven) is proposing to construct and operate the Horse Heaven Wind Farm (Project) in unincorporated Benton County, Washington, within the Horse Heaven Hills area. The Project would consist of a renewable energy generation facility and is located approximately four (4) miles south/southwest of the city of Kennewick and the larger Tri-Cities urban area, along the Columbia River.

In February 2021, Horse Heaven submitted an Application for Site Certification (ASC) to the Energy Facility Site Evaluation Council (EFSEC). The ASC was updated to incorporate information requested by EFSEC and submitted in December 2022. An initial air quality assessment was one of the resources areas evaluated in the ASC. To refer to the initial air quality assessment, the ASC and its update are available on EFSEC's project website at: https://www.efsec.wa.gov/energy-facilities/horse-heaven-wind-project/horse-heaven-application.

During construction, and as previously evaluated, air emissions would result from use of fuel-burning equipment to support construction, as well as fugitive dust associated with exposed surface windblown dust, access road traffic, bulldozing, and grading activities. At the time the ASC was submitted, the potential for batch plant use and backup diesel generators was identified, but specific locations for this equipment had not yet been determined and as a result, these emissions were not included in the initial air quality analysis. Horse Heaven has since identified temporary locations for a portable concrete batch plant (CBP) and backup diesel generators. The purpose of this report is to provide supplemental environmental analysis related to the potential ambient air quality impacts of the CBP and generator engines. As such, this report provides:

- A description of the proposed configuration of the additional equipment (Section 2);
- An inventory of maximum potential emissions resulting from the additional equipment (Section 3);
- An ambient air quality dispersion modeling analysis to show emissions associated with the additional equipment will comply with ambient air quality standards (Section 5); and
- Detailed emissions calculations (Appendix A) and modeling inputs (Appendix B).

1.2 SUMMARY

The Project will comply with ambient air quality standards, and will do so by accepting permit limits on operating conditions. Bin vent filters will be installed on cement and cement supplement silos to minimize emissions during silo loading operations.

The Project will also implement Best Management Practices for the mitigation of fugitive dust. Fugitive emissions and dust would be controlled through standard construction control practices and methods, such as the following:

- Construction and operations vehicles and equipment would comply with applicable state and federal emissions standards.
- Vehicles and equipment used during construction would be properly maintained to minimize exhaust emissions.
- Operational measures such as limiting engine idling time and shutting down equipment when not in use would be implemented.
- Watering or other fugitive dust-abatement measures would be used as needed to control fugitive dust generated during construction.
- Construction materials that could be a source of fugitive dust would be covered when stored.
- Traffic speeds on unpaved roads would be limited to 25 miles per hour to minimize generation of fugitive dust.
- Truck beds would be covered when transporting dirt or soil.

- Carpooling among construction workers would be encouraged to minimize construction-related traffic and associated emissions.
- Erosion-control measures would be implemented to limit deposition of silt to roadways, to minimize a vector for fugitive dust.
- Replanting or graveling disturbed areas will be conducted during and after construction to reduce wind-blown dust.

2.0 PROJECT DESCRIPTION

Horse Heaven is proposing to construct its Project in the Horse Heaven Hills area of Benton County located approximately four (4) miles south/southwest of the city of Kennewick and the larger Tri-Cities urban area, near the Columbia River. The construction of the project will occur over a period of approximately two years, with construction of the eastern portion of the project occurring in the first year (i.e., Phase I) and construction of the western portion of the project occurring in the second year (i.e., Phase II). A portable CBP and backup generators will support the construction of the project. The portable CBP will only be located at the site for a temporary period of 4 months for each phase (i.e., 4 months during Phase I construction and another 4 months during Phase II construction).

This section provides a description of the Project location (Section 2.1), and the proposed equipment to be installed for the Project (Section 2.2).

2.1 PROJECT LOCATION

The Project site is located in the Horse Heaven Hills approximately four (4) miles south/southwest of the city of Kennewick and the larger Tri-Cities urban area, near the Columbia River. The Project is planned to be constructed in two phases across three different locations within the Horse Heaven Hills:

Phase 1: HH-East
The first phase of the Project will include the east substation and the east laydown area located adjacent to each other. Both areas are located near coordinates 46.060611°, -119.206184° and will include four (4) total engines, with three (3) rated at 2,680 brake horsepower (bhp) each and one (1) rated at 670 bhp. The portable CBP will be located at the east laydown area for a duration of approximately four (4) months.

Phase 2: HH-West
The second phase of the Project will include the west substation and west laydown area. The west substation is located near coordinates 46.188129°, -119.551248° and will include three (3) diesel engines rated at 2,680 bhp each. The west laydown area is located near coordinates 46.116957°, -119.356656° and will include the portable CBP for a duration of approximately four (4) months and one (1) diesel engine rated at 670 bhp.

The substations and laydown yard locations are shown in Figure 2-1. The topography surrounding the Project consists of gently sloping terrain as indicated in the figure.

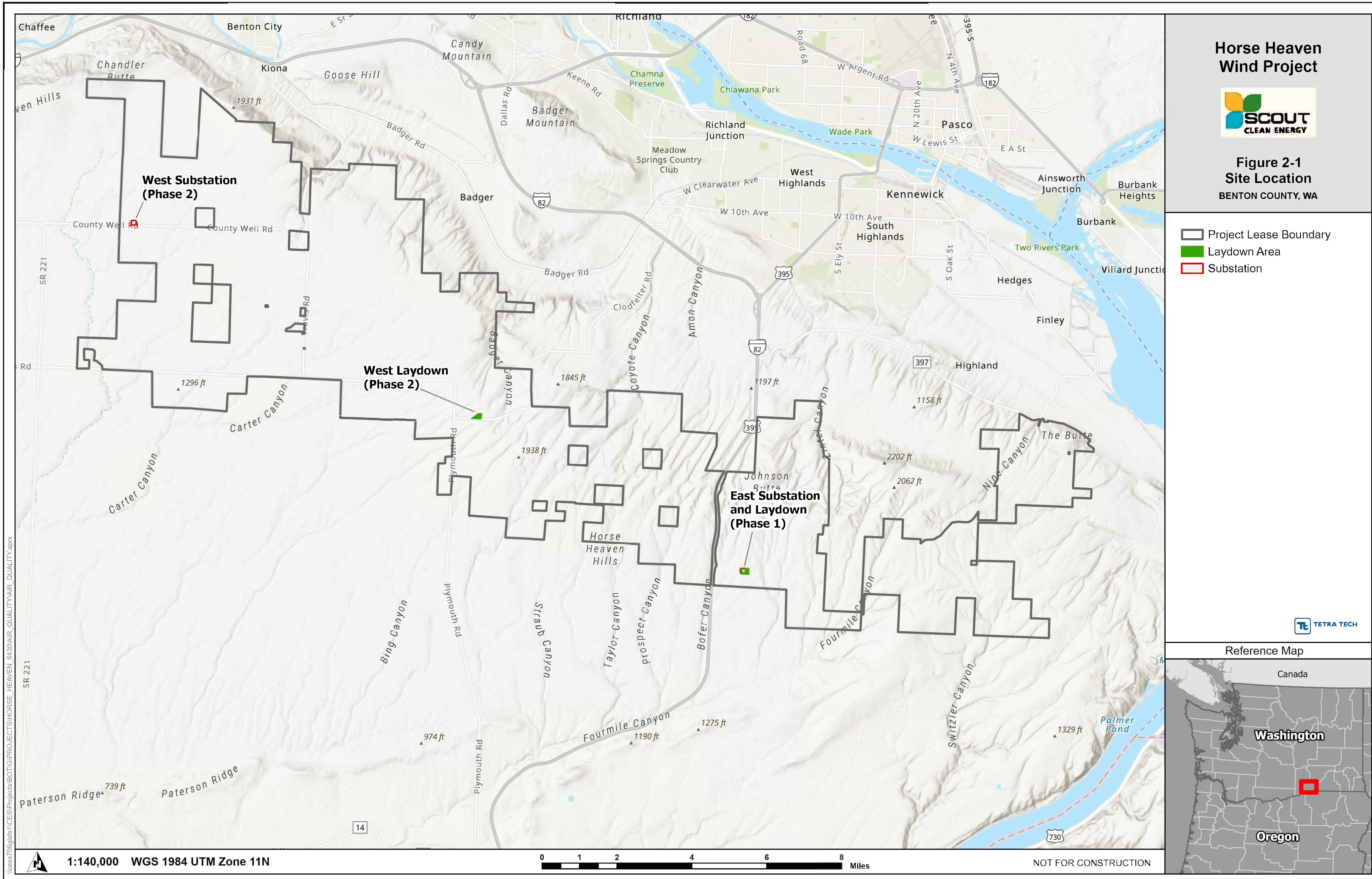
The Project is located in the USEPA's South Central Washington Intrastate Air Quality Control Region (AQCR). The AQCR is designated as attainment or unclassifiable for all criteria pollutants.

2.2 SUMMARY OF PROPOSED PROJECT

The Project includes backup diesel generators and portable concrete batching equipment to be temporarily installed on site. Aggregate and sand brought to the site by truck will be stored in the laydown areas immediately adjacent to the CBP. A front-end loader will be used to distribute materials between storage areas and the CBP operations.

2.2.1 Backup Diesel Generators

Two types of diesel generators are proposed for this Project. The substations will utilize engines for which the Cummins Model QSK60-G6 engine rated at 2,680 bhp each is representative. The engines will meet the Tier II emission standards as specified under 40 Code of Federal Regulation (CFR) 89.112(a). Each engine will operate no more than 500 hours per year during the entire duration of the Project. The laydown areas will utilize engines for which the Cummins Model QSK60-GA engines rated at 670 bhp each is representative. Similarly, these engines will meet the Tier II emission standards as specified under 40 CFR 89.112(a) and will not operate for more than 500 hours per year during the entire duration of the Project.


Horse Heaven Wind Project
SCOUT CLEAN ENERGY
Figure 2-1
Site Location
BENTON COUNTY, WA
Project Lease Boundary
Laydown Area
Substation
TETRA TECH
Reference Map
Canada
Washington
Oregon
West Substation (Phase 2)
West Laydown (Phase 2)
East Substation and Laydown (Phase 1)
Chaffee
Benton City
Kiona
Candy Mountain
Goose Hill
Chandler Butte
Badger Mountain
Badger
Richland
Richland Junction
Chamna Preserve
Chiawana Park
Wade Park
Pasco
Meadow Springs Country Club
West Highlands
Kennewick
South Highlands
Ainsworth Junction
Burbank Heights
Burbank
Two Rivers Park
Hedges
Finley
Highland
Villard Junctio
County Well Rd
Badger Rd
Carter Canyon
Coyote Canyon
Amon Canyon
Clodfelter Rd
Johnson Butte
The Butte
Nine Canyon
Horse Heaven Hills
Bing Canyon
Plymouth Rd
Straub Canyon
Taylor Canyon
Prospect Canyon
Bofer Canyon
Fourmile Canyon
Switzler Canyon
Palmer Pond
Paterson Ridge
SR 221
1931 ft
1296 ft
1845 ft
1938 ft
1197 ft
1158 ft
2202 ft
2062 ft
974 ft
1190 ft
1275 ft
1329 ft
739 ft
1:140,000 WGS 1984 UTM Zone 11N
0 1 2 4 6 8 Miles
NOT FOR CONSTRUCTION

2.2.2 Concrete Batch Plant (Ready-Mix Plant)

The basic manufacturing process of a CBP involves mixing sand, aggregate, cement, cement supplements, and water to produce concrete. Generally, sand and aggregate are loaded into hoppers which feed enclosed conveyor belts that transfer the materials to weigh hoppers according to the mix requested by the contractor. Cement and cement supplements are also loaded by pneumatic conveying systems into the weigh hoppers. All of these materials are then loaded into a ready-mix delivery truck along with water. The rotating drum on the delivery truck mixes the materials to achieve the desired product consistency. The loaded delivery truck leaves the premises to deliver the product. Product mixing continues to occur onboard the truck during transit to the delivery site. Figure 2-2 shows a representative schematic process flow diagram of a CBP.

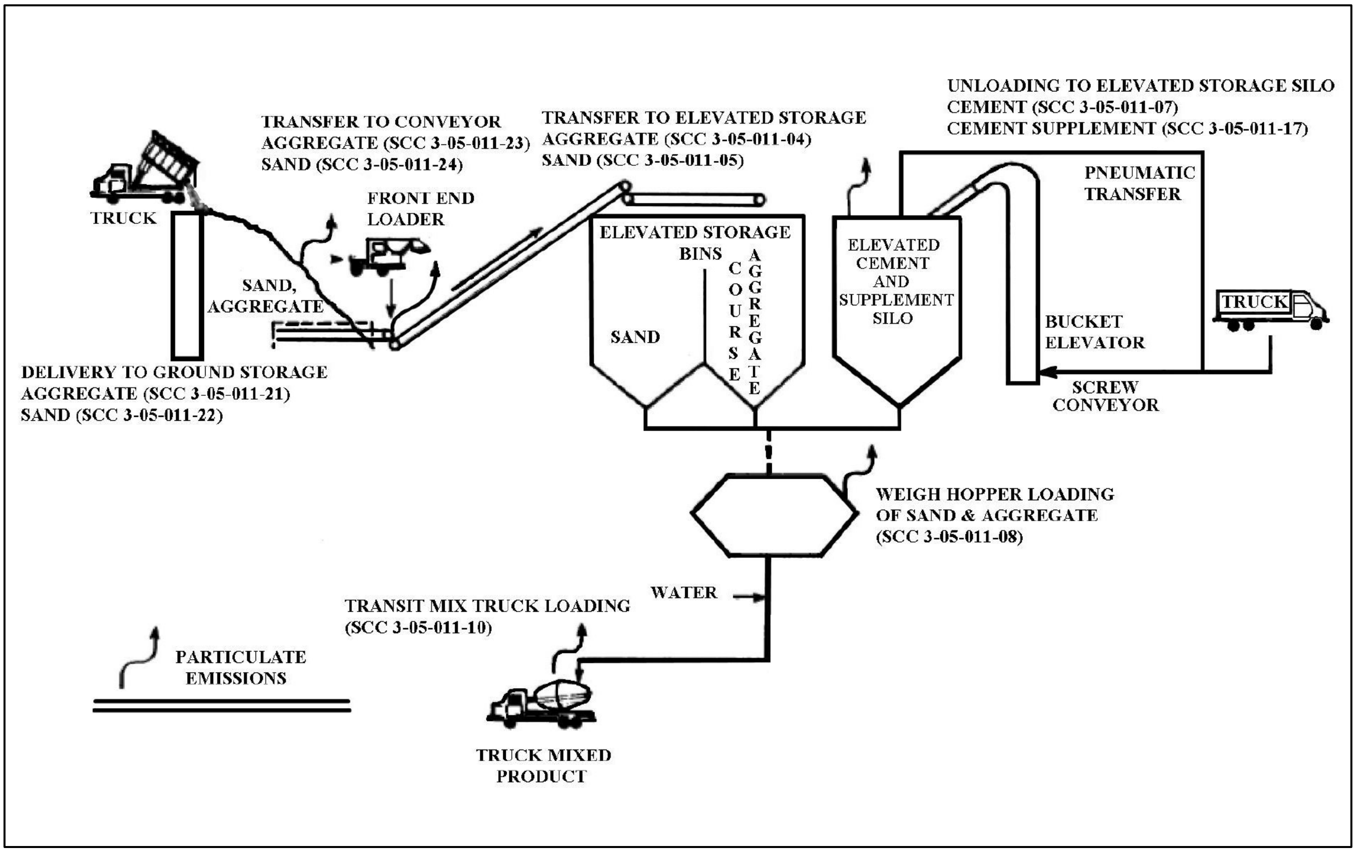


Figure 2-2. Representative Schematic Process Flow Diagram for a Concrete Batch Plant (adapted from USEPA AP-42 Compilation of Air Emission Factors, Figure 11.12-1).

The cement and cement supplement silos will be equipped with high efficiency bin vent filters. The aggregate and sand storage area will use a commercial water spray system to control dust during material handling. The Project will use washed aggregate and sand when contractor specifications allow, further reducing fugitive dust emissions during material handling. The feed hoppers will be equipped with an enclosed drop to the conveyor to minimize fugitive dust from this activity.

The Project will include sand and aggregate storage areas, equipment such as front-end loaders to transfer material between storage areas and plant areas, and haul roads upon which trucks will travel. Particulate matter in the form of fugitive dust can be generated from all these activities. Best Management Practices (BMPs) will be used to minimize the formation of fugitive dust emissions. Examples of BMPs to be used by the Project include the following:

- Construction and operations vehicles and equipment would comply with applicable state and federal emissions standards.
- Vehicles and equipment used during construction would be properly maintained to minimize exhaust emissions.
- Operational measures such as limiting engine idling time and shutting down equipment when not in use would be implemented.
- Watering or other fugitive dust-abatement measures would be used as needed to control fugitive dust generated during construction.
- Construction materials that could be a source of fugitive dust would be covered when stored.
- Traffic speeds on unpaved roads would be limited to 25 miles per hour to minimize generation of fugitive dust.
- Truck beds would be covered when transporting dirt or soil.
- Carpooling among construction workers would be encouraged to minimize construction-related traffic and associated emissions.
- Erosion-control measures would be implemented to limit deposition of silt to roadways, to minimize a vector for fugitive dust.
- Replanting or graveling disturbed areas will be conducted during and after construction to reduce wind-blown dust.

Implementation of these BMPs is expected to meet Benton Clean Air Agency (BCAA) requirements, which prohibit off-property transport of visible fugitive dust emissions.

3.0 EMISSIONS ESTIMATES

This section describes how emissions from the Project were calculated based upon activity data supplied by Horse Heaven, emission factors obtained from USEPA's AP-42 Compilation of Air Pollutant Emission Factors (AP-42), and emissions standards established for the generator engines. Detailed emissions calculations are provided in Appendix A.

From a practical perspective relevant to the Project and its emissions, the list of regulated New Source Review (NSR) pollutants includes the six criteria pollutants for which National Ambient Air Quality Standards (NAAQS) have been established and those pollutants that are subject to the New Source Performance Standards (NSPS) promulgated pursuant to Section 111 of the federal Clean Air Act (CAA).

The six criteria pollutants are: sulfur dioxide (SO_2), particulate matter (PM), carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), and lead (Pb). Volatile organic compounds (VOCs) and nitrogen oxides (NO_X) are included by virtue of being established by USEPA as ozone precursors. For regulatory purposes, PM is further classified by particle size. $PM_{2.5}$ includes all particles with an aerodynamic diameter of less than 2.5 microns. PM_{10} includes all particles with an aerodynamic diameter of less than 10 microns. Total suspended particulate includes particles of all sizes.

The list of Hazardous Air Pollutants (HAPs) is defined in Section 112(b) of the CAA and in 40 CFR Part 63 Subpart C. From a practical perspective, the HAPs to be emitted from the Project are subsets of regulated NSR pollutants, particularly trace metals (PM) and trace organics (VOCs).

Both short-term emissions (durations of 24 hours or less) and long-term emissions (construction duration of less than one year) estimates are provided. Emissions of regulated NSR pollutants and HAPs were calculated. The following sections describe how emissions from each Project area were calculated.

3.1 BACKUP DIESEL GENERATORS EMISSIONS

The diesel generators will serve as backup power sources during the construction period. The HH-West Step-up Substation will have three (3) identical engines rated at approximately 2,680 bhp each. The HH-West CBP will have one (1) engine rated at approximately 670 bhp. The HH-East Substation will have three (3) identical engines rated at approximately 2,680 bhp each. The HH-East CBP will have one (1) engine rated at approximately 670 bhp. In summary, there will be a total of eight (8) nonroad engines utilized throughout the Project. The Cummins engines identified previously are considered representative of the engines to be secured for the construction and commissioning activity.

All generator emissions are based on emission factors provided in USEPA's AP-42 Compilation of Air Pollutant Emission Factors, Section 3.4. The following tables were used to calculation emissions:

- Table 3.4-1 for criteria pollutants (NO_x, CO, SO_2, PM, and VOC)
- Table 3.4-3 for hazardous air pollutants.
- Table 3.4-4 for polycyclic aromatic hydrocarbons.

Table 3-1 includes the total emissions from diesel generators for each location. Detailed supporting calculations are provided in Appendix A.

Table 3-1. Summary of Potential Emissions from Diesel Generators

Pollutant	East Substation / Laydown		West Substation		West Laydown	
	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
CO	47.91	11.98	44.22	11.06	3.69	0.92
NO_x	209.04	52.26	192.96	48.24	16.08	4.02
PM	6.1	1.53	5.63	1.41	0.47	0.12
PM_{10}	6.1	1.53	5.63	1.41	0.47	0.12
$PM_{2.5}$	6.1	1.53	5.63	1.41	0.47	0.12
SO_2	0.11	0.03	0.10	0.02	0.01	0.00
VOC	6.14	1.54	5.67	1.42	0.47	0.12
Pb	0.00	0.00	0.00	0.00	0.00	0.00
Total HAP	0.091	0.398	0.084	0.368	0.007	0.0306

lb/hr = pound per hour; tpy = ton per year

3.2 CBP EMISSIONS

Concrete batching emissions are calculated depending on the sources and the type of activity. Particulate matter, consisting of aggregate, sand, cement, and cement supplement particles, is the primary pollutant of concern.

Emissions of PM, PM_{10}, and $PM_{2.5}$, at the CBP are based on emission factors provided in USEPA's AP-42 Compilation of Air Pollutant Emission Factors, 11.12 (USEPA, 2006a), 11.19.2 (USEPA, 2004b), and 13.2.4 (USEPA, 2006b), 13.2.1 for paved roads (USEPA, 2011b), 13.2.2 for unpaved surfaces (USEPA, 2006b), and USEPA's report, *Control of Open Fugitive Dust Sources* (USEPA, 1988) for wind erosion of active storage piles.

For the purposes of calculating 1-hour potential emissions for dispersion modeling, the maximum hourly concrete production rate is assumed to be 330 tons/hour since that is the largest potential operating capacity for a CBP of the scale anticipated to be contracted by the Project. This value is used as the maximum hourly concrete production rate for each of the west and east locations.

The maximum daily concrete production rate is 1,423 tons/day and is based on the amount of concrete required on the most active construction day including contingency. This value is used as the maximum daily concrete production rate for each of the west and east locations for calculation of 24-hour potential emissions for dispersion modeling.

The total concrete production for each phase's entire 4-month duration of construction is expected to be 141,608 tons per year (tpy) and 198,925 tpy for the west and east locations, respectively. These values are used for calculation of long-term potential emissions for dispersion modeling.

3.2.1 Sand and Aggregate Delivery and Transfer

Sand and aggregate materials are brought in via trucks and delivered to an open storage area located on the ground. The materials are transferred by front-end loader to hoppers which load the materials onto a conveyor that in turn transfers them to an elevated storage area. The AP-42 Section 13.2.4.3 Predictive Emission Factor Equation is used to calculate emission factors instead of using emission factors in Table Section 11.12-5 because the former provides a more accurate representation specific to this batching process:

$$E = k(0.0032) \times \frac{(\frac{U}{5})^{1.3}}{(\frac{M}{2})^{1.4}}$$

Where E = PM emission factor;
k = particle size multiplier;
U = wind speed at the material drop point in miles per hour; and
M = minimum moisture percentage of cement;

The emission factors are multiplied by the maximum throughput of the sand and aggregate. The material handling emissions for sand and aggregate are controlled by the use of water sprays and covered conveyors. Table 3-2 summarizes estimated potential particulate emissions from sand and aggregate delivery and transfer. Detailed supporting calculations are provided in Appendix A.

Table 3-2. Summary of Potential Emissions from Sand and Aggregate Delivery and Transfer

Pollutant	East Laydown		West Laydown	
	Sand and Aggregate Transfer (lb/hr)	Sand and Aggregate Transfer (tpy)	Sand and Aggregate Transfer (lb/hr)	Sand and Aggregate Transfer (tpy)
PM	0.13	0.21	0.13	0.15
PM_{10}	0.06	0.10	0.06	0.07
$PM_{2.5}$	0.01	0.01	0.01	0.01
lb/hr = pound per hour; tpy = ton per year				

3.2.2 Cement Delivery and Weigh Hopper Loading

Cement and cement supplements are brought in via trucks and delivered to a bucket elevator or pneumatic conveyor belt that transfers the content to an elevated silo. They are then fed into a weigh hopper along with sand and aggregate.

The emission factors from AP-42 11.12-3 and 11.12-5 are multiplied by the maximum throughput of the cement and cement supplement. Material handling emissions of cement silo and cement supplement silo loading are controlled by a bin vent filter with a 98 percent control efficiency on the top of the silo. Table 3-3 and Table 3-4 summarize estimated potential particulate emissions from cement and supplement delivery and weigh hopper loading.

Table 3-3. Summary of Potential Emissions from Cement and Supplement Delivery

Pollutant	East Laydown		West Laydown	
	Cement Delivery (lb/hr)	Cement Delivery (tpy)	Cement Delivery (lb/hr)	Cement Delivery (tpy)
PM	0.000296	0.000498	0.000296	0.000354
PM_{10}	0.000178	0.000298	0.000178	0.000212
$PM_{2.5}$	0.0000267	0.000045	0.0000267	0.0000319
lb/hr = pound per hour; tpy = ton per year				

Table 3-4. Summary of Potential Emissions from Weigh Hopper Loading

Pollutant	East Laydown		West Laydown	
	Paved Roads (lb/hr)	Paved Roads (tpy)	Paved Roads (lb/hr)	Paved Roads (tpy)
PM	0.23	0.39	0.23	0.28
PM_{10}	0.11	0.19	0.11	0.14
$PM_{2.5}$	0.02	0.03	0.02	0.02
lb/hr = pound per hour; tpy = ton per year				

3.2.3 Truck Mix Loading

The materials in the weigh hopper are then mixed with water and gravity fed into the mixer trucks. The equations from AP-42 Section 11.12 and Tables 11.12-3 and 11.12-4 were used to calculate the PM emission factors.

$$E = k(0.0032) \times \frac{(U)^a}{(M)^b} + c$$

Where E = PM emission factor;
k = particle size multiplier;
U = wind speed at the material drop point in miles per hour;
M = minimum moisture percentage of cement;
a, b = exponents; and
c = constant.

The emission factors are multiplied by the maximum throughput of the mixed materials. A control efficiency of 94 percent was applied. Table 3-5 summarizes estimated potential emissions of fugitive dust from truck mix loading. Detailed supporting calculations are provided in Appendix A.

Table 3-5. Summary of Potential Fugitive Dust Emission Rates from Truck Mix Loading

Pollutant	East Laydown		West Laydown	
	Truck Loading (lb/hr)	Truck Loading (tpy)	Truck Loading (lb/hr)	Truck Loading (tpy)
PM	0.41	0.69	0.41	0.49
PM_{10}	0.16	0.28	0.16	0.20
$PM_{2.5}$	0.02	0.04	0.02	0.03
lb/hr = pound per hour; tpy = ton per year				

3.2.4 Paved Roads

Paved roads will be constructed at the CBP site for trucks delivering raw materials and hauling out concrete. For paved roads, two equations from AP-42 Section 13.2.1 were used to calculate short-term and long-term PM emission factors.

For short-term emissions calculations (24-hour duration or less) (Equation 1):

$$E = k(sL)^{0.91} \times (W)^{1.02}$$

Where E = PM emission factor;
k = particle size multiplier;
sL = road silt surface loading; and
W = average weight of the vehicles traveling the road.

For long-term emissions calculations (Equation 2):

$$E = [k(sL)^{0.91} \times (W)^{1.02}](1 - \frac{P}{4N})$$

Where E = PM emission factor;
k = particle size multiplier;
sL = road silt surface loading;
W = average weight of the vehicles traveling the road;
P = number of wet days with at least 0.01 inches of precipitation in the averaging period; and
N = number of days in the averaging period.

Table 3-6 provides the parameter values used in the paved road calculations.

Trucks delivering raw materials to the CBP and hauling concrete away from the CBP will use the haul road loop constructed within the laydown area. Details on the truck weight calculation are provided in Appendix A.

Table 3-6. Paved Road Emission Factor Parameters

Parameter	Value	Basis
k (PM)	0.011	AP-42, Section 13.2.1
k (PM_{10})	0.0022	AP-42, Section 13.2.1
k ($PM_{2.5}$)	0.00054	AP-42, Section 13.2.1
sL	12 g/m^2	AP-42, Section 13.2.1
W	20 tons	Average Vehicle Weight
P	77 days	National Climatic Data Center (NCDC), Pasco Tri-Cities Airport, 1991-2020
N	365 days	Days per year

Table 3-7 provides the number of daily trips for each of the truck purposes, as well as the trip length for each. Additional calculations are provided in Appendix A.

Table 3-7. Truck Trips

	East Laydown		West Laydown	
Pollutant	Trip Length	Daily Trips	Trip Length	Daily Trips
Sand & Aggregate Delivery	874feet	43	874 feet	43
Cement & Supplement Delivery	874 feet	3	874 feet	3
Concrete Haul Out	874 feet	71	874 feet	71

The emission factors are multiplied by the calculated distance traveled by the trucks to estimate the PM emissions from the paved roads. A control efficiency of 80 percent was applied to account for the BMPs described previously in Section 2.2.4 per the Western Regional Air Partnership's (WRAP) Fugitive Dust Handbook (WRAP, 2006). Table 3-8 summarizes estimated maximum short-term (lb/hr) and long-term (tpy) potential emissions of fugitive dust from the paved roads. Detailed supporting calculations are provided in Appendix A.

Table 3-8. Summary of Potential Fugitive Dust Emission Rates from Paved Roads

Pollutant	East Laydown		West Laydown	
	Paved Roads (lb/hr)	Paved Roads (tpy)	Paved Roads (lb/hr)	Paved Roads (tpy)
PM	3.63	5.77	3.63	4.11
PM_{10}	0.07	0.58	0.07	0.41
$PM_{2.5}$	0.02	0.14	0.02	0.10
lb/hr = pound per hour; tpy = ton per year				

3.2.5 Unpaved Roads

Vehicles as represented by a front-end loader will be used to move aggregate between storage areas and operations. They will traverse unpaved surfaces while distributing materials. For unpaved surfaces, two equations from AP-42 Section 13.2.2 were used to calculate short-term and long-term PM emission factors.

For short-term emissions calculations (24-hour duration or less) (Equation 1a):

$$E = k(\frac{s}{12})^a \times (\frac{W}{3})^b$$

Where E = PM emission factor;
k = particle size multiplier;
s = surface material silt content; and
W = average weight of the vehicles traversing the surface.

For long-term emissions calculations (Equation 2):

$$E = k(\frac{s}{12})^a \times (\frac{W}{3})^b \times (\frac{365 - P}{365})$$

Where E = PM emission factor;
k = particle size multiplier;
sL = surface material silt content;
W = average weight of the vehicles traversing the surface; and
P = number of wet days with at least 0.01 inches of precipitation in the averaging period.

Table 3-9 provides the parameter values used in the unpaved surfaces calculations.

Table 3-9. Unpaved Surfaces Emission Factor Parameters

Parameter	Value	Basis
k (PM)	4.9	AP-42, Section 13.2.2
k (PM_{10})	1.5	AP-42, Section 13.2.2
k ($PM_{2.5}$)	0.15	AP-42, Section 13.2.2
a (PM)	0.7	AP-42, Section 13.2.2
a (PM_{10})	0.9	AP-42, Section 13.2.2
a ($PM_{2.5}$)	0.9	AP-42, Section 13.2.2
b	0.45	AP-42, Section 13.2.2
s	4.8%	AP-42, Section 13.2.2
W	20 tons	Average Loader Weight
P	77 days	National Climatic Data Center (NCDC), Pasco Tri-Cities Airport, 1991-2020

The calculated emission factors are multiplied by the total distance traveled by the front-end loaders to calculate the PM emissions from the unpaved surfaces. The total distance is estimated based on trip lengths of 413 feet multiplied by the number of trips during the appropriate period (56 per hour maximum, 325 per day maximum). A control efficiency of 80 percent was applied to account for the BMPs described previously in Section 2.2.4 per the WRAP's Fugitive Dust Handbook (WRAP, 2006). Table 3-10 summarizes estimated maximum short-term (lb/hr) and long-term (tpy) potential emissions of fugitive dust from the unpaved surfaces. Detailed supporting calculations are provided in Appendix A. Additional calculations are provided in Appendix A.

Table 3-10. Summary of Potential Fugitive Dust Emission Rates from Unpaved Surfaces

Pollutant	East Laydown		West Laydown	
	Unpaved Roads (lb/hr)	Unpaved Roads (tpy)	Unpaved Roads (lb/hr)	Unpaved Roads (tpy)
PM	0.96	1.26	0.96	1.26
PM_{10}	0.24	0.32	0.24	0.32
$PM_{2.5}$	0.02	0.03	0.02	0.03
lb/hr = pound per hour; tpy = ton per year				

3.2.6 Wind Erosion of Storage Area

The sand and aggregate piled in the storage area on site are occasionally subject to wind gusts that can potentially produce fugitive dust emissions. For wind erosion of continuously active storage piles, an equation from USEPA's *Control of Open Fugitive Dust Sources* (USEPA, 1988) was used:

$$E = 1.7\left(\frac{s}{1.5}\right)\left(\frac{365 - P}{235}\right)\left(\frac{f}{15}\right)$$

Where E = PM emission factor;
s = silt content of aggregate;
P = number of wet days with at least 0.01 inches of precipitation per year; and
f = percentage of time that the unobstructed wind speed exceeds 5.4 m/s (12 mph).

Table 3-11 provides the parameter values used in the unpaved surfaces calculations.

Table 3-11. Wind Erosion Emission Factor Parameters

Parameter	Value	Basis
s	4.8%	AP-42, Section 13.2.2
P	77 days	National Climatic Data Center (NCDC), Pasco Tri-Cities Airport, 1991-2020
f	17.6%	Percent of Wind speed greater than 12 mph according to local meteorological data in the Horse Heaven Hills

The calculated emission factors are multiplied by the surface area of each storage pile to calculate the PM emissions from wind erosion. Each storage pile was assumed to have a diameter of 65 feet and a height of 10 feet, resulting in an average surface area of 3,472 square feet per storage pile. A control efficiency of 70 percent was applied to account for the BMPs described previously in Section 2.2.4 per the WRAP's Fugitive Dust Handbook (WRAP, 2006). Table 3-12 summarizes estimated maximum short-term (lb/hr) and long-term (tpy) potential emissions of fugitive dust resulting from wind erosion. Detailed supporting calculations are located in Appendix A.

Table 3-12. Summary of Potential Fugitive Dust Emission Rates from Wind Erosion

Pollutant	East Laydown		West Laydown	
	Wind Erosion (lb/hr)	Wind Erosion (tpy)	Wind Erosion (lb/hr)	Wind Erosion (tpy)
PM	0.000974	0.0341	0.000974	0.0341
PM_{10}	0.000487	0.0171	0.000487	0.0171
$PM_{2.5}$	0.000146	0.00512	0.000146	0.00512

lb/hr = pound per hour; tpy = ton per year

3.3 SUMMARY OF CALCULATED POTENTIAL EMISSIONS

A summary of calculated potential emissions for the Project is provided in Table 3-13. A more detailed summary of pollutant emissions is provided in Appendix A along with detailed emission calculations.

Table 3-13. Maximum Annual Potential Emission Rates from the Project

Pollutant	East Laydown (tpy [a])	East Substation (tpy)	West Laydown (tpy)	West Substation (tpy)	Total (tpy)
CO	0.92	11.06	0.92	11.06	23.95
NO_x	4.02	48.24	4.02	48.24	104.52
PM	8.49	1.41	6.45	1.41	17.75
PM_{10}	1.60	1.41	1.27	1.41	5.68
$PM_{2.5}$	0.38	1.41	0.32	1.41	3.51
SO_2	0.002	0.02	0.002	0.02	0.05
VOC	0.12	1.42	0.12	1.42	3.07
Lead (Pb)	0.00002	0.00	0.00001	0.00	0.00003
Federal HAP	0.040	0.37	0.037	0.37	0.81

tpy = ton per year

4.0 REGULATORY APPLICABILITY EVALUATION

This section contains an analysis of the applicability of federal and state air quality regulations to the Project. The specific regulations and programs that are included in this review include:

- Federal NSPS;
- Federal National Emissions Standards for Hazardous Air Pollutants (NESHAP); and
- BCAA permitting and emissions standards requirements.

4.1 FEDERAL EMISSIONS STANDARDS

The backup diesel generator equipment must meet the federal emissions standards stated in 40 CFR Part 60 Subpart IIII (NSPS) and 40 CFR Part 63 Subpart ZZZZ (NESHAP). The engines being considered by the Project for installation are manufacturer-certified to meet EPA Tier 2 emissions standards for stationary emergency applications.

The federal NSPS and NESHAP emissions standards do not apply to the CBP.

4.2 BENTON CLEAN AIR AGENCY PERMITTING REQUIREMENTS

All new emissions sources must be registered with the BCAA and follow the Notice of Construction (NOC) and Application for Approval process, which also serves as the registration form for the facility. BCAA approval must be received before installation of the equipment can commence. The BCAA recommends a pre-registration meeting be conducted to learn about the proposed equipment and provide guidance on how to proceed with the NOC process.

A State Environmental Policy Act (SEPA) Checklist and a Determination of Non-Significance (DNS) are required before a facility can operate. Once the DNS is in place, the NOC application is filed with the BCAA. Forms specific to emergency generator engines and portable CBPs are available on BCAA's website. The NOC application is required to include:

- Completed and signed BCAA forms;
- A set of plans that fully describes the proposed source, including distance and height of buildings within 200 feet of the source;
- The estimated emissions that will result from the proposal, or sufficient information for BCAA to calculate the expected emissions;
- The proposed means for control of emissions;
- The base fee; and
- A SEPA checklist or DNS.

The application is subject to a 30-day review period to determine completeness. If the application is deemed to be incomplete, the 30-day completeness review clock resets. Once deemed complete, the BCAA must within 60 days issue an Order of Approval which outlines the specific requirements under federal, state, and local air quality regulations that will allow the source to operate in compliance with air quality regulations.

The Project will follow the BCAA permitting procedures.

5.0 AMBIENT AIR QUALITY ANALYSIS

5.1 INTRODUCTION

An ambient air quality dispersion modeling analysis for the Project has been conducted using procedures specified in the USEPA's *Guideline on Air Quality Models* (USEPA, 2017) and based on correspondence with Washington State Department of Ecology (Ecology).

The dispersion modeling for the Project evaluates worst-case operating conditions to predict the appropriate maximum ambient air concentration for each pollutant and averaging period. The modeled cumulative impacts are added to ambient background concentrations and the sum is compared to the NAAQS. The NAAQS are established for the criteria air pollutants by the USEPA in accordance with the federal CAA to protect public health and public welfare. Section 302(h) of the CAA defines "welfare" to include effects on soils, water, crops, wildlife, weather, damage to and deterioration of property, effects on economic values, and personal comfort and well-being. Table 5-1 provides the NAAQS as well as the modeling rank basis, as defined by USEPA, used for the assessment of this Project's compliance with the various criteria.

Table 5-1. NAAQS

Pollutant	Averaging Period	NAAQS (µg/m³) [a]	Rank for NAAQS Assessment
$PM_{2.5}$	24-hour	35	H8H [b] (5-year Average)
	Annual	12	H1H [c] (5-year Average)
PM_{10}	24-hour	150	H6H [d] over 5 years
CO	1-hour	40,000	H2H [e]
	8-hour	10,000	H2H
NO_2	1-hour	188	H8H (5-year Average)
	Annual	100	H1H [c]
SO_2	1-hour	196	H4H [f] (5-year Average)
	3-hour	1,300	H2H
	24-hour	365	H2H
	Annual	80	H1H

[a] micrograms per cubic meter
[b] H8H = highest eighth high.
[c] H1H = highest first high.
[d] H6H = highest sixth high.
[e] H2H = highest second high.
[f] H4H = highest fourth high.

NO_X emissions from the Project sources are released primarily in the form of NO, and these emissions convert to NO_2 in the atmosphere. The NO_2 impact analysis utilized the default Tier 2 NO_X to NO_2 conversion rates (Ambient Ratio Method [ARM] and ARM2). The Tier 2 approaches assume NO_X converts to NO_2 at a rate consistent with a conservative NO_2/NO_X ambient ratio.

5.2 SOURCE DATA AND OPERATING SCENARIOS

Modeled emissions include PM emissions from all facility operations including material storage and handling as well as combustion emissions from the CBP. Emission sources and rates were identified in Section 3.

For the purposes of PM_{10} and $PM_{2.5}$ dispersion modeling, the maximum 24-hour emission rates were modeled rather than the maximum 1-hour emission rates. For CO and SO_2, the maximum 1-hour emission rates were modeled. For NO_2, consistent with guidance on the modeling of intermittent sources (USEPA, 2011a), annualized emission rates were modeled based on the assumption that each stationary engine would operate up to 500 hours per year (i.e., maximum 1-hour emission rate times 500/8760). The modeling did not impose an operational restriction on the time of day, days of the week, or months of the year. Even though emission sources will be phased and will operate intermittently, all sources were conservatively modeled as operating consistently over the entire year. Emissions released through a stack or vent were modeled as point sources. Emissions from material handling operations (drop points) were modeled as volume sources. The haul roads were modeled as line sources. The front-end loader activity and the wind erosion emissions were modeled as area sources.

Model input parameters for fugitive dust sources were based on guidance provided in the National Sand, Stone, and Gravel Association's Modeling Fugitive Dust Sources with AERMOD (NSSGA, 2007). Detailed model inputs are provided in Appendix B. Figures 5-1a. 5-1b and 5-1c show the modeled source configurations.

As mentioned previously, the project consists of two phases. Source groups were used to group activities related to each phase, and model associated emissions based on duration of each phase.

5.3 MODEL SELECTION

The most recent version of the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) was used in this modeling analysis. AERMOD is USEPA's preferred near-field dispersion modeling system for a wide range of regulatory applications. The AERMOD modeling system includes four regulatory components: AERMOD, AERMAP (terrain processor), AERMET (meteorological processor), and BPIP-Prime (building input processor). The current versions of AERMOD (Version 22112), AERMET (Version 22112), AERMAP (Version 18081) and BPIP-Prime (Version 04274) have been used.

5.4 METEOROLOGICAL DATA FOR AERMOD

A 5-year hourly meteorological data set was processed using AERMET to use for input to AERMOD. The processed data consists of hourly surface observations of wind speed and direction collected at the Tri-Cities Airport in Pasco, Washington and upper air data collected by the National Weather Service (NWS) in Spokane, Washington for the period 2018 through 2022. The meteorological data were collected approximately 15 miles northeast of the Project site. A wind rose plot depicting the frequencies of wind speed and direction for this meteorological data set is provided in Figure 5-2 (the wind rose depicts the direction from which the wind is blowing).

5.5 LAND USE

A land use determination has been made following the classification technique suggested by Auer in accordance with USEPA modeling guidance. The classification determination was conducted by assessing land use categories within a 3-kilometer (km) radius of the Project Site. Review of the 3-km area indicates that the area within the 3-km radius can be characterized as rural. Therefore, rural dispersion coefficients were used in the air quality modeling analysis.

5.6 GOOD ENGINEERING PRACTICE STACK HEIGHT ANALYSIS

A Good Engineering Practice (GEP) stack height analysis has been performed based on the Project structures to determine the potential for building-induced aerodynamic downwash for the proposed stacks. The analysis procedures described in USEPA's Guidelines for Determination of Good Engineering Practice Stack Height (USEPA 1985) have been used.

The "GEP stack height" is defined as the greater of 65 meters or the formula height. The "formula height" is based on the observed phenomena of disturbed atmospheric flow in the immediate vicinity of a structure resulting in higher ground-level concentrations at a closer proximity than would otherwise occur. It identifies the minimum stack height at which significant aerodynamic downwash is avoided.

The GEP formula stack height, as defined by USEPA in the 1985 final regulation, is calculated as follows:

$$H_{GEP} = H_{BLDG} + 1.5L$$

Where:

- H_{GEP} is the calculated GEP formula height;
- H_{BLDG} is the height of the nearby structure; and
- L is the lesser dimension (height or projected width) of the nearby structure.

Both the height and width of the structure are determined from the frontal area of the structure projected onto the plane perpendicular to the direction of the wind. The GEP stack height is based on the plane projection of any structure that results in the greatest calculated height. For the purpose of the GEP analysis, nearby refers to the “sphere of influence” defined as 5 times L (the lesser dimension – height or projected width – of the nearby structure), downwind from the trailing edge of the structure.

The USEPA’s Building Profile Input Program (BPIP-Prime, v04274) that is appropriate for use with the PRIME algorithms in AERMOD has been used. The building dimensions and coordinates for each potentially influencing structure were input to BPIP-Prime to determine direction-specific building dimension data for input to AERMOD.

The exhaust emissions of the stacks below their calculated GEP heights will experience the aerodynamic effects of downwash. For each stack the controlling structures can differ by wind direction, and wind-direction specific building dimensions are generated by BPIP-Prime for input to AERMOD. AERMOD then accounts for potential downwash from nearby structures in the dispersion calculations. The PRIME algorithms in AERMOD calculate the dimensions of the structure’s wake, from the cavity immediately downwind of the structure to the far wake.

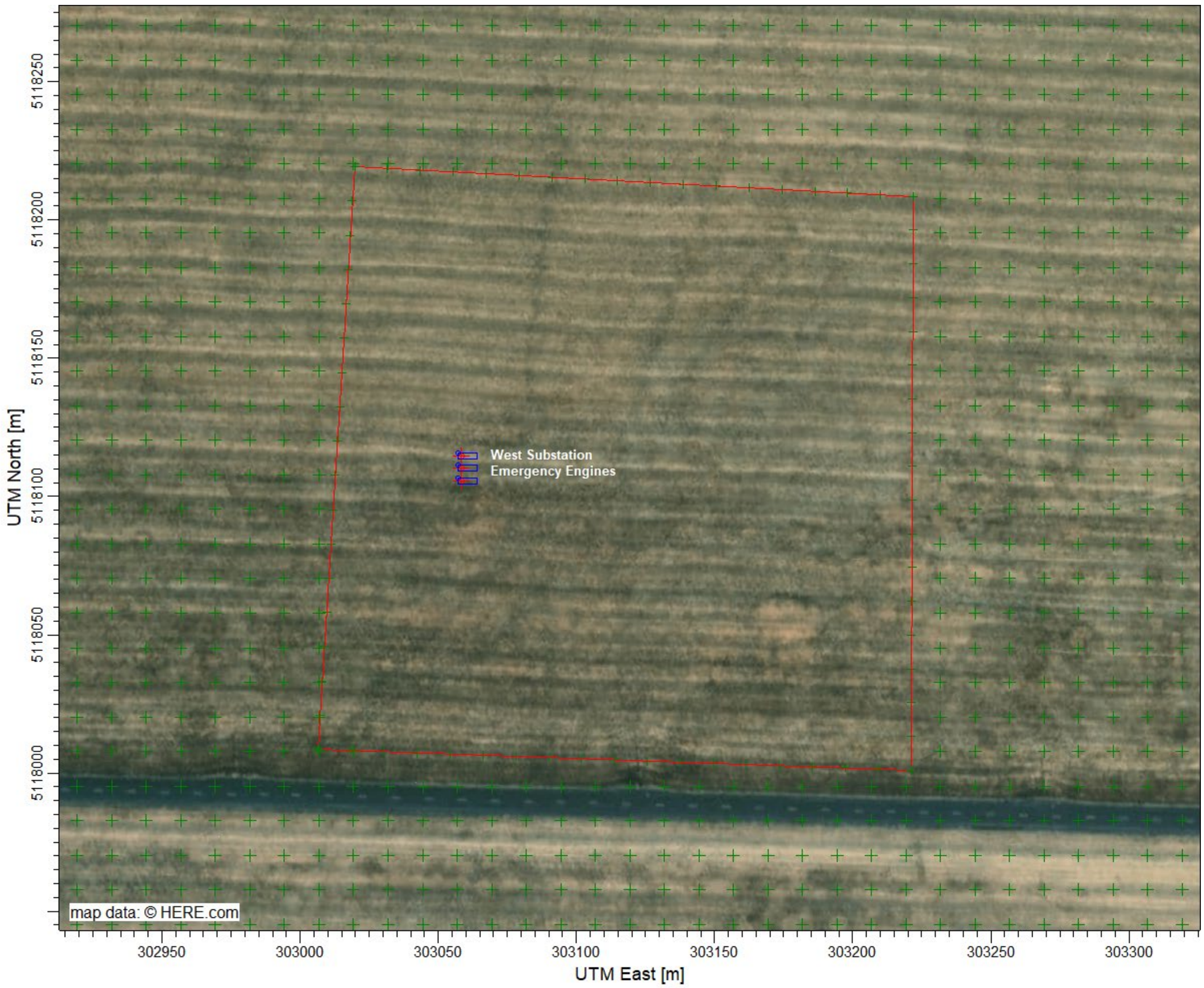


Figure 5-1a. Modeled Source Configuration: West Substation

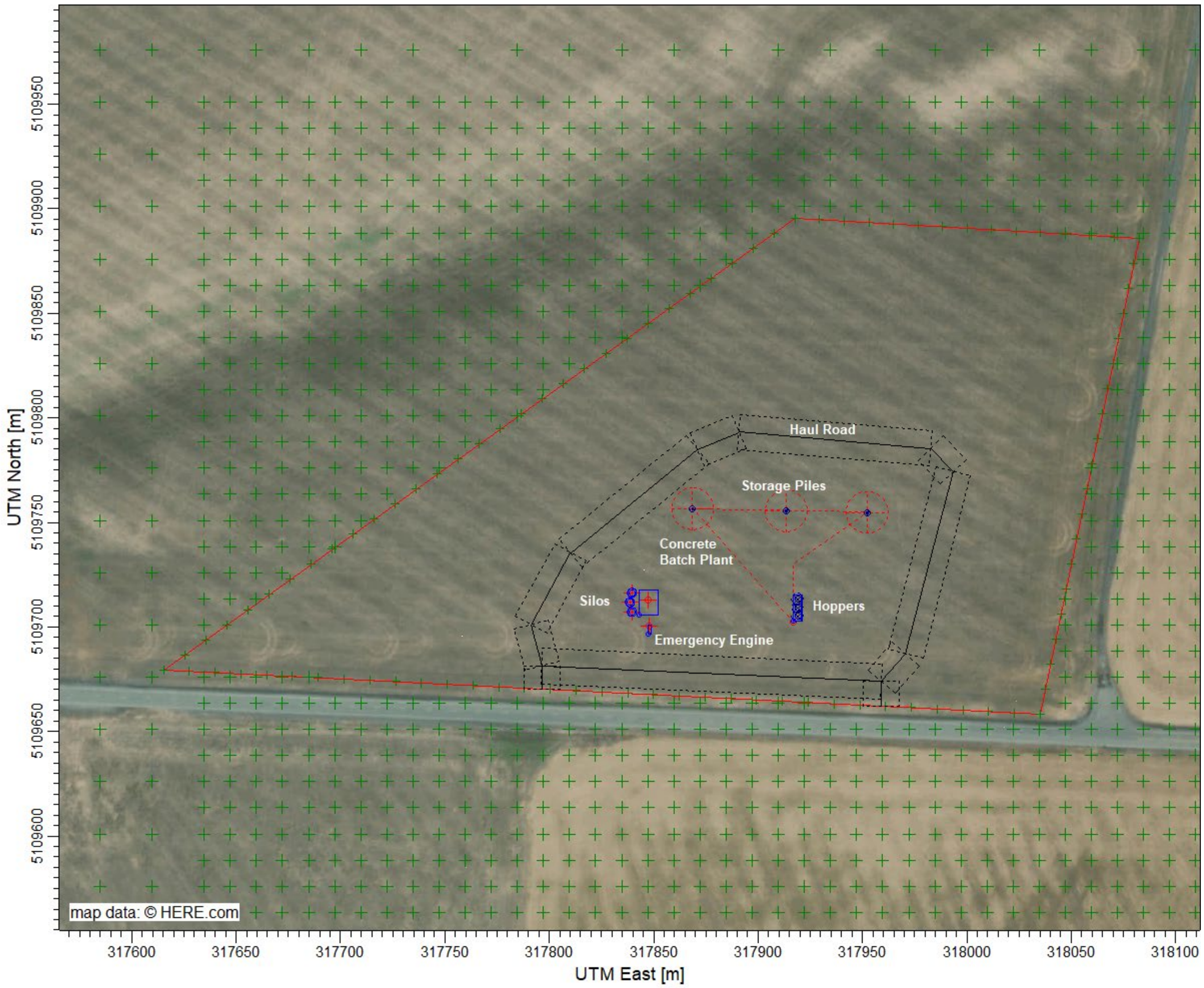


Figure 5-1b. Modeled Source Configuration: West Laydown

Figure 5-1c. Modeled Source Configuration: East Substation and Laydown

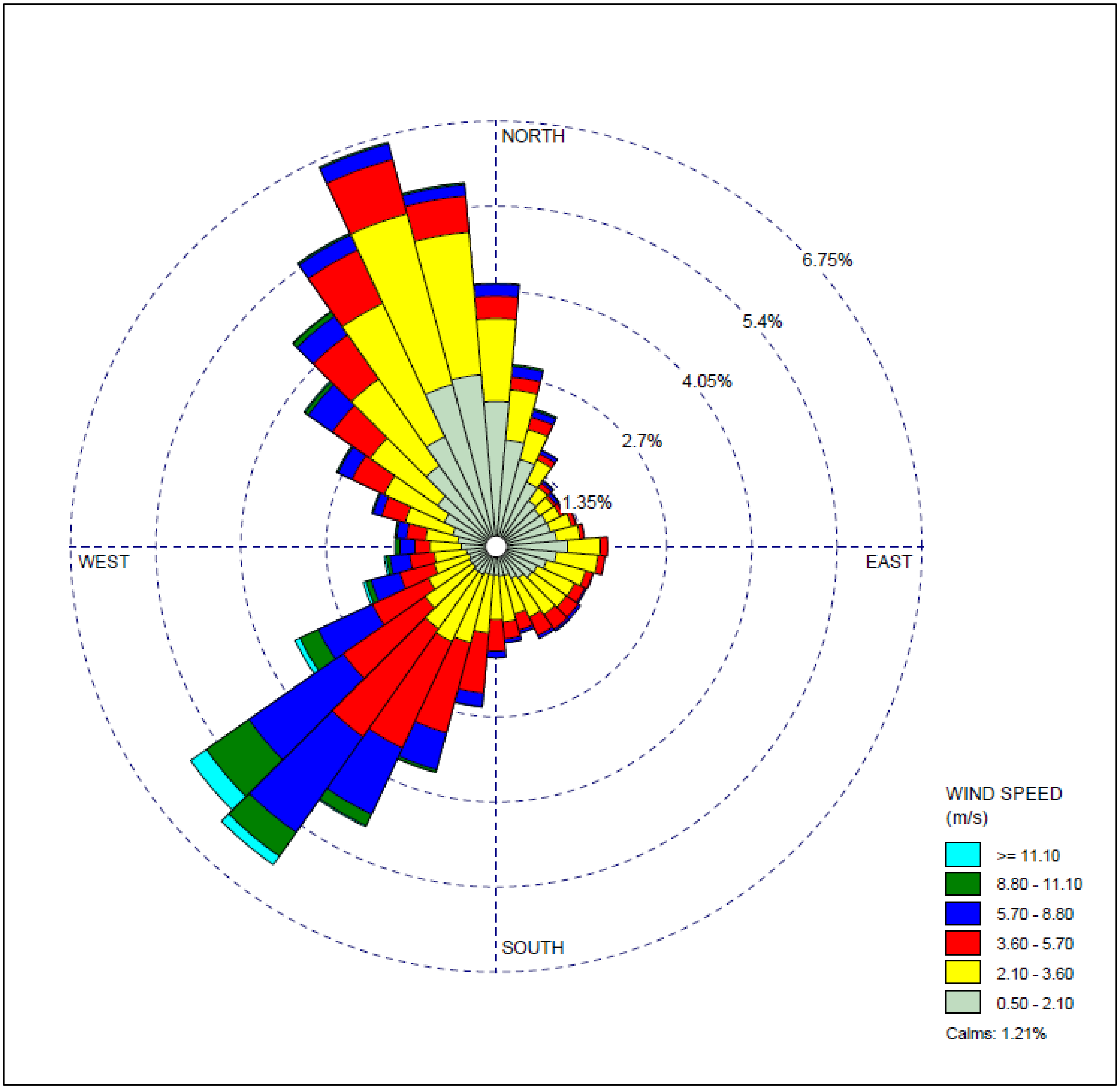


Figure 5-2. Five-Year (2018-2022) Wind Rose of Measurements from Tri-Cities Airport in Pasco, WA

5.7 RECEPTOR GRID AND AERMAP PROCESSING

Discrete receptors are placed at intervals of 12.5 meters along the Project fence line. A nested Cartesian grid was extended out from the fence line at the following receptor intervals and distances:

- At 12.5-meter intervals from the Project Site fence line to 150 meters;
- At 25-meter intervals from 150 meters to 400 meters;
- At 50-meter intervals from 400 meters to 900 meters;
- At 100-meter intervals from 900 meters to 2,000 meters;
- At 300-meter intervals from 2,000 to 4,500 meters; and
- At 600-meter intervals at from 4,500 to 10,000 meters.

Receptor elevations were assigned by using USEPA's AERMAP software tool (version 18081; USEPA, 2018), which is designed to extract elevations from the U.S. Geological Survey (USGS) Digital Elevation Model (DEM) files and USGS National Elevation Dataset (NED) files. AERMAP is the terrain preprocessor for AERMOD and uses the following procedure to assign elevations to a receptor:

- For each receptor, the program searches through the USGS input files to determine the two profiles (longitudes or eastings) that straddle this receptor.
- For each of these two profiles, the program then searches through the nodes in the USGS input files to determine which two rows (latitudes or northings) straddle the receptor.
- The program then calculates the coordinates of these four points and reads the elevations for these four points.
- A 2-dimensional distance-weighted interpolation is used to determine the elevation at the receptor location based on the elevations at the four nodes determined above.

NED data with a resolution of 1/3 arc-second (roughly 10 meters) were used as inputs to AERMAP. The NED data domain was sufficient to properly account for terrain that would factor into the critical hill height calculations. Receptor elevations generated by AERMAP were then visually confirmed with the actual USGS 7.5-minute topographic maps to ensure accurate representation of terrain features. Based on guidance from Ecology, flagpole receptor heights were set to 1.5 meters above ground. Figure 5-3 shows the receptors included in the modeling analysis.

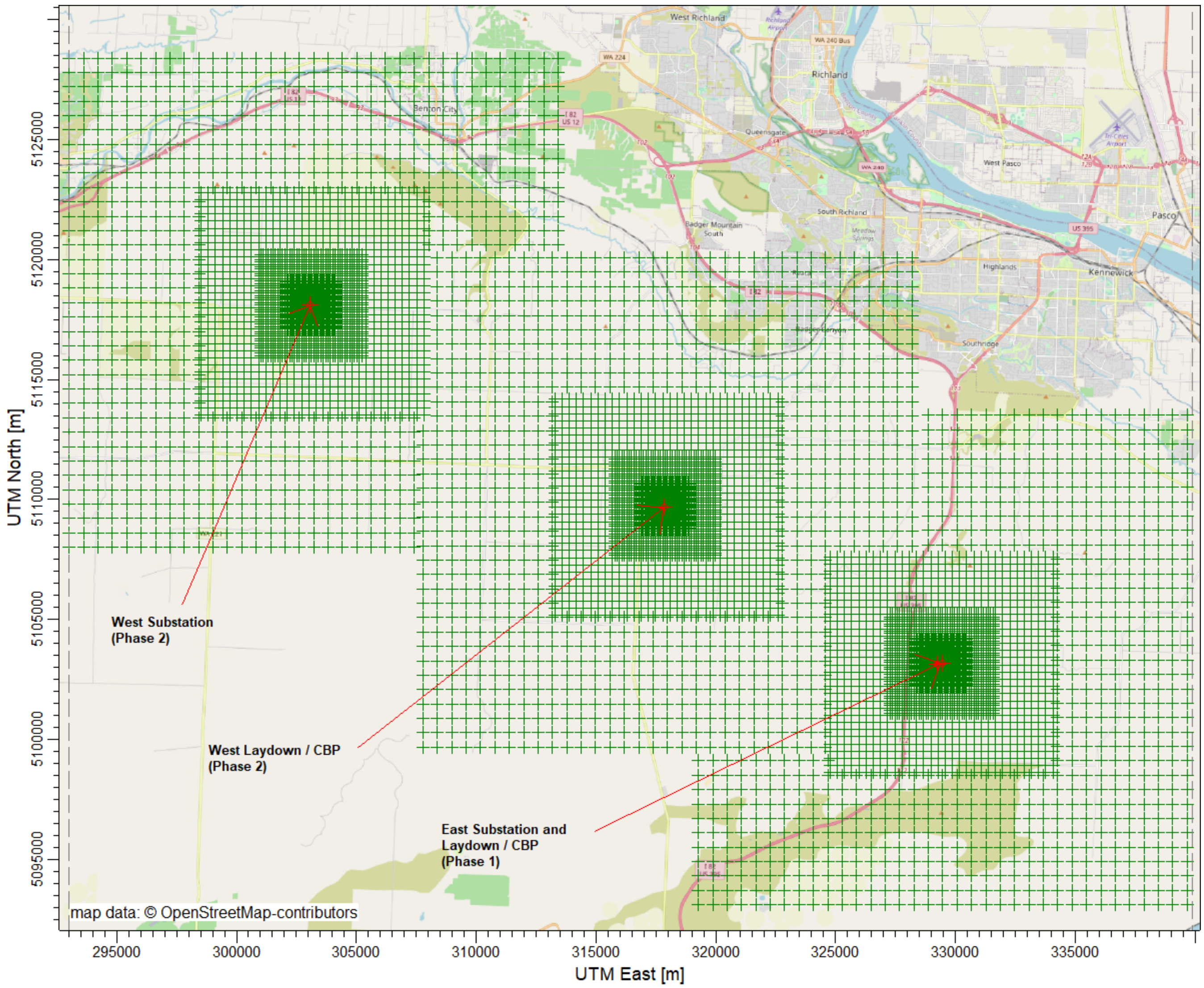


Figure 5-3. Modeled Receptor Grids

5.8 AMBIENT BACKGROUND DATA

Per guidance from Ecology, data from the NW-AIRQUEST tool was used to determine ambient background concentrations for use in the air quality analysis. In collaboration between Ecology, the Idaho Department of Environmental Quality, and the Oregon Department of Environmental Quality, the tool was created using model and monitoring data from 2014 through 2017 to estimate background concentrations of criteria air pollutant design values at user-specified locations in Washington, Idaho, and Oregon (IDEQ 2019). A location near the center of the modeled emissions sources was specified and representative criteria pollutant design values were provided. The representative ambient air quality background concentrations are provided in Table 5-2.

Table 5-2. Ambient Background Air Quality Concentrations

Pollutant	Averaging Period	Rank	Background Concentration (μg/m³)	NAAQS (μg/m³)	Ambient Background % of NAAQS
$PM_{2.5}$	24-hour	98th percentile	17.5	35	50%
	Annual	Mean	5.7	12	48%
PM_{10}	24-hour	2nd high	71.6	150	48%
CO	1-hour	2nd high	1,386	40,000	3%
	8-hour	2nd high	962	10,000	10%
NO_2	1-hour	98th percentile	19.0	188	10%
	Annual	Mean	3.8	100	4%
SO_2	1-hour	2nd high	12.8	196	7%
	3-hour	2nd high	17.0	1,300	1%
	24-hour	2nd high	5.8	365	2%
	Annual	Mean	1.0	80	1%

Notes:
Monitor located at 46.130541°, -119.381191°
Source: https://idahodeq.maps.arcgis.com/apps/MapSeries/index.html?appid=0c8a006e11fe4ec5939804b873098dfe

5.9 MODELING RESULTS

The modeling analyses were conducted using the most current version of AERMOD (Version 22112) along with the meteorological data as described in Section 5.4. The analyses were conducted to demonstrate compliance with the NAAQS. All Project emissions sources were assumed to be operating at maximum potential emission rates to assess compliance with the NAAQS. The modeled results for the Project are summarized in Table 5-3 for all pollutants modeled. Representative background concentrations were added to modeled impacts and the total concentrations were then compared to the NAAQS. As shown in Table 5-3, emissions from the Project will not cause or contribute to a violation of the NAAQS.

The modeling of fugitive dust emissions is known to over-predict ambient PM_{10} and $PM_{2.5}$ concentrations, such that the predictions presented here should be regarded as conservative overestimates of ambient air quality impacts. AERMOD does not account for the episodic (non-continuous) nature of fugitive dust emissions sources, does not properly address near-source plume depletion, and does not consider the removal of dust in plumes by trees, berms, and other obstacles. Cowherd (2009) identified deficiencies with model representation of fugitive dust sources, and assigned factors of overestimation to the deficiencies:

- Misrepresentation of haul roads as continuously emitting sources, factor of 2 overestimation;
- Cumulative effects of modeling deficiencies, factor of 4 overestimation for “average” groundcover;
- Exclusion of near-source agglomeration and enhanced deposition, up to a factor of 6 overestimation, depending on wind and groundcover; and
- Exclusion of trapping by vertical obstacles during horizontal transport, factor of 2 to 6 overestimation, depending on wind and groundcover;

Given these deficiencies, the worst-case ambient concentrations of PM_{10} and $PM_{2.5}$ resulting from the Project are expected to be considerably less than those presented in Table 5-3. Additionally, due to the broad spatial and temporal distribution of construction activities (i.e., construction activities across the Project will be spread over an expansive area and will likely not occur simultaneously), emissions from the generators and CBP are not expected to interact with the balance of construction activities in a way that would cause or contribute to a violation of the NAAQS.

Figures in Appendix C illustrate the extents of maximum predicted pollutant concentrations relative to the whole Project area and surrounding residences for $PM_{2.5}$ (24-hour and Annual), PM_{10} (24-hour), and NO_2 (1-hour). Figures show areas where design value concentrations with ambient background are predicted to take up more than 50% of the NAAQS. For 24-hour $PM_{2.5}$, since ambient background concentrations already take up 50% of the NAAQS, figures show areas where total concentrations are predicted to take up 55% of the NAAQS. For 1-hour NO_2, areas where total concentrations take up 50% of the NAAQS are limited, and therefore are only shown in the near-field relative to surrounding residences. The figures show that predicted maximum pollutant concentrations, inclusive of a number of conservative assumptions, are highly localized and drop rapidly with distance from the sources. The figures also show that the emissions modeled are not expected to cause violations at the nearest residential receptors.

Table 5-3. Maximum AERMOD-Predicted Concentrations and NAAQS Compliance Assessment

Pollutant	Averaging Period	Rank Basis	Predicted Project Concentration (µg/m³)	Ambient Background (µg/m³)	Total Concentration (µg/m³)	NAAQS (µg/m³)
$PM_{2.5}$	24-hour	H8H (5-year Average)	16.9	17.5	34	35
	Annual	H1H (5-year Average)	4.2	5.7	10	12
PM_{10}	24-Hour	H6H (5-year Duration)	59.8	71.6	131	150
CO	1-hour	H2H	624.9	1,386	2,011	40,000
	8-hour	H2H	445.3	962	1,407	10,000
NO_2	1-hour	H8H (5-year Average)	105.6	19.0	125	188
	Annual	H1H	6.9	3.8	11	100
SO_2	1-hour	H4H (5-year Average)	1.1	12.8	14	196
	3-hour	H2H	1.3	17.0	18	1,300
	24-hour	H2H	0.6	5.8	6	365
	Annual	H1H	0.07	1.0	1	80
µg/m³ = microgram per cubic meter						

6.0 REFERENCES

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APPENDIX A: EMISSIONS CALCULATIONS

	Location	Substation Location	Equipment Type	Units	CO	NOx	PM	PM_{10}	$PM_{2.5}$	SO_2	VOC	Lead
					Criteria Pollutants							
Uncontrolled	Location 1	East Substation	East Load Bank Engines	(lb/hr)	44.22	192.96	5.63	5.63	5.63	0.10	5.67	-
				(tpy)	11.06	48.24	1.41	1.41	1.41	0.02	1.42	-
		East Laydown	East CBP Engine	(lb/hr)	3.69	16.08	0.47	0.47	0.47	0.01	0.47	-
				(tpy)	0.92	4.02	0.12	0.12	0.12	0.00	0.12	-
			East CBP Mat'l Handling	(lb/hr)	-	-	181.87	24.27	3.66	-	-	0.01
				(tpy)	-	-	51.61	6.90	1.07	-	-	0.00
	Location 2	West Substation	West Load Bank Engines	(lb/hr)	44.22	192.96	5.63	5.63	5.63	0.10	5.67	-
				(tpy)	11.06	48.24	1.41	1.41	1.41	0.02	1.42	-
	Location 3	West Laydown	West CBP Engine	(lb/hr)	3.69	16.08	0.47	0.47	0.47	0.01	0.47	-
				(tpy)	0.92	4.02	0.12	0.12	0.12	0.00	0.12	-
			West CBP Mat'l Handling	(lb/hr)	-	-	181.87	24.27	3.66	-	-	0.01
				(tpy)	-	-	38.59	5.39	0.81	-	-	0.00
			Total:	**(lb/hr)**	**95.81**	**418.08**	**375.94**	**60.73**	**19.52**	**0.21**	**12.28**	**0.02**
				(tpy)	**23.95**	**104.52**	**93.25**	**15.34**	**4.93**	**0.05**	**3.07**	**0.01**
Controlled	Location 1	East Substation	East Load Bank Engines	(lb/hr)	44.22	192.96	5.63	5.63	5.63	0.10	5.67	-
				(tpy)	11.06	48.24	1.41	1.41	1.41	0.02	1.42	-
		East Laydown	East CBP Engine	(lb/hr)	3.69	16.08	0.47	0.47	0.47	0.01	0.47	-
				(tpy)	0.92	4.02	0.12	0.12	0.12	0.00	0.12	-
			East CBP Mat'l Handling	(lb/hr)	-	-	5.36	0.65	0.09	-	-	0.00
				(tpy)	-	-	8.37	1.48	0.26	-	-	0.00
	Location 2	West Substation	West Load Bank Engines	(lb/hr)	44.22	192.96	5.63	5.63	5.63	0.10	5.67	-
				(tpy)	11.06	48.24	1.41	1.41	1.41	0.02	1.42	-
	Location 3	West Laydown	West CBP Engine	(lb/hr)	3.69	16.08	0.47	0.47	0.47	0.01	0.47	-
				(tpy)	0.92	4.02	0.12	0.12	0.12	0.00	0.12	-
			West CBP Mat'l Handling	(lb/hr)	-	-	5.36	0.65	0.09	-	-	0.00
				(tpy)	-	-	6.33	1.15	0.20	-	-	0.00
			Total:	**(lb/hr)**	**95.81**	**418.08**	**22.91**	**13.50**	**12.38**	**0.21**	**12.28**	**0.01**
				(tpy)	**23.95**	**104.52**	**17.75**	**5.68**	**3.51**	**0.05**	**3.07**	**0.00**

	Location	Substation Location	Equipment Type	Units	Hazardous Air Pollutants																	
					Acetaldehyde	Acrolein	Arsenic	Benzene	Beryllium	Cadmium	Total Chromium	Formaldehyde	Lead	Manganese	Naphthalene	Nickel	Total Phosphorus	Selenium	Toluene	Xylenes	Total PAH	Total HAPs
Uncontrolled	Location 1	East Substation	East Load Bank Engines	(lb/hr)	1.42E-03	4.43E-04	-	4.37E-02	-	-	-	4.44E-03	0.00E+00	-	7.32E-03	-	-	-	1.58E-02	1.09E-02	1.19E-02	8.40E-02
				(tpy)	6.21E-03	1.94E-03	-	1.91E-01	-	-	-	1.94E-02	0.00E+00	-	3.20E-02	-	-	-	6.93E-02	4.76E-02	5.23E-02	3.68E-01
		East Laydown	East CBP Engine	(lb/hr)	1.18E-04	3.70E-05	-	3.64E-03	-	-	-	3.70E-04	0.00E+00	-	6.10E-04	-	-	-	1.32E-03	9.05E-04	9.94E-04	7.00E-03
				(tpy)	5.18E-04	1.62E-04	-	1.59E-02	-	-	-	1.62E-03	0.00E+00	-	2.67E-03	-	-	-	5.77E-03	3.96E-03	4.35E-03	3.06E-02
			East CBP Mat'l Handling	(lb/hr)	-	-	2.11E-02	-	1.58E-03	9.18E-05	2.40E-02	-	1.00E-02	9.11E-02	-	4.74E-02	7.50E-02	2.06E-03	-	-	-	2.72E-01
				(tpy)	-	-	6.35E-03	-	4.76E-04	2.77E-05	7.23E-03	-	3.02E-03	2.75E-02	-	1.43E-02	2.26E-02	6.21E-04	-	-	-	8.20E-02
	Location 2	West Substation	West Load Bank Engines	(lb/hr)	1.42E-03	4.43E-04	-	4.37E-02	-	-	-	4.44E-03	0.00E+00	-	7.32E-03	-	-	-	1.58E-02	1.09E-02	1.19E-02	8.40E-02
				(tpy)	6.21E-03	1.94E-03	-	1.91E-01	-	-	-	1.94E-02	0.00E+00	-	3.20E-02	-	-	-	6.93E-02	4.76E-02	5.23E-02	3.68E-01
	Location 3	West Laydown	West CBP Engine	(lb/hr)	1.18E-04	3.70E-05	-	3.64E-03	-	-	-	3.70E-04	0.00E+00	-	6.10E-04	-	-	-	1.32E-03	9.05E-04	9.94E-04	7.00E-03
				(tpy)	5.18E-04	1.62E-04	-	1.59E-02	-	-	-	1.62E-03	0.00E+00	-	2.67E-03	-	-	-	5.77E-03	3.96E-03	4.35E-03	3.06E-02
			West CBP Mat'l Handling	(lb/hr)	-	-	2.11E-02	-	1.58E-03	9.18E-05	2.40E-02	-	1.00E-02	9.11E-02	-	4.74E-02	7.50E-02	2.06E-03	-	-	-	2.72E-01
				(tpy)	-	-	4.52E-03	-	3.39E-04	1.97E-05	5.14E-03	-	2.15E-03	1.95E-02	-	1.02E-02	1.61E-02	4.42E-04	-	-	-	5.84E-02
	Total:			**(lb/hr)**	**0.00**	**0.00**	**0.04**	**0.09**	**0.00**	**0.00**	**0.05**	**0.01**	**0.02**	**0.18**	**0.02**	**0.09**	**0.15**	**0.00**	**0.03**	**0.02**	**0.03**	**0.73**
				(tpy)	**0.01**	**0.00**	**0.01**	**0.41**	**0.00**	**0.00**	**0.01**	**0.04**	**0.01**	**0.05**	**0.07**	**0.02**	**0.04**	**0.00**	**0.15**	**0.10**	**0.11**	**0.94**
Controlled	Location 1	East Substation	East Load Bank Engines	(lb/hr)	1.42E-03	4.43E-04	-	4.37E-02	-	-	-	4.44E-03	0.00E+00	-	7.32E-03	-	-	-	1.58E-02	1.09E-02	1.19E-02	0.08
				(tpy)	6.21E-03	1.94E-03	-	1.91E-01	-	-	-	1.94E-02	0.00E+00	-	3.20E-02	-	-	-	6.93E-02	4.76E-02	5.23E-02	3.68E-01
		East Laydown	East CBP Engine	(lb/hr)	1.18E-04	3.70E-05	-	3.64E-03	-	-	-	3.70E-04	0.00E+00	-	6.10E-04	-	-	-	1.32E-03	9.05E-04	9.94E-04	7.00E-03
				(tpy)	5.18E-04	1.62E-04	-	1.59E-02	-	-	-	1.62E-03	0.00E+00	-	2.67E-03	-	-	-	5.77E-03	3.96E-03	4.35E-03	3.06E-02
			East CBP Mat'l Handling	(lb/hr)	-	-	2.28E-03	-	2.77E-04	1.98E-05	7.61E-03	-	2.93E-03	3.01E-02	-	7.13E-02	2.26E-02	2.64E-04	-	-	-	1.37E-01
				(tpy)	-	-	1.60E-04	-	1.94E-05	1.39E-06	5.32E-04	-	2.05E-04	2.11E-03	-	4.99E-03	1.58E-03	1.84E-05	-	-	-	9.60E-03
	Location 2	West Substation	West Load Bank Engines	(lb/hr)	1.42E-03	4.43E-04	-	4.37E-02	-	-	-	4.44E-03	0.00E+00	-	7.32E-03	-	-	-	1.58E-02	1.09E-02	1.19E-02	8.40E-02
				(tpy)	6.21E-03	1.94E-03	-	1.91E-01	-	-	-	1.94E-02	0.00E+00	-	3.20E-02	-	-	-	6.93E-02	4.76E-02	5.23E-02	3.68E-01
	Location 3	West Laydown	West CBP Engine	(lb/hr)	1.18E-04	3.70E-05	-	3.64E-03	-	-	-	3.70E-04	0.00E+00	-	6.10E-04	-	-	-	1.32E-03	9.05E-04	9.94E-04	7.00E-03
				(tpy)	5.18E-04	1.62E-04	-	1.59E-02	-	-	-	1.62E-03	0.00E+00	-	2.67E-03	-	-	-	5.77E-03	3.96E-03	4.35E-03	3.06E-02
			West CBP Mat'l Handling	(lb/hr)	-	-	2.28E-03	-	2.77E-04	1.98E-05	7.61E-03	-	2.93E-03	3.01E-02	-	7.13E-02	2.26E-02	2.64E-04	-	-	-	1.37E-01
				(tpy)	-	-	1.14E-04	-	1.38E-05	9.87E-07	3.79E-04	-	1.46E-04	1.50E-03	-	3.55E-03	1.12E-03	1.31E-05	-	-	-	6.84E-03
	Total:			**(lb/hr)**	**0.00**	**0.00**	**0.00**	**0.09**	**0.00**	**0.00**	**0.02**	**0.01**	**0.01**	**0.06**	**0.02**	**0.14**	**0.05**	**0.00**	**0.03**	**0.02**	**0.03**	**0.46**
				(tpy)	**0.01**	**0.00**	**0.00**	**0.41**	**0.00**	**0.00**	**0.00**	**0.04**	**0.00**	**0.00**	**0.07**	**0.01**	**0.00**	**0.00**	**0.15**	**0.10**	**0.11**	**0.81**

	Location	Substation Location	Equipment Type	Units	Polycyclic Aromatic Hydrocarbons																
					Acena-phthene	Acenaph-thylene	Anthracene	Benz(a)an-thracene	Benzo(a)-pyrene	Benzo(b)-fluoranthene	Benzo(g,h,l)-perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3,-d)pyrene	Naphthalene	Phenanthrene	Pyrene	Total PAH
Uncontrolled	Location 1	East Substation	East Load Bank Engines	(lb/hr)	-	-	6.92E-05	-	-	-	-	1.23E-05	8.61E-05	1.95E-05	2.27E-04	7.20E-04	2.33E-05	7.32E-03	2.30E-03	2.09E-04	1.19E-02
				(tpy)	-	-	3.03E-04	-	-	-	-	5.37E-05	3.77E-04	8.53E-05	9.93E-04	3.16E-03	1.02E-04	3.20E-02	1.01E-02	9.15E-04	5.23E-02
		East Laydown	East CBP Engine	(lb/hr)	-	-	5.77E-06	-	-	-	-	1.02E-06	7.18E-06	1.62E-06	1.89E-05	6.00E-05	1.94E-06	6.10E-04	1.91E-04	1.74E-05	9.94E-04
				(tpy)	-	-	2.53E-05	-	-	-	-	4.48E-06	3.14E-05	7.11E-06	8.28E-05	2.63E-04	8.50E-06	2.67E-03	8.38E-04	7.62E-05	4.35E-03
			East CBP Mat'l Handling	(lb/hr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				(tpy)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Location 2	West Substation	West Load Bank Engines	(lb/hr)	-	-	6.92E-05	-	-	-	-	1.23E-05	8.61E-05	1.95E-05	2.27E-04	7.20E-04	2.33E-05	7.32E-03	2.30E-03	2.09E-04	1.19E-02
				(tpy)	-	-	3.03E-04	-	-	-	-	5.37E-05	3.77E-04	8.53E-05	9.93E-04	3.16E-03	1.02E-04	3.20E-02	1.01E-02	9.15E-04	5.23E-02
	Location 3	West Laydown	West CBP Engine	(lb/hr)	-	-	5.77E-06	-	-	-	-	1.02E-06	7.18E-06	1.62E-06	1.89E-05	6.00E-05	1.94E-06	6.10E-04	1.91E-04	1.74E-05	9.94E-04
				(tpy)	-	-	2.53E-05	-	-	-	-	4.48E-06	3.14E-05	7.11E-06	8.28E-05	2.63E-04	8.50E-06	2.67E-03	8.38E-04	7.62E-05	4.35E-03
			West CBP Mat'l Handling	(lb/hr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				(tpy)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Total:	**(lb/hr)**	**-**	**-**	**0.00**	**-**	**-**	**-**	**-**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.02**	**0.00**	**0.00**	**0.03**
				(tpy)	**-**	**-**	**0.00**	**-**	**-**	**-**	**-**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.00**	**0.07**	**0.02**	**0.00**	**0.11**
Controlled	Location 1	East Substation	East Load Bank Engines	(lb/hr)	-	-	6.92E-05	-	-	-	-	1.23E-05	8.61E-05	1.95E-05	2.27E-04	7.20E-04	2.33E-05	7.32E-03	2.30E-03	2.09E-04	1.19E-02
				(tpy)	-	-	3.03E-04	-	-	-	-	5.37E-05	3.77E-04	8.53E-05	9.93E-04	3.16E-03	1.02E-04	3.20E-02	1.01E-02	9.15E-04	5.23E-02
		East Laydown	East CBP Engine	(lb/hr)	-	-	5.77E-06	-	-	-	-	1.02E-06	7.18E-06	1.62E-06	1.89E-05	6.00E-05	1.94E-06	6.10E-04	1.91E-04	1.74E-05	9.94E-04
				(tpy)	-	-	2.53E-05	-	-	-	-	4.48E-06	3.14E-05	7.11E-06	8.28E-05	2.63E-04	8.50E-06	2.67E-03	8.38E-04	7.62E-05	4.35E-03
			East CBP Mat'l Handling	(lb/hr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				(tpy)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Location 2	West Substation	West Load Bank Engines	(lb/hr)	-	-	6.92E-05	-	-	-	-	1.23E-05	8.61E-05	1.95E-05	2.27E-04	7.20E-04	2.33E-05	7.32E-03	2.30E-03	2.09E-04	1.19E-02
				(tpy)	-	-	3.03E-04	-	-	-	-	5.37E-05	3.77E-04	8.53E-05	9.93E-04	3.16E-03	1.02E-04	3.20E-02	1.01E-02	9.15E-04	5.23E-02
	Location 3	West Laydown	West CBP Engine	(lb/hr)	-	-	5.77E-06	-	-	-	-	1.02E-06	7.18E-06	1.62E-06	1.89E-05	6.00E-05	1.94E-06	6.10E-04	1.91E-04	1.74E-05	9.94E-04
				(tpy)	-	-	2.53E-05	-	-	-	-	4.48E-06	3.14E-05	7.11E-06	8.28E-05	2.63E-04	8.50E-06	2.67E-03	8.38E-04	7.62E-05	4.35E-03
			West CBP Mat'l Handling	(lb/hr)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				(tpy)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			Total:	**(lb/hr)**	**-**	**-**	**0.00**	**-**	**-**	**-**	**-**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.02**	**0.00**	**0.00**	**0.03**
				(tpy)	**-**	**-**	**0.00**	**-**	**-**	**-**	**-**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.00**	**0.07**	**0.02**	**0.00**	**0.11**

	Concrete Usage and Schedule	Units	Location East	Location West	Location Total	Source
Concrete Usage	Turbine Foundation	(CY)	76,565	53,638	130,203	Estimated usage based on Scout-provided data.
Concrete Usage	BESS Foundation	(CY)	2,045	2,045	4,090	Estimated usage based on Scout-provided data.
Concrete Usage	Substation Foundation	(CY)	960	960	1,920	Estimated usage based on Scout-provided data.
Concrete Usage	Concrete Usage	(CY)	79,570	56,643	136,213	Sum of all foundations.
Concrete Usage	Percent Used by Each Location	(%)	58%	42%	100%	Calculated percentage.
Concrete Usage	Concrete Usage (Applied Margins)	(CY)	99,463	70,804	170,266	Assume 25% increase in margin to account for uncertainty and spoiled batches.
Concrete Usage		(ton)	198,925	141,608	340,533	
Max Operating Schedule	Estimated Operating Duration	(months)	4	4	8	Estimated project timeline.
Max Operating Schedule	Max Hourly Production	(CY/hr)	165	165		The operating capacity of the largest possible concrete batch plant is 165 cy/hr.
Max Operating Schedule		(ton/hr)	330	330		Assume 2 tons = 1 CY of concrete.
Max Operating Schedule	Max Daily Production	(CY/day)	711	711		Assume 2 tons = 1 CY of concrete.
Max Operating Schedule		(ton/day)	1,423	1,423		Provided by Scout, with 25% margin to account for uncertainty and spoiled batches
Max Operating Schedule	Max Annual Production	(CY/yr)	99,463	70,804	170,266	Max concrete usage per location.
Max Operating Schedule		(ton/yr)	198,925	141,608	340,533	Max concrete usage per location.

	Raw Materials	Units	Processing Rate East	Processing Rate West	Source
Composition	Cement - 8%	(ton/hr)	26.4	26.4	Ratios of raw materials from Wanzek and Blattner. Cement composition is estimated to contain 8% cement and 2% cement supplement.
Composition		(ton/day)	114	114	
Composition		(ton/yr)	15,914	11,329	
Composition	Cement Supplement - 2%	(ton/hr)	6.6	6.6	
Composition		(ton/day)	28	28	
Composition		(ton/yr)	3,979	2,832	
Composition	Fly Ash (Light Aggregate) - 3%	(ton/hr)	9.9	9.9	
Composition		(ton/day)	43	43	
Composition		(ton/yr)	5,968	4,248	
Composition	Rock (Heavy Aggregate) - 45%	(ton/hr)	149	149	
Composition		(ton/day)	640	640	
Composition		(ton/yr)	89,516	63,723	
Composition	Sand - 37%	(ton/hr)	122.1	122.1	
Composition		(ton/day)	526	526	
Composition		(ton/yr)	73,602	52,395	
Composition	Water - 5%	(ton/hr)	17	17	
Composition		(ton/day)	71	71	
Composition		(ton/yr)	9,946	7,080	

	Misc Parameters	Units	Location East	Location West	Source
Storage Pile	Storage Pile Diameter	(ft)	65	65	Estimated size.
Storage Pile	Storage Pile Height	(ft)	10	10	Estimated size.
Storage Pile	Storage Pile Surface Area	(ft^2)	3472	3472	Cone shape storage area.
Storage Pile		(acre)	0.08	0.08	Square feet to acre conversion.
Storage Pile	Number of Storage Piles	(qty)	3	3	Estimated number of piles.
Misc	Wind Speed [U]	(mph)	6	6	Estimated average wind speed in Benton County.
Misc	Moisture [M]	(%)	5	5	Average moisture content of sand and aggregate.

	Vehicle Parameters and Trip Lengths	Units	East Sand & Aggregate Delivery	East Cement Delivery	East Concrete Haul-Out	West Sand & Aggregate Delivery	West Cement Delivery	West Concrete Haul-Out
MPR	Material Processing Rate	(ton/hour)	281	26	330	281	26	330
MPR		(ton/day)	1,209	114	1,423	1,209	114	1,423
MPR		(ton/yr)	169,086	15,914	198,925	120,366	11,329	141,608
Truck Weight and Trip Lengths (Paved)	Truck Trips	(trips/hour)	10	1	17	10	1	17
Truck Weight and Trip Lengths (Paved)		(trips/day)	43	3	71	43	3	71
Truck Weight and Trip Lengths (Paved)		(trips/yr)	6,039	442	9,946	4,299	315	7,080
Truck Weight and Trip Lengths (Paved)	Typical Trip Length [Loaded]	(feet/trip)	395	648	227	395	648	227
Truck Weight and Trip Lengths (Paved)	Typical Trip Length [Unloaded]	(feet/trip)	479	227	648	479	227	648
Truck Weight and Trip Lengths (Paved)	Typical Trip Length [Total]	(feet/trip)	874	874	874	874	874	874
Truck Weight and Trip Lengths (Paved)	Truck Full Weight	(tons)	43	54	35	43	54	35
Truck Weight and Trip Lengths (Paved)	Truck Haul Capacity	(tons)	28	36	20	28	36	20
Truck Weight and Trip Lengths (Paved)	Truck Empty Weight	(tons/load)	15	18	15	15	18	15
Truck Weight and Trip Lengths (Paved)	Hourly VMT [Loaded]	(mi/hr)	0.75	0.09	0.71	0.75	0.09	0.71
Truck Weight and Trip Lengths (Paved)	Hourly VMT [Unloaded]	(mi/hr)	0.91	0.03	2.02	0.91	0.03	2.02
Truck Weight and Trip Lengths (Paved)	Hourly VMT [Total]	(mi/hr)	1.66	0.12	2.73	1.66	0.12	2.73
Truck Weight and Trip Lengths (Paved)	Daily VMT [Loaded]	(mi/day)	3.23	0.39	3.05	3.23	0.39	3.05
Truck Weight and Trip Lengths (Paved)	Daily VMT [Unloaded]	(mi/day)	3.92	0.14	8.72	3.92	0.14	8.72
Truck Weight and Trip Lengths (Paved)	Daily VMT [Total]	(mi/day)	7.15	0.52	11.77	7.15	0.52	11.77
Truck Weight and Trip Lengths (Paved)	Annual VMT [Loaded]	(mi/yr)	452	54	427	322	39	304
Truck Weight and Trip Lengths (Paved)	Annual VMT [Unloaded]	(mi/yr)	548	19	1,220	390	13	868
Truck Weight and Trip Lengths (Paved)	Annual VMT [Total]	(mi/yr)	1,000	73	1,646	712	52	1,172
Loader and Trip Lengths (Unpaved)	Loader Full Weight	(ton)		22.5			22.5	
Loader and Trip Lengths (Unpaved)	Loader Empty Weight	(ton)		17.5			17.5	
Loader and Trip Lengths (Unpaved)	Loader Haul Capacity	(ton)		5.0			5.0	
Loader and Trip Lengths (Unpaved)	Loader Average Weight	(ton)		20.0			20.0	
Loader and Trip Lengths (Unpaved)	Loader Round Trip	(ft)		413			413	
Loader and Trip Lengths (Unpaved)		(mi)		0.078			0.078	

Description of Concrete Batching	Equation	Source	Coefficients											PM Emission Factors				
			U	M	k	a	b	c	f [1]	p [2]	s [3]	sL [4]	W	Pollutant				
			(mph)	(%)					(%)	(days)	(%)	(g/m^2)	(ton)		(lb/ton)	(lb/VMT)	(lb/VMT)	(lb/hr-acre)
			Wind speed	Moisture content	Particle size multiplier	Exponent	Exponent	Constant	Wind speed over 12 mph	No. of wet days/yr	Silt Content	Silt Load	Vehicle Weight		EF	Short Term EF	Long Term EF	EF
Aggregate delivery to ground storage; Sand delivery to ground storage; Aggregate transfer to conveyor; Aggregate transfer to elevated storage; Sand transfer to elevated storage	$E = k(0.0032) \times \frac{(\frac{U}{5})^{1.3}}{(\frac{M}{2})^{1.4}}$	AP-42, 13.2.4.3 Predictive Emission Factor Equation.	6	5	0.74									PM	0.00083			
			6	5	0.35									PM_{10}	0.00039			
			6	5	0.053									$PM_{2.5}$	0.00006			
Truck mix loading [Controlled]	$E = k(0.0032) \times \frac{(U)^a}{(M)^b} + c$	AP-42, Section 11.12, Equation 11.12-1.	6	5	0.8	1.75	0.3	0.013						PM	0.04933			
			6	5	0.32	1.75	0.3	0.0052						PM_{10}	0.01973			
			6	5	0.048	1.75	0.3	0.00078						$PM_{2.5}$	0.00296			
Vehicle traffic (paved roads) [Uncontrolled]	$E = [k(sL)^{0.91} \times (W)^{1.02}](1 - \frac{P}{4N})$	AP-42 Section 13.2.1. Paved Roads.	6	5	0.11					77		12	20	PM		22.41291	21.23086	
			6	5	0.0022					77		12	20	PM_{10}		0.44826	0.42462	
			6	5	0.00054					77		12	20	$PM_{2.5}$		0.11003	0.10422	
Vehicle traffic (unpaved roads) [Uncontrolled]	$E = k(\frac{s}{12})^a \times (\frac{W}{3})^b$	AP-42 Section 13.2.2. Unpaved Roads.			4.9	0.7	0.45			77	4.8		20	PM		6.05894	4.78076	
					1.5	0.9	0.45			77	4.8		20	PM_{10}		1.54420	1.21844	
					0.15	0.9	0.45			77	4.8		20	$PM_{2.5}$		0.15442	0.12184	
Wind erosion from aggregate and sand storage piles [Uncontrolled] [5, 6]	$E = 1.7 \left(\frac{s}{1.5}\right)\left(\frac{365 - P}{235}\right)\left(\frac{f}{15}\right)\left(\frac{k}{24}\right)$	Control of Open Fugitive Dust Sources, EPA-450/3-88-008, September 1988, Page 4-17.			1				17.6	77	4.8			PM				0.32594
					0.5				17.6	77	4.8			PM_{10}				0.16297
					0.15				17.6	77	4.8			$PM_{2.5}$				0.04889

References:
[1] Unobstructed wind speed AERMET met data.
[2] Pasco Tri-Cities Airport precipitation data, 1991-2020, obtained from the National Climatic Data Center.
[3] AP-42, Table 13.2.2-1, sand and gravel processing
[4] AP-42, Table 13.2.1-3, Concrete Batching
[5] Particle size multiplier (k) for wind erosion from aggregate and sand storage piles are assumed using engineering judgements.
[6] The (k/24) factor has been added to the original equation for the conversion of TSP lb/day/acre into $PM/PM_{10}/PM_{2.5}$ lb/hour/acre.

	Source Description	Maximum Capacity	Units	Criteria Pollutants			Trace Metals									
				PM	PM_{10}	$PM_{2.5}$	Arsenic	Beryllium	Cadmium	Total Chromium	Lead	Manganese	Nickel	Total Phosphorus	Selenium	Total HAPs
Uncontrolled Emissions Calculations	Aggregate delivery to ground storage	158 tons/hr	(lb/hr) - Max Hour	0.13	0.06	0.01										
		683 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		95,484 tons/yr	(tons/total duration)	0.04	0.02	0.00										
	Sand delivery to ground storage	122 tons/hr	(lb/hr) - Max Hour	0.10	0.05	0.01										
		526 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		73,602 tons/yr	(tons/total duration)	0.03	0.01	0.00										
	Aggregate transfer to conveyor	158 tons/hr	(lb/hr) - Max Hour	0.13	0.06	0.01										
		683 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		95,484 tons/yr	(tons/total duration)	0.04	0.02	0.00										
	Sand transfer to conveyor	122 tons/hr	(lb/hr) - Max Hour	0.10	0.05	0.01										
		526 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		73,602 tons/yr	(tons/total duration)	0.03	0.01	0.00										
	Aggregate transfer to elevated storage	158 tons/hr	(lb/hr) - Max Hour	0.13	0.06	0.01										
		683 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		95,484 tons/yr	(tons/total duration)	0.04	0.02	0.00										
	Sand transfer to elevated storage	122 tons/hr	(lb/hr) - Max Hour	0.10	0.05	0.01										
		526 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		73,602 tons/yr	(tons/total duration)	0.03	0.01	0.00										
	Cement delivery to silo	330 tons/hr	(lb/hr) - Max Hour	3.30E-02	1.65E-02	2.48E-03	5.54E-04	5.91E-06	7.72E-05	8.32E-05	2.43E-04	6.67E-02	5.81E-03	3.89E-03	0.00E+00	7.73E-02
		1,423 tons/day	(avg lb/hr) - Max Day	5.93E-03	2.96E-03	4.45E-04	2.39E-03	2.55E-05	3.33E-04	3.58E-04	1.05E-03	2.87E-01	2.50E-02	1.68E-02	0.00.E+00	3.33E-01
		198,925 tons/yr	(tons/total duration)	9.95E-03	4.97E-03	7.46E-04	1.67E-04	1.78E-06	2.33E-05	2.51E-05	7.32E-05	2.01E-02	1.75E-03	1.17E-03	0.00.E+00	2.33.E-02
	Cement supplement delivery to silo	330 tons/hr	(lb/hr) - Max Hour	4.95E-02	3.30E-02	4.95E-03	1.65E-02	1.49E-03	3.27E-06	2.01E-02	8.58E-03	4.22E-03	3.76E-02	5.84E-02	1.19E-03	1.48E-01
		1,423 tons/day	(avg lb/hr) - Max Day	8.89E-03	5.93E-03	8.89E-04	7.11E-02	6.43E-03	1.41E-05	8.68E-02	3.70E-02	1.82E-02	1.62E-01	2.52E-01	5.15E-03	6.39E-01
		198,925 tons/yr	(tons/total duration)	1.49E-02	9.95E-03	1.49E-03	4.97E-03	4.50E-04	9.85E-07	6.07E-03	2.59E-03	1.27E-03	1.13E-02	1.76E-02	3.60E-04	4.47E-02
	Weigh hopper loading	330 tons/hr	(lb/hr) - Max Hour	1.30	0.63	0.09										
		1,423 tons/day	(avg lb/hr) - Max Day	0.23	0.11	0.02										
		198,925 tons/yr	(tons/total duration)	0.39	0.19	0.03										
	Truck mix loading	330 tons/hr	(lb/hr) - Max Hour	52.02	14.42	2.33	4.03E-03	8.05E-05	1.13E-05	3.76E-03	1.19E-03	2.02E-02	3.93E-03	1.27E-02	8.65E-04	4.67E-02
		1,423 tons/day	(avg lb/hr) - Max Day	9.34	2.59	0.42	1.74E-02	3.47E-04	4.86E-05	1.62E-02	5.15E-03	8.71E-02	1.69E-02	5.46E-02	3.73E-03	2.01.E-01
		198,925 tons/yr	(tons/total duration)	15.68	4.35	0.70	1.21E-03	2.43E-05	3.40E-06	1.13E-03	3.60E-04	6.09E-03	1.18E-03	3.82E-03	2.61E-04	1.41.E-02
	Vehicle Traffic (paved roads)	5 mi/hr	(lb/hr) - Max Hour	101.10	2.02	0.50										
		19 mi/day	(avg lb/hr) - Max Day	18.16	0.36	0.09										
		2,719 mi/yr	(tons/total duration)	28.87	0.58	0.14										
	Vehicle Traffic (unpaved roads)	4.39 mi/hr	(lb/hr) - Max Hour	26.59	6.78	0.68										
		18.92 mi/hr	(avg lb/hr) - Max Day	4.78	1.22	0.12										
		2,645 mi/yr	(tons/total duration)	6.32	1.61	0.16										
	Wind erosion from aggregate and sand storage piles	0.24 total acres	(lb/hr) - Max Hour	0.078	0.039	0.012										
			(avg lb/hr) - Max Day	3.25E-03	1.62E-03	4.87E-04										
			(tons/total duration)	1.14E-01	5.69E-02	1.71E-02										
		Totals Emissions:	**(lb/hr) - Max Hour**	**181.87**	**24.27**	**3.66**	**2.11E-02**	**1.58E-03**	**9.18E-05**	**2.40E-02**	**1.00E-02**	**9.11E-02**	**4.74E-02**	**7.50E-02**	**2.06E-03**	**2.72E-01**
			(avg lb/hr) - Max Day	**32.66**	**4.35**	**0.66**	**9.09E-02**	**6.80E-03**	**3.96E-04**	**1.03E-01**	**4.32E-02**	**3.93E-01**	**2.04E-01**	**3.23E-01**	**8.88E-03**	**1.17E+00**
			(tons/total duration)	**51.61**	**6.90**	**1.07**	**6.35E-03**	**4.76E-04**	**2.77E-05**	**7.23E-03**	**3.02E-03**	**2.75E-02**	**1.43E-02**	**2.26E-02**	**6.21E-04**	**8.20E-02**
Controlled Emissions Calculations	Aggregate delivery to ground storage	158 tons/hr	(lb/hr) - Max Hour	0.13	0.06	0.01										
		683 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		95,484 tons/yr	(tons/total duration)	0.04	0.02	0.00										
	Sand delivery to ground storage	122 tons/hr	(lb/hr) - Max Hour	0.10	0.05	0.01										
		526 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		73,602 tons/yr	(tons/total duration)	0.03	0.01	0.00										
	Aggregate transfer to conveyor	158 tons/hr	(lb/hr) - Max Hour	0.13	0.06	0.01										
		683 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		95,484 tons/yr	(tons/total duration)	0.04	0.02	0.00										
	Sand transfer to conveyor	122 tons/hr	(lb/hr) - Max Hour	0.10	0.05	0.01										
		526 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		73,602 tons/yr	(tons/total duration)	0.03	0.01	0.00										
	Aggregate transfer to elevated storage	158 tons/hr	(lb/hr) - Max Hour	0.13	0.06	0.01										
		683 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		95,484 tons/yr	(tons/total duration)	0.04	0.02	0.00										
	Sand transfer to elevated storage	122 tons/hr	(lb/hr) - Max Hour	0.10	0.05	0.01										
		526 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		73,602 tons/yr	(tons/total duration)	0.03	0.01	0.00										
	Cement delivery to silo	330 tons/hr	(lb/hr) - Max Hour	6.60E-04	3.30E-04	4.95E-05	1.40E-06	1.60E-07	1.54E-06	9.57E-06	3.60E-06	3.86E-05	1.38E-05	7.79E-06	0.00E+00	7.65E-05
		1,423 tons/day	(avg lb/hr) - Max Day	1.19E-04	5.93E-05	8.89E-06	2.51E-07	2.88E-08	6.66E-06	4.13E-05	1.55E-05	1.66E-04	5.95E-05	3.36E-05	0.00.E+00	3.23E-04
		198,925 tons/yr	(tons/total duration)	1.99E-04	9.95E-05	1.49E-05	4.22E-07	4.83E-08	4.65E-07	2.88E-06	1.08E-06	1.16E-05	4.16E-06	2.35E-06	0.00.E+00	2.30.E-05
	Cement supplement delivery to silo	330 tons/hr	(lb/hr) - Max Hour	9.90E-04	6.60E-04	9.90E-05	3.30E-04	2.98E-05	6.53E-08	4.03E-04	1.72E-04	8.45E-05	7.52E-04	1.17E-03	2.39E-05	2.96E-03
		1,423 tons/day	(avg lb/hr) - Max Day	1.78E-04	1.19E-04	1.78E-05	1.42E-03	1.29E-04	2.82E-07	1.74E-03	7.40E-04	3.64E-04	3.24E-03	5.04E-03	1.03E-04	1.28E-02
		198,925 tons/yr	(tons/total duration)	2.98E-04	1.99E-04	2.98E-05	9.95E-05	8.99E-06	1.97E-08	1.21E-04	5.17E-05	2.55E-05	2.27E-04	3.52E-04	7.20E-06	8.93E-04
	Weigh hopper loading	330 tons/hr	(lb/hr) - Max Hour	1.30	0.63	0.09										
		1,423 tons/day	(avg lb/hr) - Max Day	0.23	0.11	0.02										
		198,925 tons/yr	(tons/total duration)	0.39	0.19	0.03										
	Truck mix loading	330 tons/hr	(lb/hr) - Max Hour	2.30	0.92	0.14	1.99E-04	3.43E-05	2.99E-06	1.35E-03	5.05E-04	6.86E-03	1.58E-02	4.06E-03	3.73E-05	2.88E-02
		1,423 tons/day	(avg lb/hr) - Max Day	0.41	0.16	0.02	8.56E-04	1.48E-04	1.29E-05	5.83E-03	2.18E-03	2.96E-02	6.80E-02	1.75E-02	1.61E-04	1.24.E-01
		198,925 tons/yr	(tons/total duration)	0.69	0.28	0.04	5.99E-05	1.03E-05	9.01E-07	4.08E-04	1.52E-04	2.07E-03	4.75E-03	1.22E-03	1.12E-05	8.69.E-03
	Vehicle Traffic (paved roads)	5 mi/hr	(lb/hr) - Max Hour	20.22	2.02	0.50										
		19 mi/day	(avg lb/hr) - Max Day	3.63	0.07	0.018										
		2,719 mi/yr	(tons/total duration)	5.77	0.58	0.14										
	Vehicle Traffic (unpaved roads)	4.39 mi/hr	(lb/hr) - Max Hour	5.32	1.36	0.14										
		18.92 mi/hr	(avg lb/hr) - Max Day	0.96	0.24	0.02										
		2,645 mi/yr	(tons/total duration)	1.26	0.32	0.03										
	Wind erosion from aggregate and sand storage piles	0.24 total acres	(lb/hr) - Max Hour	0.023	0.012	0.004										
			(avg lb/hr) - Max Day	9.74E-04	4.87E-04	1.46E-04										
			(tons/total duration)	3.41E-02	1.71E-02	5.12E-03										
		Totals Emissions:	**(lb/hr) - Max Hour**	**29.86**	**5.27**	**0.92**	**5.30E-04**	**6.43E-05**	**4.60E-06**	**1.77E-03**	**6.80E-04**	**6.99E-03**	**1.65E-02**	**5.23E-03**	**6.12E-05**	**3.19E-02**
			(avg lb/hr) - Max Day	**5.36**	**0.65**	**0.09**	**2.28E-03**	**2.77E-04**	**1.98E-05**	**7.61E-03**	**2.93E-03**	**3.01E-02**	**7.13E-02**	**2.26E-02**	**2.64E-04**	**1.37E-01**
			(tons/total duration)	**8.37**	**1.48**	**0.26**	**1.60E-04**	**1.94E-05**	**1.39E-06**	**5.32E-04**	**2.05E-04**	**2.11E-03**	**4.99E-03**	**1.58E-03**	**1.84E-05**	**9.60E-03**

Emission Factors

Emission Factor Source Description	Emission Control Efficiency	Units	PM	PM_{10}	$PM_{2.5}$	Arsenic	Beryllium	Cadmium	Total Chromium	Lead	Manganese	Nickel	Total Phosphorus	Selenium	Total HAPs
Aggregate delivery to ground storage[1]	0%	(lb/ton aggregate)	0.00083	0.00039	0.00006										
Sand delivery to ground storage[1]	0%	(lb/ton sand)	0.00083	0.00039	0.00006										
Aggregate transfer to conveyor[1]	0%	(lb/ton aggregate)	0.00083	0.00039	0.00006										
Sand transfer to conveyor[1]	0%	(lb/ton sand)	0.00083	0.00039	0.00006										
Aggregate transfer to elevated storage[1]	0%	(lb/ton aggregate)	0.00083	0.00039	0.00006										
Sand transfer to elevated storage[1]	0%	(lb/ton sand)	0.00083	0.00039	0.00006										
Cement delivery to silo[2, 4, 5, 6]	0%	(lb/ton concrete)	1.00E-04	5.00E-05	7.50E-06	1.68E-06	1.79E-08	2.34E-07	2.52E-07	7.36E-07	2.02E-04	1.76E-05	1.18E-05	ND	
	98%	(lb/ton concrete)	2.00E-06	1.00E-06	1.50E-07	4.24E-09	4.86E-10	4.68E-09	2.90E-08	1.09E-08	1.17E-07	4.18E-08	2.36E-08	ND	
Cement supplement delivery to silo[2, 4, 5, 6]	0%	(lb/ton concrete)	1.50E-04	1.00E-04	1.50E-05	5.00E-05	4.52E-06	9.90E-09	6.10E-05	2.60E-05	1.28E-05	1.14E-04	1.77E-04	3.62E-06	
	98%	(lb/ton concrete)	3.00E-06	2.00E-06	3.00E-07	1.00E-06	9.04E-08	1.98E-10	1.22E-06	5.20E-07	2.56E-07	2.28E-06	3.54E-06	7.24E-08	
Weigh hopper loading[2, 4, 5]	0%	(lb/ton concrete)	0.00395	0.00190	0.00029										
Truck mix loading[3, 6, 7]	0%	(lb/ton concrete)	0.15764	0.04371	0.00705	1.22E-05	2.44E-07	3.42E-08	1.14E-05	3.62E-06	6.12E-05	1.19E-05	3.84E-05	2.62E-06	
	94%	(lb/ton concrete)	0.00696	0.00278	0.00042	6.02E-07	1.04E-07	9.06E-09	4.10E-06	1.53E-06	2.08E-05	4.78E-05	1.23E-05	1.13E-07	
Vehicle traffic (paved roads)[8, 9, 10]	0%	(lb/VMT)	22.413	0.448	0.110										
[Short-Term Emission Factor]	80%	(lb/VMT)	4.483	0.090	0.022										
Vehicle traffic (paved roads)[8, 9, 10]	0%	(lb/VMT)	21.231	0.425	0.104										
[Annual Emission Factor]	80%	(lb/VMT)	4.246	0.085	0.021										
Vehicle traffic (unpaved roads)[8, 9, 10]	0%	(lb/VMT)	6.059	1.544	0.154										
[Short-Term Emission Factor]	80%	(lb/VMT)	1.212	0.309	0.031										
Vehicle traffic (unpaved roads)[8, 9, 10]	0%	(lb/VMT)	4.781	1.218	0.122										
[Annual Emission Factor]	80%	(lb/VMT)	0.956	0.244	0.024										
Wind erosion from aggregate and sand	0%	(lb/hr-acre)	0.326	0.163	0.049										
storage piles[8, 10]	70%	(lb/hr-acre)	0.098	0.049	0.015										

References:

[1] Uncontrolled emission factors for PM, PM_{10}, and $PM_{2.5}$ are based on the Predictive Emission Factor Equation in Section 13.2.4.3, AP-42 Fifth Edition, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources.
[2] Uncontrolled emission factors for PM and PM_{10} are from Table 11.12-5. Controlled emissions are based on the indicated control efficiency.
[3] For truck mix loading, the emissions of PM, PM_{10}, and $PM_{2.5}$ are calculated by multiplying the emission factor calculated using Equation 11.12-2 by a factor of 0.282 to convert from emissions per ton of cement and cement supplement to emissions per yard of concrete.
[4] Assuming 2 tons of concrete is approximately equivalent to 1 CY for conversion.
[5] Uncontrolled emission factors for $PM_{2.5}$ are assumed to be 16% of the PM_{10} emission factor, based on the ratio of uncontrolled $PM_{2.5}$ to PM_{10} presented in Table 11.12-3. Controlled emissions are based on the indicated control efficiency.
[6] Emission factors for trace metals are from Table 11.12-8. In cases where "ND" was reported for either the controlled or the uncontrolled value, the corresponding missing value was calculated using the unit's control device efficiency.
[7] Uncontrolled and controlled emission factors for PM, PM_{10}, and $PM_{2.5}$ are computed from Table 11.12-3. Control efficiency calculated by taking the worst case scenario when dividing the calculated controlled emissions by the uncontrolled emission factors in Table 11.12-3.
[8] Emission factors derived from equations in tab "PM Emission Factors" for certain operating scenarios with varying conditions.
[9] Short term PM emission factors are used to calculate hourly and daily emissions while annual emission factors are used to calculate yearly emissions.
[10] WRAP Fugitive Dust Handbook

	Source Description	Maximum Capacity	Units	Criteria Pollutants			Trace Metals									
				PM	PM_{10}	$PM_{2.5}$	Arsenic	Beryllium	Cadmium	Total Chromium	Lead	Manganese	Nickel	Total Phosphorus	Selenium	Total HAPs
Uncontrolled Emissions Calculations		158 tons/hr	(lb/hr) - Max Hour	0.13	0.06	0.01										
	Aggregate delivery to ground storage	683 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		67,972 tons/yr	(tons/total duration)	0.03	0.01	0.00										
		122 tons/hr	(lb/hr) - Max Hour	0.10	0.05	0.01										
	Sand delivery to ground storage	526 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		52,395 tons/yr	(tons/total duration)	0.02	0.01	0.00										
		158 tons/hr	(lb/hr) - Max Hour	0.13	0.06	0.01										
	Aggregate transfer to conveyor	683 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		67,972 tons/yr	(tons/total duration)	0.03	0.01	0.00										
		122 tons/hr	(lb/hr) - Max Hour	0.10	0.05	0.01										
	Sand transfer to conveyor	526 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		52,395 tons/yr	(tons/total duration)	0.02	0.01	0.00										
		158 tons/hr	(lb/hr) - Max Hour	0.13	0.06	0.01										
	Aggregate transfer to elevated storage	683 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		67,972 tons/yr	(tons/total duration)	0.03	0.01	0.00										
		122 tons/hr	(lb/hr) - Max Hour	0.10	0.05	0.01										
	Sand transfer to elevated storage	526 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		52,395 tons/yr	(tons/total duration)	0.02	0.01	0.00										
		330 tons/hr	(lb/hr) - Max Hour	3.30E-02	1.65E-02	2.48E-03	5.54E-04	5.91E-06	7.72E-05	8.32E-05	2.43E-04	6.67E-02	5.81E-03	3.89E-03	0.00E+00	7.73E-02
	Cement delivery to silo	1,423 tons/day	(avg lb/hr) - Max Day	5.93E-03	2.96E-03	4.45E-04	2.39E-03	2.55E-05	3.33E-04	3.58E-04	1.05E-03	2.87E-01	2.50E-02	1.68E-02	0.00.E+00	3.33.E-01
		141,608 tons/yr	(tons/total duration)	7.08E-03	3.54E-03	5.31E-04	1.19E-04	1.27E-06	1.66E-05	1.78E-05	5.21E-05	1.43E-02	1.25E-03	8.35E-04	0.00.E+00	1.66.E-02
		330 tons/hr	(lb/hr) - Max Hour	4.95E-02	3.30E-02	4.95E-03	1.65E-02	1.49E-03	3.27E-06	2.01E-02	8.58E-03	4.22E-03	3.76E-02	5.84E-02	1.19E-03	1.48E-01
	Cement supplement delivery to silo	1,423 tons/day	(avg lb/hr) - Max Day	8.89E-03	5.93E-03	8.89E-04	7.11E-02	6.43E-03	1.41E-05	8.68E-02	3.70E-02	1.82E-02	1.62E-01	2.52E-01	5.15E-03	6.39E-01
		141,608 tons/yr	(tons/total duration)	1.06E-02	7.08E-03	1.06E-03	3.54E-03	3.20E-04	7.01E-07	4.32E-03	1.84E-03	9.06E-04	8.07E-03	1.25E-02	2.56E-04	3.18E-02
		330 tons/hr	(lb/hr) - Max Hour	1.30	0.63	0.09										
	Weigh hopper loading	1,423 tons/day	(avg lb/hr) - Max Day	0.23	0.11	0.02										
		141,608 tons/yr	(tons/total duration)	0.28	0.13	0.02										
		330 tons/hr	(lb/hr) - Max Hour	52.02	14.42	2.33	4.03E-03	8.05E-05	1.13E-05	3.76E-03	1.19E-03	2.02E-02	3.93E-03	1.27E-02	8.65E-04	4.67E-02
	Truck mix loading	1,423 tons/day	(avg lb/hr) - Max Day	9.34	2.59	0.42	1.74E-02	3.47E-04	4.86E-05	1.62E-02	5.15E-03	8.71E-02	1.69E-02	5.46E-02	3.73E-03	2.01.E-01
		141,608 tons/yr	(tons/total duration)	11.16	3.09	0.50	8.64E-04	1.73E-05	2.42E-06	8.07E-04	2.56E-04	4.33E-03	8.43E-04	2.72E-03	1.86E-04	1.00.E-02
		5 mi/hr	(lb/hr) - Max Hour	101.10	2.02	0.50										
	Vehicle Traffic (paved roads)	19 mi/day	(avg lb/hr) - Max Day	18.16	0.36	0.09										
		1,936 mi/yr	(tons/total duration)	20.55	0.41	0.10										
		4.39 mi/hr	(lb/hr) - Max Hour	26.59	6.78	0.68										
	Vehicle Traffic (unpaved roads)	18.92 mi/hr	(avg lb/hr) - Max Day	4.78	1.22	0.12										
		2,645 mi/yr	(tons/total duration)	6.32	1.61	0.16										
			(lb/hr) - Max Hour	0.078	0.039	0.012										
	Wind erosion from aggregate and sand storage piles	0.24 total acres	(avg lb/hr) - Max Day	3.25E-03	1.62E-03	4.87E-04										
			(tons/total duration)	1.14E-01	5.69E-02	1.71E-02										
			(lb/hr) - Max Hour	**181.87**	**24.27**	**3.66**	**2.11E-02**	**1.58E-03**	**9.18E-05**	**2.40E-02**	**1.00E-02**	**9.11E-02**	**4.74E-02**	**7.50E-02**	**2.06E-03**	**2.72E-01**
		Totals Emissions:	**(avg lb/hr) - Max Day**	**32.66**	**4.35**	**0.66**	**9.09E-02**	**6.80E-03**	**3.96E-04**	**1.03E-01**	**4.32E-02**	**3.93E-01**	**2.04E-01**	**3.23E-01**	**8.88E-03**	**1.17E+00**
			(tons/total duration)	**38.59**	**5.39**	**0.81**	**4.52E-03**	**3.39E-04**	**1.97E-05**	**5.14E-03**	**2.15E-03**	**1.95E-02**	**1.02E-02**	**1.61E-02**	**4.42E-04**	**5.84E-02**
Controlled Emissions Calculations		158 tons/hr	(lb/hr) - Max Hour	0.13	0.06	0.01										
	Aggregate delivery to ground storage	683 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		67,972 tons/yr	(tons/total duration)	0.03	0.01	0.00										
		122 tons/hr	(lb/hr) - Max Hour	0.10	0.05	0.01										
	Sand delivery to ground storage	526 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		52,395 tons/yr	(tons/total duration)	0.02	0.01	0.00										
		158 tons/hr	(lb/hr) - Max Hour	0.13	0.06	0.01										
	Aggregate transfer to conveyor	683 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		67,972 tons/yr	(tons/total duration)	0.03	0.01	0.00										
		122 tons/hr	(lb/hr) - Max Hour	0.10	0.05	0.01										
	Sand transfer to conveyor	526 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		52,395 tons/yr	(tons/total duration)	0.02	0.01	0.00										
		158 tons/hr	(lb/hr) - Max Hour	0.13	0.06	0.01										
	Aggregate transfer to elevated storage	683 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		67,972 tons/yr	(tons/total duration)	0.03	0.01	0.00										
		122 tons/hr	(lb/hr) - Max Hour	0.10	0.05	0.01										
	Sand transfer to elevated storage	526 tons/day	(avg lb/hr) - Max Day	0.02	0.01	0.00										
		52,395 tons/yr	(tons/total duration)	0.02	0.01	0.00										
		330 tons/hr	(lb/hr) - Max Hour	6.60E-04	3.30E-04	4.95E-05	1.40E-06	1.60E-07	1.54E-06	9.57E-06	3.60E-06	3.86E-05	1.38E-05	7.79E-06	0.00E+00	7.65E-05
	Cement delivery to silo	1,423 tons/day	(avg lb/hr) - Max Day	1.19E-04	5.93E-05	8.89E-06	2.51E-07	2.88E-08	6.66E-06	4.13E-05	1.55E-05	1.66E-04	5.95E-05	3.36E-05	0.00.E+00	3.23.E-04
		141,608 tons/yr	(tons/total duration)	1.42E-04	7.08E-05	1.06E-05	3.00E-07	3.44E-08	3.31E-07	2.05E-06	7.72E-07	8.28E-06	2.96E-06	1.67E-06	0.00.E+00	1.64.E-05
		330 tons/hr	(lb/hr) - Max Hour	9.90E-04	6.60E-04	9.90E-05	3.30E-04	2.98E-05	6.53E-08	4.03E-04	1.72E-04	8.45E-05	7.52E-04	1.17E-03	2.39E-05	2.96E-03
	Cement supplement delivery to silo	1,423 tons/day	(avg lb/hr) - Max Day	1.78E-04	1.19E-04	1.78E-05	1.42E-03	1.29E-04	2.82E-07	1.74E-03	7.40E-04	3.64E-04	3.24E-03	5.04E-03	1.03E-04	1.28E-02
		141,608 tons/yr	(tons/total duration)	2.12E-04	1.42E-04	2.12E-05	7.08E-05	6.40E-06	1.40E-08	8.64E-05	3.68E-05	1.81E-05	1.61E-04	2.51E-04	5.13E-06	6.36E-04
		330 tons/hr	(lb/hr) - Max Hour	1.30	0.63	0.09										
	Weigh hopper loading	1,423 tons/day	(avg lb/hr) - Max Day	0.234	0.113	0.017										
		141,608 tons/yr	(tons/total duration)	0.280	0.135	0.020										
		330 tons/hr	(lb/hr) - Max Hour	2.30	0.92	0.14	1.99E-04	3.43E-05	2.99E-06	1.35E-03	5.05E-04	6.86E-03	1.58E-02	4.06E-03	3.73E-05	2.88E-02
	Truck mix loading	1,423 tons/day	(avg lb/hr) - Max Day	0.41	0.16	0.02	8.56E-04	1.48E-04	1.29E-05	5.83E-03	2.18E-03	2.96E-02	6.80E-02	1.75E-02	1.61E-04	1.24.E-01
		141,608 tons/yr	(tons/total duration)	0.49	0.20	0.03	4.26E-05	7.36E-06	6.41E-07	2.90E-04	1.08E-04	1.47E-03	3.38E-03	8.71E-04	8.00E-06	6.19.E-03
		5 mi/hr	(lb/hr) - Max Hour	20.22	2.02	0.50										
	Vehicle Traffic (paved roads)	19 mi/day	(avg lb/hr) - Max Day	3.63	0.07	0.018										
		1,936 mi/yr	(tons/total duration)	4.11	0.41	0.10										
		4.39 mi/hr	(lb/hr) - Max Hour	5.32	1.36	0.14										
	Vehicle Traffic (unpaved roads)	18.92 mi/hr	(avg lb/hr) - Max Day	0.96	0.24	0.02										
		2,645 mi/yr	(tons/total duration)	1.26	0.32	0.03										
			(lb/hr) - Max Hour	0.023	0.012	0.004										
	Wind erosion from aggregate and sand storage piles	0.24 total acres	(avg lb/hr) - Max Day	9.74E-04	4.87E-04	1.46E-04										
			(tons/total duration)	3.41E-02	1.71E-02	5.12E-03										
			(lb/hr) - Max Hour	**29.86**	**5.27**	**0.92**	**5.30E-04**	**6.43E-05**	**4.60E-06**	**1.77E-03**	**6.80E-04**	**6.99E-03**	**1.65E-02**	**5.23E-03**	**6.12E-05**	**3.19E-02**
		Totals Emissions:	**(avg lb/hr) - Max Day**	**5.36**	**0.65**	**0.09**	**2.28E-03**	**2.77E-04**	**1.98E-05**	**7.61E-03**	**2.93E-03**	**3.01E-02**	**7.13E-02**	**2.26E-02**	**2.64E-04**	**1.37E-01**
			(tons/total duration)	**6.33**	**1.15**	**0.20**	**1.14E-04**	**1.38E-05**	**9.87E-07**	**3.79E-04**	**1.46E-04**	**1.50E-03**	**3.55E-03**	**1.12E-03**	**1.31E-05**	**6.84E-03**

Emission Factors

Emission Factor Source Description	Emission Control Efficiency	Units	PM	PM_{10}	$PM_{2.5}$	Arsenic	Beryllium	Cadmium	Total Chromium	Lead	Manganese	Nickel	Total Phosphorus	Selenium	Total HAPs
Aggregate delivery to ground storage [1]	0%	(lb/ton aggregate)	0.00083	0.00039	0.00006										
Sand delivery to ground storage [1]	0%	(lb/ton sand)	0.00083	0.00039	0.00006										
Aggregate transfer to conveyor [1]	0%	(lb/ton aggregate)	0.00083	0.00039	0.00006										
Sand transfer to conveyor [1]	0%	(lb/ton sand)	0.00083	0.00039	0.00006										
Aggregate transfer to elevated storage [1]	0%	(lb/ton aggregate)	0.00083	0.00039	0.00006										
Sand transfer to elevated storage [1]	0%	(lb/ton sand)	0.00083	0.00039	0.00006										
Cement delivery to silo [2, 4, 5, 6]	0%	(lb/ton concrete)	1.00E-04	5.00E-05	7.50E-06	1.68E-06	1.79E-08	2.34E-07	2.52E-07	7.36E-07	2.02E-04	1.76E-05	1.18E-05	ND	
	98%	(lb/ton concrete)	2.00E-06	1.00E-06	1.50E-07	4.24E-09	4.86E-10	4.68E-09	2.90E-08	1.09E-08	1.17E-07	4.18E-08	2.36E-08	ND	
Cement supplement delivery to silo [2, 4, 5, 6]	0%	(lb/ton concrete)	1.50E-04	1.00E-04	1.50E-05	5.00E-05	4.52E-06	9.90E-09	6.10E-05	2.60E-05	1.28E-05	1.14E-04	1.77E-04	3.62E-06	
	98%	(lb/ton concrete)	3.00E-06	2.00E-06	3.00E-07	1.00E-06	9.04E-08	1.98E-10	1.22E-06	5.20E-07	2.56E-07	2.28E-06	3.54E-06	7.24E-08	
Weigh hopper loading [2, 4, 5]	0%	(lb/ton concrete)	0.00395	0.00190	0.00029										
Truck mix loading [3, 6, 7]	0%	(lb/ton concrete)	0.15764	0.04371	0.00705	1.22E-05	2.44E-07	3.42E-08	1.14E-05	3.62E-06	6.12E-05	1.19E-05	3.84E-05	2.62E-06	
	94%	(lb/ton concrete)	0.00696	0.00278	0.00042	6.02E-07	1.04E-07	9.06E-09	4.10E-06	1.53E-06	2.08E-05	4.78E-05	1.23E-05	1.13E-07	
Vehicle traffic (paved roads) [8, 9, 10]	0%	(lb/VMT)	22.413	0.448	0.110										
[Short-Term Emission Factor]	80%	(lb/VMT)	4.483	0.090	0.022										
Vehicle traffic (paved roads) [8, 9, 10]	0%	(lb/VMT)	21.231	0.425	0.104										
[Annual Emission Factor]	80%	(lb/VMT)	4.246	0.085	0.021										
Vehicle traffic (unpaved roads) [8, 9, 10]	0%	(lb/VMT)	6.059	1.544	0.154										
[Short-Term Emission Factor]	80%	(lb/VMT)	1.212	0.309	0.031										
Vehicle traffic (unpaved roads) [8, 9, 10]	0%	(lb/VMT)	4.781	1.218	0.122										
[Annual Emission Factor]	80%	(lb/VMT)	0.956	0.244	0.024										
Wind erosion from aggregate and sand storage piles [8, 10]	0%	(lb/hr-acre)	0.326	0.163	0.049										
	70%	(lb/hr-acre)	0.098	0.049	0.015										

References:

[1] Uncontrolled emission factors for PM, PM_{10}, and $PM_{2.5}$ are based on the Predictive Emission Factor Equation in Section 13.2.4.3, AP-42 Fifth Edition, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources.

[2] Uncontrolled emission factors for PM and PM_{10} are from Table 11.12-5. Controlled emissions are based on the indicated control efficiency.

[3] For truck mix loading, the emissions of PM, PM_{10}, and $PM_{2.5}$ are calculated by multiplying the emission factor calculated using Equation 11.12-2 by a factor of 0.282 to convert from emissions per ton of cement and cement supplement to emissions per yard of concrete.

[4] Assuming 2 tons of concrete is approximately equivalent to 1 CY for conversion.

[5] Uncontrolled emission factors for $PM_{2.5}$ are assumed to be 16% of the PM_{10} emission factor, based on the ratio of uncontrolled $PM_{2.5}$ to PM_{10} presented in Table 11.12-3. Controlled emissions are based on the indicated control efficiency.

[6] Emission factors for trace metals are from Table 11.12-8. In cases where "ND" was reported for either the controlled or the uncontrolled value, the corresponding missing value was calculated using the unit's control device efficiency.

[7] Uncontrolled and controlled emission factors for PM, PM_{10}, and $PM_{2.5}$ are computed from Table 11.12-3. Control efficiency calculated by taking the worst case scenario when dividing the calculated controlled emissions by the uncontrolled emission factors in Table 11.12-3.

[8] Emission factors derived from equations in tab "PM Emission Factors" for certain operating scenarios with varying conditions.

[9] Short term PM emission factors are used to calculate hourly and daily emissions while annual emission factors are used to calculate yearly emissions.

[10] WRAP Fugitive Dust Handbook

Parameters	Units	CBP Engines	Load Bank Engines
Total Quantity	(qty)	2	6
Quantity Located at HHW	(qty)	1	3
Quantity Located at HHE	(qty)	1	3
Engine Fuel Type		Diesel	Diesel
Engine Make		TBD	TBD
Engine Model		TBD	TBD
Rated Power	(kW)	500	2,000
Rated Output	(hp)	670	2680
Diesel Heat Content	(Btu/gal)	138,000	138,000
Engine Heat Input	(MMBtu/hr)	4.69	18.76
Max. Fuel Consumption	(gal/hr)	34.0	135.9
Operating Hours Each	(hrs)	500	500

Note:
Hourly fuel consumption is based on default brake-specific fuel consumption of 7,000 Btu/hp-hr, from AP-42 Table 3.4-1.

		EF	CBP Engines Emissions				Load Bank Engines Emissions			
			Single		Combined (1)		Single		Combined (3)	
		(lb/hp-hr)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Criteria Pollutants [1, 5]	CO	5.50E-03	3.69	0.92	3.69	0.92	14.74	3.69	44.22	11.06
	NOx	2.40E-02	16.08	4.02	16.08	4.02	64.32	16.08	192.96	48.24
	PM	7.00E-04	0.47	0.12	0.47	0.12	1.88	0.47	5.63	1.41
	PM_{10}	7.00E-04	0.47	0.12	0.47	0.12	1.88	0.47	5.63	1.41
	$PM_{2.5}$	7.00E-04	0.47	0.12	0.47	0.12	1.88	0.47	5.63	1.41
	SO_2	1.21E-05	0.01	0.00	0.01	0.00	0.03	0.01	0.10	0.02
	VOC	7.05E-04	0.47	0.12	0.47	0.12	1.89	0.47	5.67	1.42
	Lead	0.00E+00	-	-	-	-	-	-	-	-
		(lb/MMBtu)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)
HAPs [3]	Acetaldehyde	2.52E-05	1.18E-04	5.18E-04	1.18E-04	5.18E-04	4.73E-04	2.07E-03	1.42E-03	6.21E-03
	Acrolein	7.88E-06	3.70E-05	1.62E-04	3.70E-05	1.62E-04	1.48E-04	6.47E-04	4.43E-04	1.94E-03
	Benzene	7.76E-04	3.64E-03	1.59E-02	3.64E-03	1.59E-02	1.46E-02	6.38E-02	4.37E-02	1.91E-01
	Formaldehyde	7.89E-05	3.70E-04	1.62E-03	3.70E-04	1.62E-03	1.48E-03	6.48E-03	4.44E-03	1.94E-02
	Naphthalene	1.30E-04	6.10E-04	2.67E-03	6.10E-04	2.67E-03	2.44E-03	1.07E-02	7.32E-03	3.20E-02
	Toluene	2.81E-04	1.32E-03	5.77E-03	1.32E-03	5.77E-03	5.27E-03	2.31E-02	1.58E-02	6.93E-02
	Xylenes	1.93E-04	9.05E-04	3.96E-03	9.05E-04	3.96E-03	3.62E-03	1.59E-02	1.09E-02	4.76E-02
	Total HAPs		7.00E-03	3.06E-02	7.00E-03	3.06E-02	2.80E-02	1.23E-01	8.40E-02	3.68E-01
PAHs [4]	Acenaphthene	4.68E-06	2.19E-05	9.61E-05	2.19E-05	9.61E-05	8.78E-05	3.85E-04	2.63E-04	1.15E-03
	Acenaphthylene	9.23E-06	4.33E-05	1.90E-04	4.33E-05	1.90E-04	1.73E-04	7.58E-04	5.19E-04	2.28E-03
	Anthracene	1.23E-06	5.77E-06	2.53E-05	5.77E-06	2.53E-05	2.31E-05	1.01E-04	6.92E-05	3.03E-04
	Benz(a)anthracene	6.22E-07	2.92E-06	1.28E-05	2.92E-06	1.28E-05	1.17E-05	5.11E-05	3.50E-05	1.53E-04
	Benzo(a)pyrene	2.57E-07	1.21E-06	5.28E-06	1.21E-06	5.28E-06	4.82E-06	2.11E-05	1.45E-05	6.34E-05
	Benzo(b)fluoranthene	1.11E-06	5.21E-06	2.28E-05	5.21E-06	2.28E-05	2.08E-05	9.12E-05	6.25E-05	2.74E-04
	Benzo(g,h,l)perylene	5.56E-07	2.61E-06	1.14E-05	2.61E-06	1.14E-05	1.04E-05	4.57E-05	3.13E-05	1.37E-04
	Benzo(k)fluoranthene	2.18E-07	1.02E-06	4.48E-06	1.02E-06	4.48E-06	4.09E-06	1.79E-05	1.23E-05	5.37E-05
	Chrysene	1.53E-06	7.18E-06	3.14E-05	7.18E-06	3.14E-05	2.87E-05	1.26E-04	8.61E-05	3.77E-04
	Dibenz(a,h)anthracene	3.46E-07	1.62E-06	7.11E-06	1.62E-06	7.11E-06	6.49E-06	2.84E-05	1.95E-05	8.53E-05
	Fluoranthene	4.03E-06	1.89E-05	8.28E-05	1.89E-05	8.28E-05	7.56E-05	3.31E-04	2.27E-04	9.93E-04
	Fluorene	1.28E-05	6.00E-05	2.63E-04	6.00E-05	2.63E-04	2.40E-04	1.05E-03	7.20E-04	3.16E-03
	Indeno(1,2,3,-d)pyrene	4.14E-07	1.94E-06	8.50E-06	1.94E-06	8.50E-06	7.77E-06	3.40E-05	2.33E-05	1.02E-04
	Naphthalene	1.30E-04	6.10E-04	2.67E-03	6.10E-04	2.67E-03	2.44E-03	1.07E-02	7.32E-03	3.20E-02
	Phenanthrene	4.08E-05	1.91E-04	8.38E-04	1.91E-04	8.38E-04	7.65E-04	3.35E-03	2.30E-03	1.01E-02
	Pyrene	3.71E-06	1.74E-05	7.62E-05	1.74E-05	7.62E-05	6.96E-05	3.05E-04	2.09E-04	9.15E-04
	Total PAH	2.12E-04	9.94E-04	4.35E-03	9.94E-04	4.35E-03	3.98E-03	1.74E-02	1.19E-02	5.23E-02

References:

[1] Parameters copied from the "Engine Parameters" tab.

Parameters	Units	CBP	Load Bank
Rated Output	(hp)	670	2,680
Engine Heat Input	(MMBtu/hr)	4.69	18.76
Operating Hours Each	(hrs)	500	500

[2] AP 42 Section 3.4 Table 3.4-1 for criteria pollutants.
[3] AP 42 Section 3.4 Table 3.4-3 for hazardous air pollutants (HAP).
[4] AP 42 Section 3.4 Table 3.4-4 for polycyclic aromatic hydrocarbons (PAH)
[5] Assume the sulfur content is 0.15%.

		EF	CBP Engines Emissions				Load Bank Engines Emissions			
			Single		Combined (1)		Single		Combined (3)	
		(lb/hp-hr)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Criteria Pollutants [1][5]	CO	5.50E-03	3.69	0.92	3.69	0.92	14.74	3.69	44.22	11.06
	NOx	2.40E-02	16.08	4.02	16.08	4.02	64.32	16.08	192.96	48.24
	PM	7.00E-04	0.47	0.12	0.47	0.12	1.88	0.47	5.63	1.41
	PM_{10}	7.00E-04	0.47	0.12	0.47	0.12	1.88	0.47	5.63	1.41
	$PM_{2.5}$	7.00E-04	0.47	0.12	0.47	0.12	1.88	0.47	5.63	1.41
	SO_2	1.21E-05	0.01	0.00	0.01	0.00	0.03	0.01	0.10	0.02
	VOC	7.05E-04	0.47	0.12	0.47	0.12	1.89	0.47	5.67	1.42
	Lead	0.00E+00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		(lb/MMBtu)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
HAPs [3]	Acetaldehyde	2.52E-05	1.18E-04	5.18E-04	1.18E-04	5.18E-04	4.73E-04	2.07E-03	1.42E-03	6.21E-03
	Acrolein	7.88E-06	3.70E-05	1.62E-04	3.70E-05	1.62E-04	1.48E-04	6.47E-04	4.43E-04	1.94E-03
	Benzene	7.76E-04	3.64E-03	1.59E-02	3.64E-03	1.59E-02	1.46E-02	6.38E-02	4.37E-02	1.91E-01
	Formaldehyde	7.89E-05	3.70E-04	1.62E-03	3.70E-04	1.62E-03	1.48E-03	6.48E-03	4.44E-03	1.94E-02
	Naphthalene	1.30E-04	6.10E-04	2.67E-03	6.10E-04	2.67E-03	2.44E-03	1.07E-02	7.32E-03	3.20E-02
	Toluene	2.81E-04	1.32E-03	5.77E-03	1.32E-03	5.77E-03	5.27E-03	2.31E-02	1.58E-02	6.93E-02
	Xylenes	1.93E-04	9.05E-04	3.96E-03	9.05E-04	3.96E-03	3.62E-03	1.59E-02	1.09E-02	4.76E-02
	Total HAPs		7.00E-03	3.06E-02	7.00E-03	3.06E-02	2.80E-02	1.23E-01	8.40E-02	3.68E-01
PAHs [4]	Acenaphthene	4.68E-06	2.19E-05	9.61E-05	2.19E-05	9.61E-05	8.78E-05	3.85E-04	2.63E-04	1.15E-03
	Acenaphthylene	9.23E-06	4.33E-05	1.90E-04	4.33E-05	1.90E-04	1.73E-04	7.58E-04	5.19E-04	2.28E-03
	Anthracene	1.23E-06	5.77E-06	2.53E-05	5.77E-06	2.53E-05	2.31E-05	1.01E-04	6.92E-05	3.03E-04
	Benz(a)anthracene	6.22E-07	2.92E-06	1.28E-05	2.92E-06	1.28E-05	1.17E-05	5.11E-05	3.50E-05	1.53E-04
	Benzo(a)pyrene	2.57E-07	1.21E-06	5.28E-06	1.21E-06	5.28E-06	4.82E-06	2.11E-05	1.45E-05	6.34E-05
	Benzo(b)fluoranthene	1.11E-06	5.21E-06	2.28E-05	5.21E-06	2.28E-05	2.08E-05	9.12E-05	6.25E-05	2.74E-04
	Benzo(g,h,l)perylene	5.56E-07	2.61E-06	1.14E-05	2.61E-06	1.14E-05	1.04E-05	4.57E-05	3.13E-05	1.37E-04
	Benzo(k)fluoranthene	2.18E-07	1.02E-06	4.48E-06	1.02E-06	4.48E-06	4.09E-06	1.79E-05	1.23E-05	5.37E-05
	Chrysene	1.53E-06	7.18E-06	3.14E-05	7.18E-06	3.14E-05	2.87E-05	1.26E-04	8.61E-05	3.77E-04
	Dibenz(a,h)anthracene	3.46E-07	1.62E-06	7.11E-06	1.62E-06	7.11E-06	6.49E-06	2.84E-05	1.95E-05	8.53E-05
	Fluoranthene	4.03E-06	1.89E-05	8.28E-05	1.89E-05	8.28E-05	7.56E-05	3.31E-04	2.27E-04	9.93E-04
	Fluorene	1.28E-05	6.00E-05	2.63E-04	6.00E-05	2.63E-04	2.40E-04	1.05E-03	7.20E-04	3.16E-03
	Indeno(1,2,3,-d)pyrene	4.14E-07	1.94E-06	8.50E-06	1.94E-06	8.50E-06	7.77E-06	3.40E-05	2.33E-05	1.02E-04
	Naphthalene	1.30E-04	6.10E-04	2.67E-03	6.10E-04	2.67E-03	2.44E-03	1.07E-02	7.32E-03	3.20E-02
	Phenanthrene	4.08E-05	1.91E-04	8.38E-04	1.91E-04	8.38E-04	7.65E-04	3.35E-03	2.30E-03	1.01E-02
	Pyrene	3.71E-06	1.74E-05	7.62E-05	1.74E-05	7.62E-05	6.96E-05	3.05E-04	2.09E-04	9.15E-04
	Total PAH	2.12E-04	9.94E-04	4.35E-03	9.94E-04	4.35E-03	3.98E-03	1.74E-02	1.19E-02	5.23E-02

References:

[1] Parameters copied from the "Engine Parameters" tab.

Parameters	Units	CBP	Load Bank
Rated Output	(hp)	670	2,680
Engine Heat Input	(MMBtu/hr)	4.69	18.76
Operating Hours Each	(hrs)	500	500

[2] AP 42 Section 3.4 Table 3.4-1 for criteria pollutants.
[3] AP 42 Section 3.4 Table 3.4-3 for hazardous air pollutants (HAP).
[4] AP 42 Section 3.4 Table 3.4-4 for polycyclic aromatic hydrocarbons (PAH)
[5] Assume the sulfur content is 0.15%.

APPENDIX B: MODEL INPUTS

AERMOD
POINT Sources

Source ID	X Coord.	Y Coord.	Base Elevation	Release Height	PM_{10} Emission Rate		$PM_{2.5}$ Emission Rate		CO Emission Rate		NO_x Emission Rate		SO_2 Emission Rate		Gas Exit Temperature	Gas Exit Velocity	Inside Diameter	Description
	(m)	(m)	(m)	(m)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(K)	(m/s)	(m)	
ESENG1	329247.37	5103134.23	440.69	5.85	1.88E+00	2.36E-01	1.88E+00	2.36E-01	1.47E+01	1.86E+00	6.43E+01	8.10E+00	3.25E-02	4.10E-03	600	50	0.393192	East Substation Loading Engine 1
ESENG2	329247.37	5103129.68	440.69	5.85	1.88E+00	2.36E-01	1.88E+00	2.36E-01	1.47E+01	1.86E+00	6.43E+01	8.10E+00	3.25E-02	4.10E-03	600	50	0.393192	East Substation Loading Engine 2
ESENG3	329247.37	5103124.92	440.69	5.85	1.88E+00	2.36E-01	1.88E+00	2.36E-01	1.47E+01	1.86E+00	6.43E+01	8.10E+00	3.25E-02	4.10E-03	600	50	0.393192	East Substation Loading Engine 3
ELCBENG	329469.69	5103182.16	440.69	3.9	4.69E-01	5.91E-02	4.69E-01	5.91E-02	3.69E+00	4.64E-01	1.61E+01	2.03E+00	8.13E-03	1.02E-03	600	50	0.19812	East Laydown CBP Engine 1
ECBBLDG	329458.3491	5103186.192	440.69	15.24	2.97E-01	3.75E-02	4.46E-02	5.62E-03							0	3.048	1.57	East Laydown CBP Exhaust from Main Building
ECBSILO1	329450.8552	5103182.517	440.69	18.29	9.88E-05	1.24E-05	1.48E-05	1.87E-06							0	3.048	1.22	East Laydown CBP Silo 1
ECBSILO2	329449.7765	5103187.046	440.69	18.29	9.88E-05	1.24E-05	1.48E-05	1.87E-06							0	3.048	1.22	East Laydown CBP Silo 2
ECBSILO3	329450.6461	5103191.662	440.69	18.29	9.88E-05	1.24E-05	1.48E-05	1.87E-06							0	3.048	1.22	East Laydown CBP Silo 3
WSENG1	303058.24	5118114.6	421.13	5.85	1.88E+00	2.36E-01	1.88E+00	2.36E-01	1.47E+01	1.86E+00	6.43E+01	8.10E+00	3.25E-02	4.10E-03	600	50	0.393192	West Substation Loading Engine 1
WSENG2	303058.24	5118110.18	421.13	5.85	1.88E+00	2.36E-01	1.88E+00	2.36E-01	1.47E+01	1.86E+00	6.43E+01	8.10E+00	3.25E-02	4.10E-03	600	50	0.393192	West Substation Loading Engine 2
WSENG3	303058.24	5118105.64	421.13	5.85	1.88E+00	2.36E-01	1.88E+00	2.36E-01	1.47E+01	1.86E+00	6.43E+01	8.10E+00	3.25E-02	4.10E-03	600	50	0.393192	West Substation Loading Engine 3
WLCBENG	317848.04	5109700.25	561.17	3.9	4.69E-01	5.91E-02	4.69E-01	5.91E-02	3.69E+00	4.64E-01	1.61E+01	2.03E+00	8.13E-03	1.02E-03	600	50	0.19812	West Laydown CBP Engine 1
WCBBLDG	317847.19	5109712.80	561.17	15.24	2.97E-01	3.75E-02	4.46E-02	5.62E-03							0	3.048	1.57	West Laydown CBP Exhaust from Main Building
WCBSILO1	317839.63	5109716.34	561.17	18.29	9.88E-05	1.24E-05	1.48E-05	1.87E-06							0	3.048	1.22	West Laydown CBP Silo 1
WCBSILO2	317838.63	5109711.80	561.17	18.29	9.88E-05	1.24E-05	1.48E-05	1.87E-06							0	3.048	1.22	West Laydown CBP Silo 2
WCBSILO3	317839.58	5109707.20	561.17	18.29	9.88E-05	1.24E-05	1.48E-05	1.87E-06							0	3.048	1.22	West Laydown CBP Silo 3

Source ID	X Coord.	Y Coord.	Base Elevation	Release Height	PM_{10} Emission Rate		$PM_{2.5}$ Emission Rate		CO Emission Rate		NO_x Emission Rate	SO_2 Emission Rate	Side Length	Building Height	Initial Lateral Dimension	Initial Vertical Dimension	Description
	(m)	(m)	(m)	(m)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(lb/hr)	(m)	(m)	(m)	(m)	
ELCBHOP1	329502.68	5103181.89	440.69	3.05	6.61E-03	8.33E-04	1.00E-03	1.26E-04					4.11	6.10	0.96	2.84	East Laydown: CBP Loading to hopper 1
ELCBHOP2	329502.65	5103186.18	440.69	3.05	6.61E-03	8.33E-04	1.00E-03	1.26E-04					4.11	6.10	0.96	2.84	East Laydown: CBP Loading to hopper 2
ELCBHOP3	329502.61	5103190.16	440.69	3.05	6.61E-03	8.33E-04	1.00E-03	1.26E-04					4.11	6.10	0.96	2.84	East Laydown: CBP Loading to hopper 3
ELCBSP1	329451.47	5103139.67	440.69	1.52	3.97E-03	5.00E-04	6.01E-04	7.57E-05					0.91		0.21	0.71	East Laydown: Front-End Loader Drop to CBP storage pile 1
ELCBSP2	329496.26	5103139.85	440.69	1.52	3.97E-03	5.00E-04	6.01E-04	7.57E-05					0.91		0.21	0.71	East Laydown: Front-End Loader Drop to CBP storage pile 2
ELCBSP3	329534.98	5103140.22	440.69	1.52	3.97E-03	5.00E-04	6.01E-04	7.57E-05					0.91		0.21	0.71	East Laydown: Front-End Loader Drop to CBP storage pile 3
WLCBHOP1	317919.10	5109713.21	561.17	3.05	6.61E-03	8.33E-04	1.00E-03	1.26E-04					4.11	6.10	0.96	2.84	West Laydown: CBP Loading to hopper 1
WLCBHOP2	317919.11	5109709.10	561.17	3.05	6.61E-03	8.33E-04	1.00E-03	1.26E-04					4.11	6.10	0.96	2.84	West Laydown: CBP Loading to hopper 2
WLCBHOP3	317919.11	5109704.98	561.17	3.05	6.61E-03	8.33E-04	1.00E-03	1.26E-04					4.11	6.10	0.96	2.84	West Laydown: CBP Loading to hopper 3
WLCBSP1	317868.67	5109756.58	561.17	1.52	3.97E-03	5.00E-04	6.01E-04	7.57E-05					0.91		0.21	0.71	West Laydown: Front-End Loader Drop to CBP storage pile 1
WLCBSP2	317913.45	5109755.73	561.17	1.52	3.97E-03	5.00E-04	6.01E-04	7.57E-05					0.91		0.21	0.71	West Laydown: Front-End Loader Drop to CBP storage pile 2
WLCBSP3	317952.17	5109754.77	561.17	1.52	3.97E-03	5.00E-04	6.01E-04	7.57E-05					0.91		0.21	0.71	West Laydown: Front-End Loader Drop to CBP storage pile 3

AERMOD
AREA Sources

Source ID	AREA Source Type	X Coord. (m)	Y Coord. (m)	Base Elevation (m)	Release Height (m)	PM_{10} Emission Rate (lb/hr)	$PM_{2.5}$ Emission Rate (lb/hr)	Circular Area Radius (m)	Initial Vertical Dimension (m)	No. Vertices (or sides)	Description
ELCBS1	AREACIRC	329539.835	5103149.17	440.69	1.52	4.87E-04	1.46E-04	10	0.7088	20	East Laydown: CBP Storage Pile 1
ELCBS2	AREACIRC	329501.44	5103148.53	440.69	1.52	4.87E-04	1.46E-04	10	0.7088	20	East Laydown: CBP Storage Pile 2
ELCBS3	AREACIRC	329456.341	5103148.17	440.69	1.52	4.87E-04	1.46E-04	10	0.7088	20	East Laydown: CBP Storage Pile 3
ELFELCB	AREAPOLY	329505.47	5103201.84	440.69	3.05	2.43E-01	2.43E-02	N/A	1.4200	5	East Laydown: Front-End Loader CBP
WLCBS1	AREACIRC	317868.672	5109756.58	561.17	1.52	4.87E-04	1.46E-04	10	0.7088	20	West Laydown: CBP Storage Pile 1
WLCBS2	AREACIRC	317913.478	5109755.61	561.17	1.52	4.87E-04	1.46E-04	10	0.7088	20	West Laydown: CBP Storage Pile 2
WLCBS3	AREACIRC	317952.172	5109754.77	561.17	1.52	4.87E-04	1.46E-04	10	0.7088	20	West Laydown: CBP Storage Pile 3
WLFELCB	AREAPOLY	317916.786	5109702.21	561.17	3.05	2.43E-01	2.43E-02	N/A	1.4200	5	West Laydown: Front-End Loader CBP

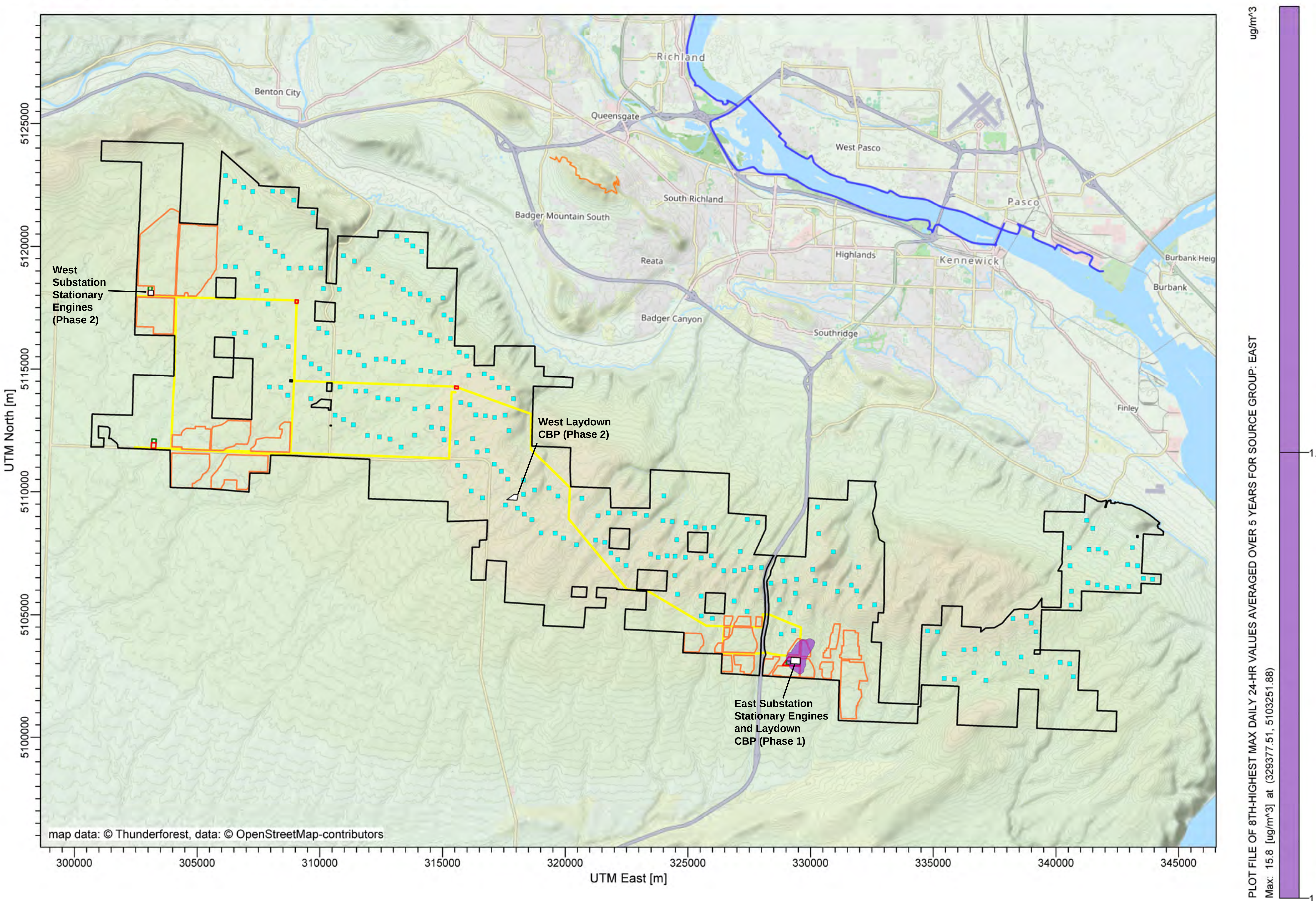
AERMOD
LINE Sources

Source ID	X Coord.	Y Coord.	Base Elevation	Release Height	PM_{10} Emission Rate	$PM_{2.5}$ Emission Rate	X2 Coordinate	Y2 Coordinate	Width	Initial Vertical Dimension	Description	Length	Area
	(m)	(m)	(m)	(m)	[g/(s-m^2)]	[g/(s-m^2)]	(m)	(m)	(m)	(m)		(m)	(m^2)
	ENTER TOTAL HAUL ROAD EMISSIONS (g/s)				**9.15E-03**	**2.25E-03**						**506.02**	**3701.62**
ELCBPRD1	329549.66	5103225.95	440.69	4.27	2.472E-06	6.07E-07	329550.32	5103240.71	17.07	13.02	East Laydown: aggregate storage piles 01	14.77	108.08
ELCBPRD2	329555.59	5103217.22	440.69	4.27	2.472E-06	6.07E-07	329549.66	5103225.95	17.07	13.02	East Laydown: aggregate storage piles 02	10.55	77.20
ELCBPRD3	329557.71	5103124.19	440.69	4.27	2.472E-06	6.07E-07	329555.59	5103217.22	17.07	13.02	East Laydown: aggregate storage piles 03	93.05	680.71
ELCBPRD4	329544.64	5103109.44	440.69	4.27	2.472E-06	6.07E-07	329557.7	5103124.19	17.07	13.02	East Laydown: aggregate storage piles 04	19.70	144.12
ELCBPRD5	329434.89	5103111.61	440.69	4.27	2.472E-06	6.07E-07	329544.29	5103109.5	17.07	13.02	East Laydown: aggregate storage piles 05	109.42	800.43
ELCBPRD6	329434.6	5103111.39	440.69	4.27	2.472E-06	6.07E-07	329427.37	5103133.45	17.07	13.02	East Laydown: aggregate storage piles 06	23.21	169.82
ELCBPRD7	329427.29	5103133.47	440.69	4.27	2.472E-06	6.07E-07	329429.4	5103229.86	17.07	13.02	East Laydown: aggregate storage piles 07	96.41	705.28
ELCBPRD8	329429.4	5103229.86	440.69	4.27	2.472E-06	6.07E-07	329429.21	5103248.42	17.07	13.02	East Laydown: aggregate storage piles 08	18.56	135.78
ELCBPRD9	329429.4	5103229.86	440.69	4.27	2.472E-06	6.07E-07	329549.66	5103225.95	17.07	13.02	East Laydown: aggregate storage piles 09	120.32	880.19
	ENTER TOTAL HAUL ROAD EMISSIONS (g/s)				**9.15E-03**	**2.25E-03**						**560.44**	**4099.76**
WLCBPRD1	317959.09	5109673.92	561.17	4.27	2.232E-06	5.48E-07	317958.97	5109662.15	17.07	13.02	West Laydown: aggregate storage piles 01	11.77	86.10
WLCBPRD2	317959.09	5109673.92	561.17	4.27	2.232E-06	5.48E-07	317970.69	5109687.12	17.07	13.02	West Laydown: aggregate storage piles 02	17.57	128.55
WLCBPRD3	317993.55	5109774.27	561.17	4.27	2.232E-06	5.48E-07	317970.68	5109687.13	17.07	13.02	West Laydown: aggregate storage piles 03	90.09	659.04
WLCBPRD4	317993.54	5109774.23	561.17	4.27	2.232E-06	5.48E-07	317982.7	5109785.49	17.07	13.02	West Laydown: aggregate storage piles 04	15.63	114.34
WLCBPRD5	317982.7	5109785.47	561.17	4.27	2.232E-06	5.48E-07	317890.81	5109793.15	17.07	13.02	West Laydown: aggregate storage piles 05	92.21	674.54
WLCBPRD6	317870.95	5109784.84	561.17	4.27	2.232E-06	5.48E-07	317890.83	5109793.13	17.07	13.02	West Laydown: aggregate storage piles 06	21.54	157.56
WLCBPRD7	317810.31	5109735.41	561.17	4.27	2.232E-06	5.48E-07	317870.95	5109784.84	17.07	13.02	West Laydown: aggregate storage piles 07	78.23	572.30
WLCBPRD8	317791.3	5109701.02	561.17	4.27	2.232E-06	5.48E-07	317810.14	5109735.45	17.07	13.02	West Laydown: aggregate storage piles 08	39.25	287.10
WLCBPRD9	317796.49	5109681.29	561.17	4.27	2.232E-06	5.48E-07	317791.34	5109701.08	17.07	13.02	West Laydown: aggregate storage piles 09	20.45	149.59
WLCBPRD10	317796.5	5109681.29	561.17	4.27	2.232E-06	5.48E-07	317796.52	5109670.44	17.07	13.02	West Laydown: aggregate storage piles 10	10.85	79.37
WLCBPRD11	317959.09	5109673.92	561.17	4.27	2.232E-06	5.48E-07	317796.41	5109681.33	17.07	13.02	West Laydown: aggregate storage piles 11	162.85	1191.27

Source ID	X Coord.	Y Coord.	Base Elevation	Release Height	PM_{10} Emission Rate	X2 Coordinate	Y2 Coordinate	Width	Initial Vertical Dimension	Description
	(m)	(m)	(m)	(m)	[g/(s-m^2)]	(m)	(m)	(m)	(m)	
	ENTER TOTAL HAUL ROAD EMISSIONS (g/s)				**0.002246**					
ELCBPRD1	329549.66	5103225.95	440.69	4.27	6.069E-07	329550.32	5103240.71	17.07	13.02	East Laydown: aggregate storage piles 01
ELCBPRD2	329555.59	5103217.22	440.69	4.27	6.069E-07	329549.66	5103225.95	17.07	13.02	East Laydown: aggregate storage piles 02
ELCBPRD3	329557.71	5103124.19	440.69	4.27	6.069E-07	329555.59	5103217.22	17.07	13.02	East Laydown: aggregate storage piles 03
ELCBPRD4	329544.64	5103109.44	440.69	4.27	6.069E-07	329557.7	5103124.19	17.07	13.02	East Laydown: aggregate storage piles 04
ELCBPRD5	329434.89	5103111.61	440.69	4.27	6.069E-07	329544.29	5103109.5	17.07	13.02	East Laydown: aggregate storage piles 05
ELCBPRD6	329434.60	5103111.39	440.69	4.27	6.069E-07	329427.37	5103133.45	17.07	13.02	East Laydown: aggregate storage piles 06
ELCBPRD7	329427.29	5103133.47	440.69	4.27	6.069E-07	329429.4	5103229.86	17.07	13.02	East Laydown: aggregate storage piles 07
ELCBPRD8	329429.40	5103229.86	440.69	4.27	6.069E-07	329429.21	5103248.42	17.07	13.02	East Laydown: aggregate storage piles 08
ELCBPRD9	329429.40	5103229.86	440.69	4.27	6.069E-07	329549.66	5103225.95	17.07	13.02	East Laydown: aggregate storage piles 09
	ENTER TOTAL HAUL ROAD EMISSIONS (g/s)				**0.002246**					
WLCBPRD1	317959.09	5109673.92	561.17	4.27	5.479E-07	317958.97	5109662.15	17.07	13.02	West Laydown: aggregate storage piles 01
WLCBPRD2	317959.09	5109673.92	561.17	4.27	5.479E-07	317970.69	5109687.12	17.07	13.02	West Laydown: aggregate storage piles 02
WLCBPRD3	317993.55	5109774.27	561.17	4.27	5.479E-07	317970.68	5109687.13	17.07	13.02	West Laydown: aggregate storage piles 03
WLCBPRD4	317993.54	5109774.23	561.17	4.27	5.479E-07	317982.7	5109785.49	17.07	13.02	West Laydown: aggregate storage piles 04
WLCBPRD5	317982.7	5109785.47	561.17	4.27	5.479E-07	317890.81	5109793.15	17.07	13.02	West Laydown: aggregate storage piles 05
WLCBPRD6	317870.95	5109784.84	561.17	4.27	5.479E-07	317890.83	5109793.13	17.07	13.02	West Laydown: aggregate storage piles 06
WLCBPRD7	317810.31	5109735.41	561.17	4.27	5.479E-07	317870.95	5109784.84	17.07	13.02	West Laydown: aggregate storage piles 07
WLCBPRD8	317791.3	5109701.02	561.17	4.27	5.479E-07	317810.14	5109735.45	17.07	13.02	West Laydown: aggregate storage piles 08
WLCBPRD9	317796.49	5109681.29	561.17	4.27	5.479E-07	317791.34	5109701.08	17.07	13.02	West Laydown: aggregate storage piles 09
WLCBPRD10	317796.5	5109681.29	561.17	4.27	5.479E-07	317796.52	5109670.44	17.07	13.02	West Laydown: aggregate storage piles 10
WLCBPRD11	317959.09	5109673.92	561.17	4.27	5.479E-07	317796.41	5109681.33	17.07	13.02	West Laydown: aggregate storage piles 11

APPENDIX C: FIGURES

Figure C-1
Horse Heaven - Air Quality Dispersion Modeling Evaluation
East Stationary Engines and Concrete Batch Plant (Phase 1) - 24-hour PM2.5



LEGEND

- Project Boundary
- Solar Siting Area
- Proposed BESS
- Proposed Substation
- Proposed Transmission Line
- Option 1 Turbine Location
- 24-hour PM2.5 Maximum Impact Area 55% of NAAQS

SOURCES:
56

RECEPTORS:
20275

OUTPUT TYPE:
Concentration

MAX:
15.8 ug/m^3

COMPANY NAME:

MODELER:

DATE:
6/13/2023

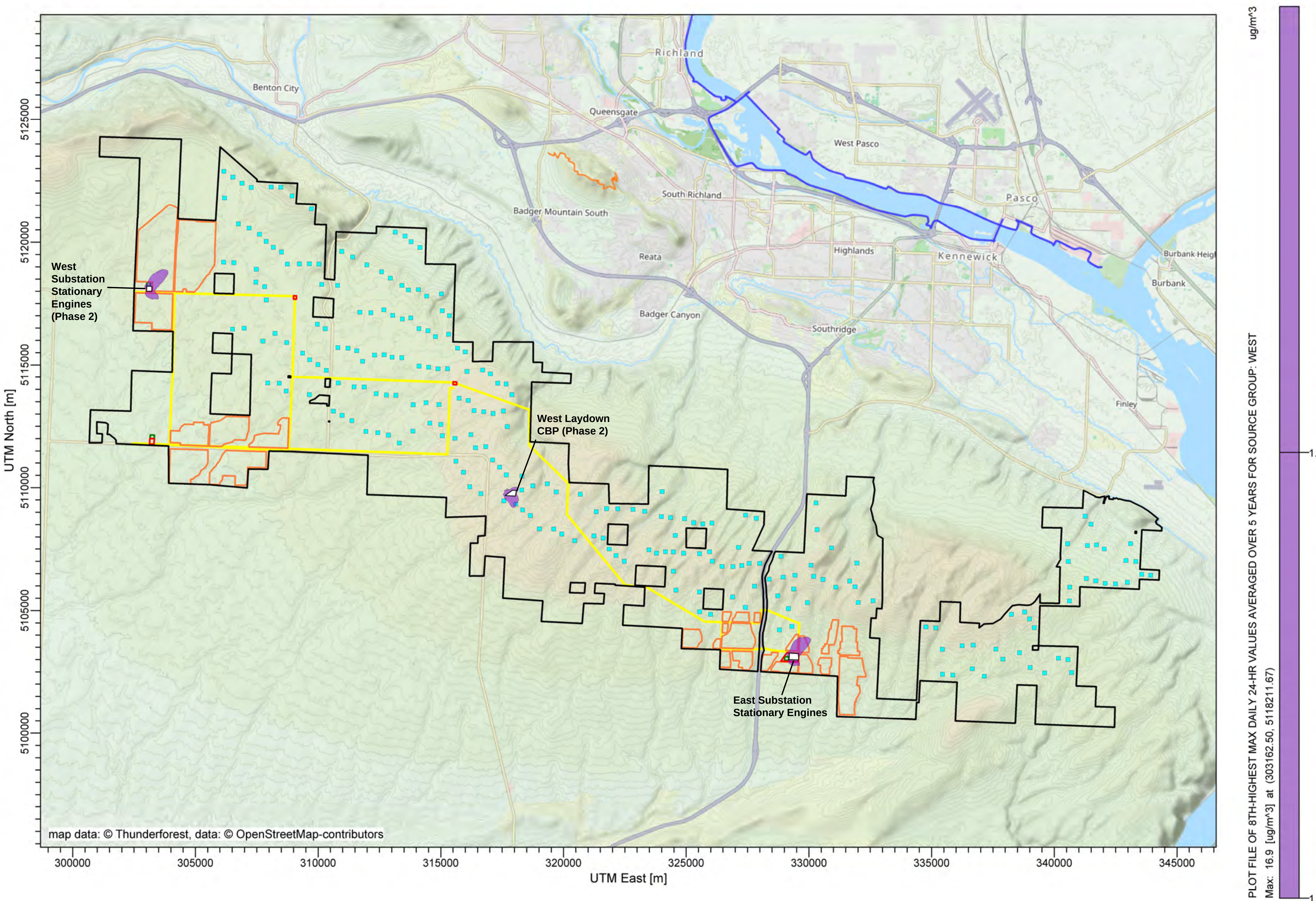
SCALE: 1:150,000

0 5 km

PROJECT NO.:

AERMOD View - Lakes Environmental Software

Figure C-2
Horse Heaven - Air Quality Dispersion Modeling Evaluation
Stationary Engines and West Concrete Batch Plant (Phase 2) - 24-hour PM2.5



LEGEND

- Project Boundary
- Solar Siting Area
- Proposed BESS
- Proposed Substation
- Proposed Transmission Line
- Option 1 Turbine Location
- 24-hour PM2.5 Maximum Impact Area 55% of NAAQS

SOURCES:
56

RECEPTORS:
20275

OUTPUT TYPE:
Concentration

MAX:
16.9 ug/m^3

COMPANY NAME:

MODELER:

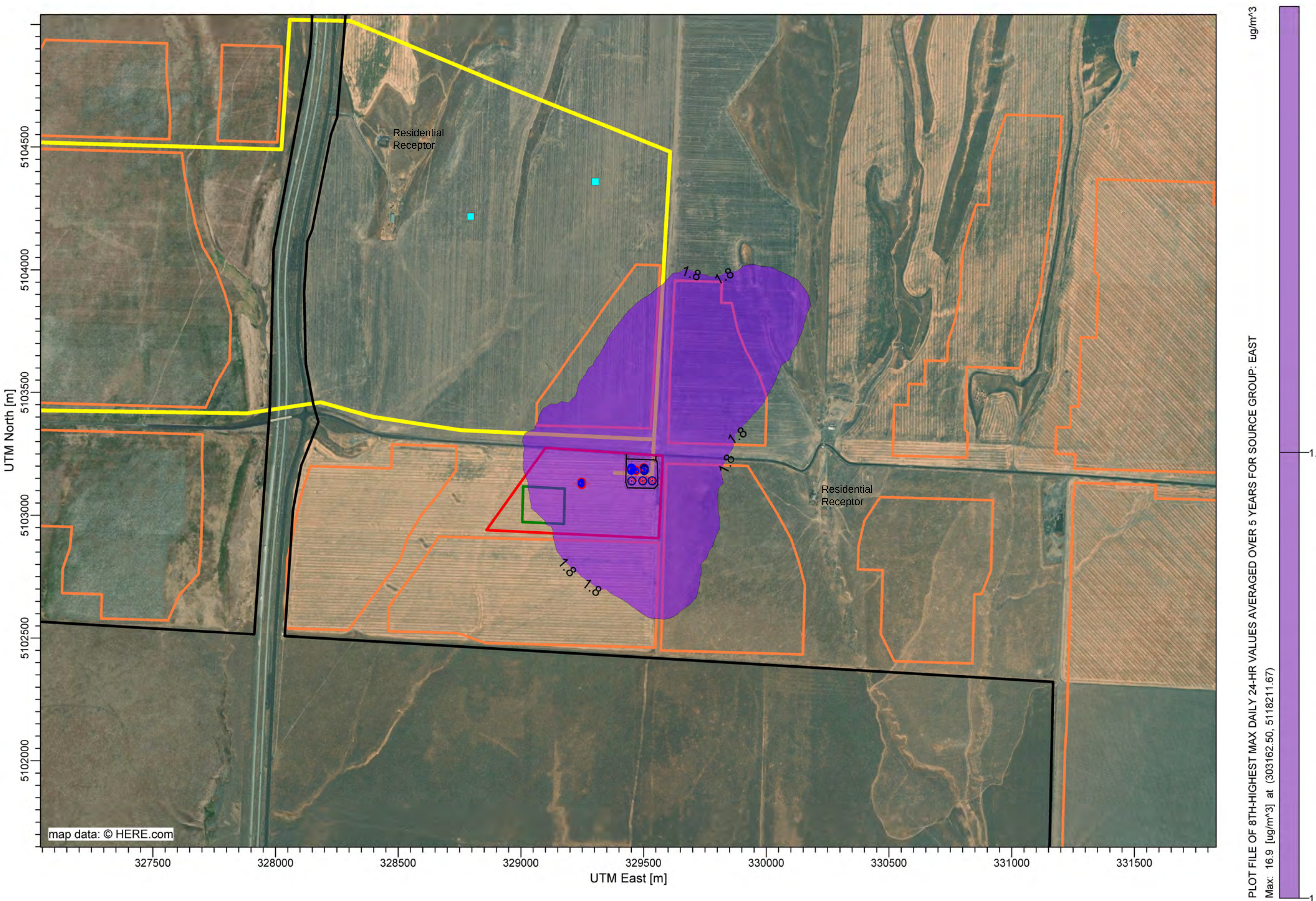
DATE:
6/12/2023

SCALE: 1:150,000
0 5 km

PROJECT NO.:

AERMOD View - Lakes Environmental Software

Figure C-3
Horse Heaven - Air Quality Dispersion Modeling Evaluation
Stationary Engines and East Concrete Batch Plant (Phase 1) - 24-hour PM2.5



LEGEND

- Project Boundary
- Solar Siting Area
- Proposed BESS
- Proposed Substation
- Proposed Transmission Line
- Option 1 Turbine Location
- 24-hour PM2.5 Maximum Impact Area 55% of NAAQS

SOURCES:
56

RECEPTORS:
20275

OUTPUT TYPE:
Concentration

MAX:
16.9 ug/m^3

COMPANY NAME:

MODELER:

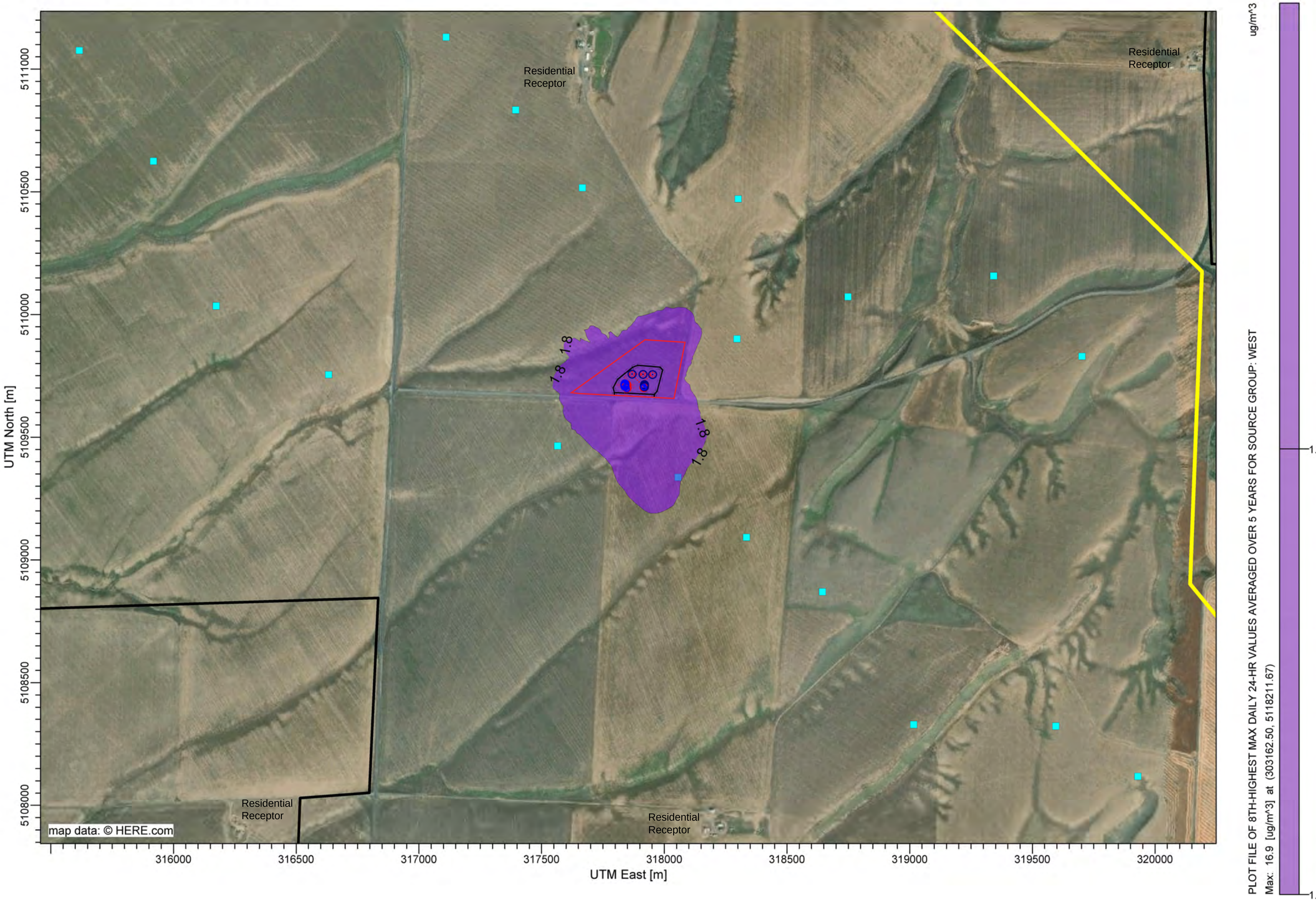
DATE:
6/12/2023

SCALE: 1:15,000
0 0.4 km

PROJECT NO.:

AERMOD View - Lakes Environmental Software

Figure C-4
Horse Heaven - Air Quality Dispersion Modeling Evaluation
West Concrete Batch Plant (Phase 2) - 24-hour PM2.5



LEGEND

- Project Boundary
- Proposed Transmission Line
- Option 1 Turbine Location
- 24-hour PM2.5 Maximum Impact Area 55% of NAAQS

SOURCES:
56

RECEPTORS:
20275

OUTPUT TYPE:
Concentration

MAX:
16.9 ug/m^3

COMPANY NAME:

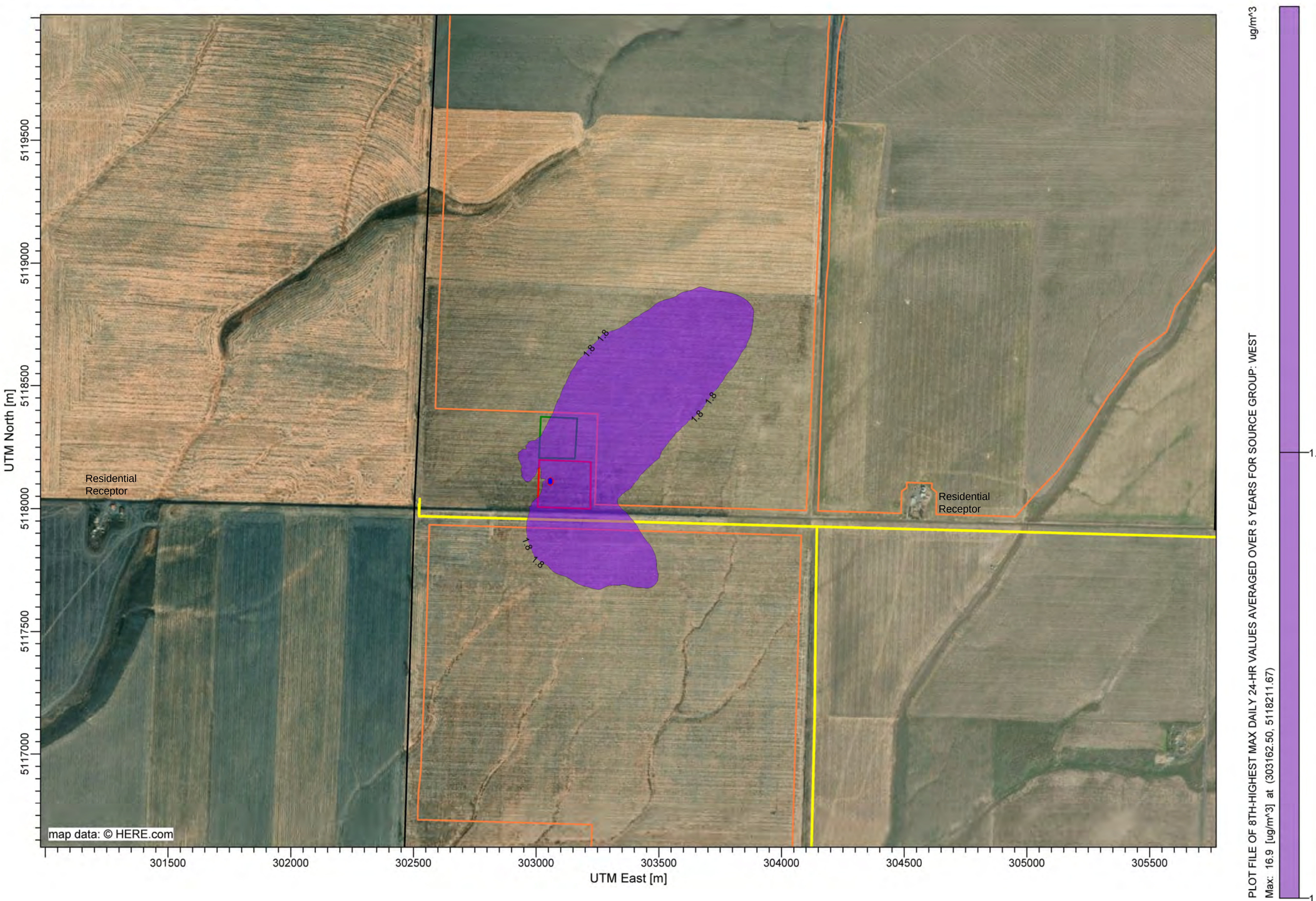
MODELER:

DATE:
6/12/2023

SCALE: 1:15,000
0 0.4 km

PROJECT NO.:

Figure C-5
Horse Heaven - Air Quality Dispersion Modeling Evaluation
Stationary Engines - West Substation - 24-hour PM2.5

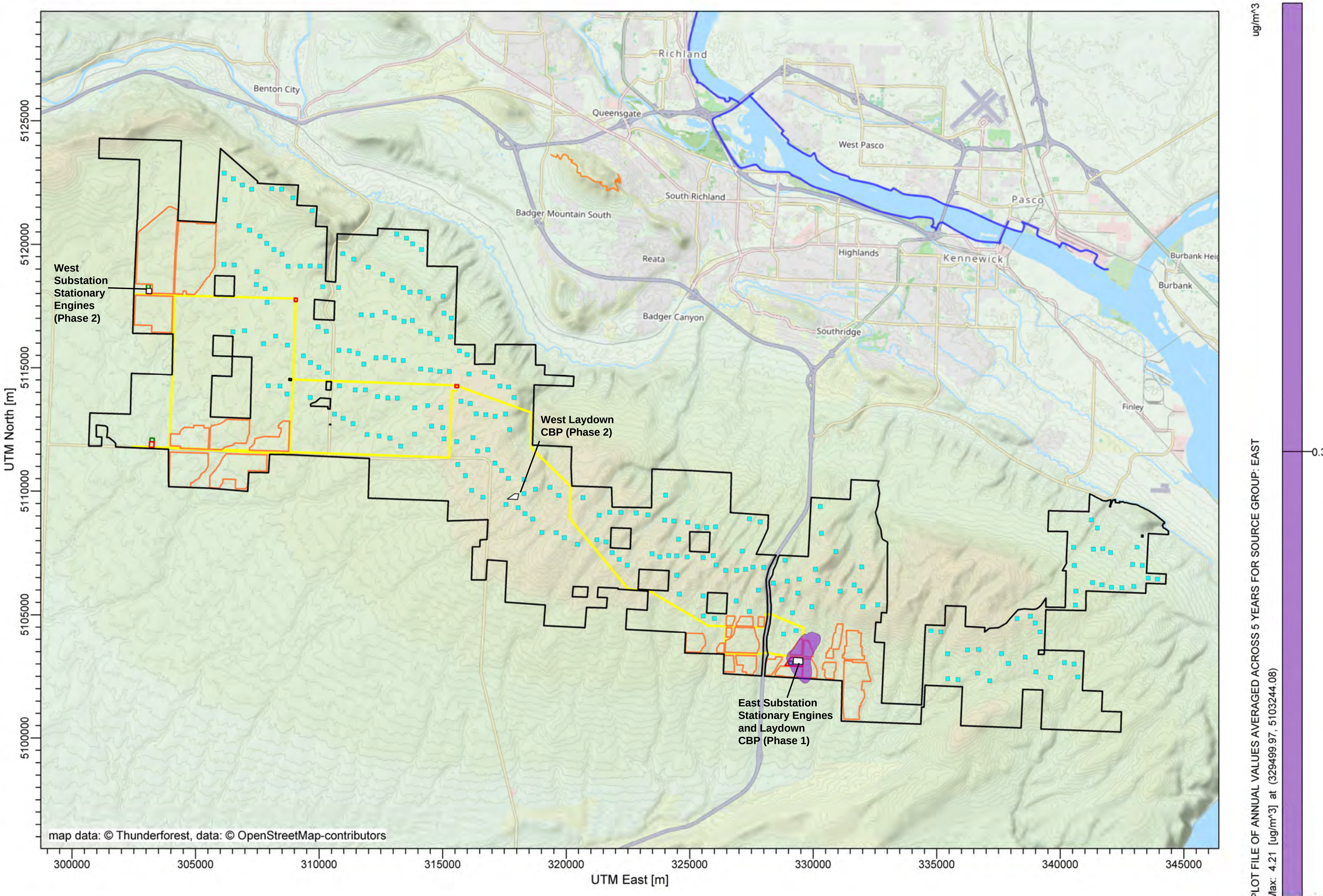


LEGEND

- Project Boundary
- Solar Siting Area
- Proposed BESS
- Proposed Substation
- Proposed Transmission Line
- 24-hour PM2.5 Maximum Impact Area 55% of NAAQS

SOURCES:	**56**
RECEPTORS:	**20275**
OUTPUT TYPE:	**Concentration**
MAX:	**16.9 ug/m^3**
COMPANY NAME:	
MODELER:	
DATE:	**6/12/2023**
SCALE:	1:15,000 (0 – 0.4 km)
PROJECT NO.:	

Figure C-6
Horse Heaven - Air Quality Dispersion Modeling Evaluation
East Stationary Engines and Concrete Batch Plant (Phase 1) - Annual PM2.5



LEGEND

- Project Boundary
- Solar Siting Area
- Proposed BESS
- Proposed Substation
- Proposed Transmission Line
- Option 1 Turbine Location
- Annual PM2.5 Maximum Impact Area 50% of NAAQS

SOURCES:
56

RECEPTORS:
20275

OUTPUT TYPE:
Concentration

MAX:
4.21 ug/m^3

COMPANY NAME:

MODELER:

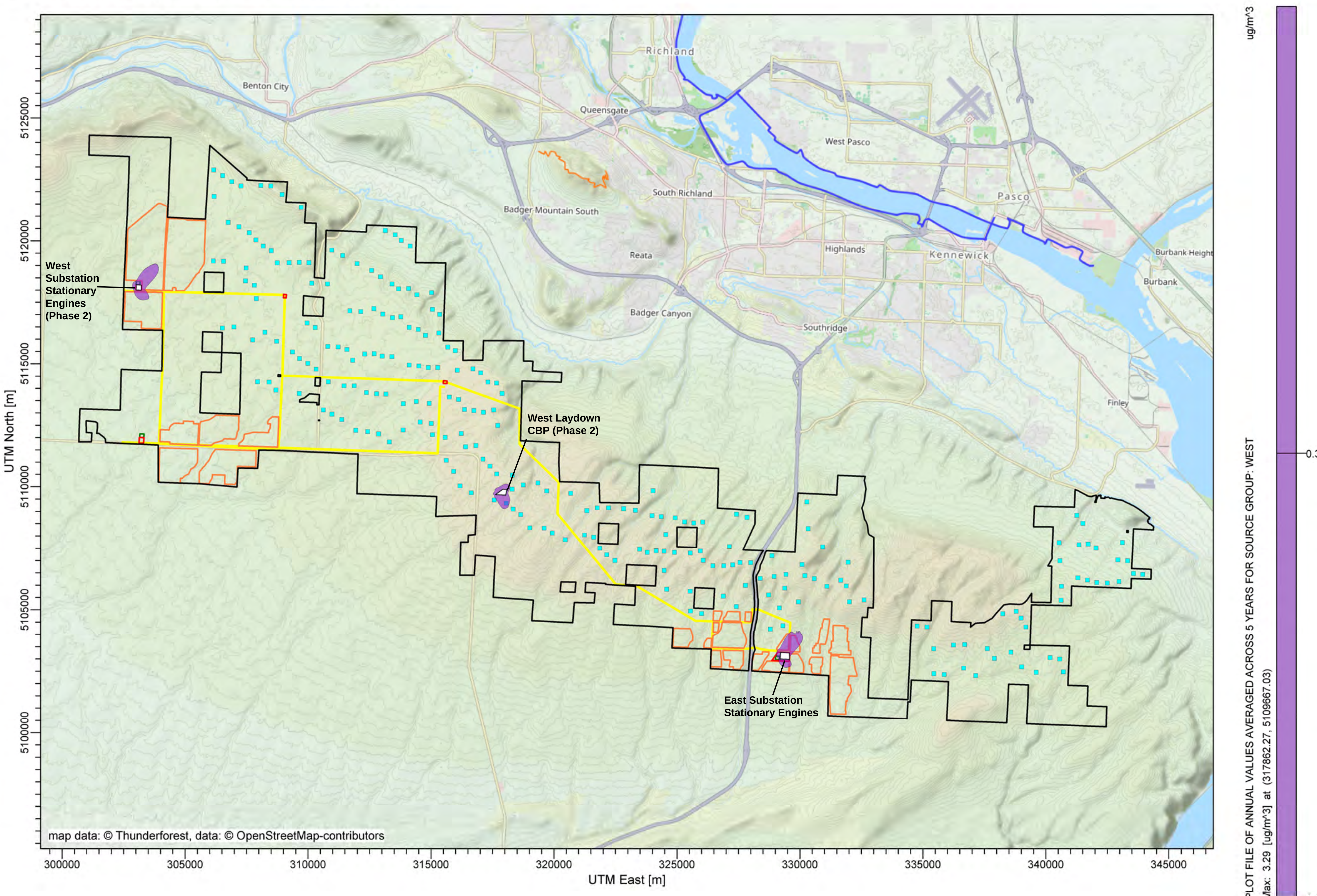
DATE:
6/13/2023

SCALE: 1:150,000
0 5 km

PROJECT NO.:

AERMOD View - Lakes Environmental Software

Figure C-7
Horse Heaven - Air Quality Dispersion Modeling Evaluation
Stationary Engines and West Concrete Batch Plant (Phase 2) - Annual PM2.5



LEGEND

- Project Boundary
- Solar Siting Area
- Proposed BESS
- Proposed Substation
- Proposed Transmission Line
- Option 1 Turbine Location
- Annual PM2.5 Maximum Impact Area 50% of NAAQS

SOURCES:
56

RECEPTORS:
20275

OUTPUT TYPE:
Concentration

MAX:
3.29 ug/m^3

COMPANY NAME:

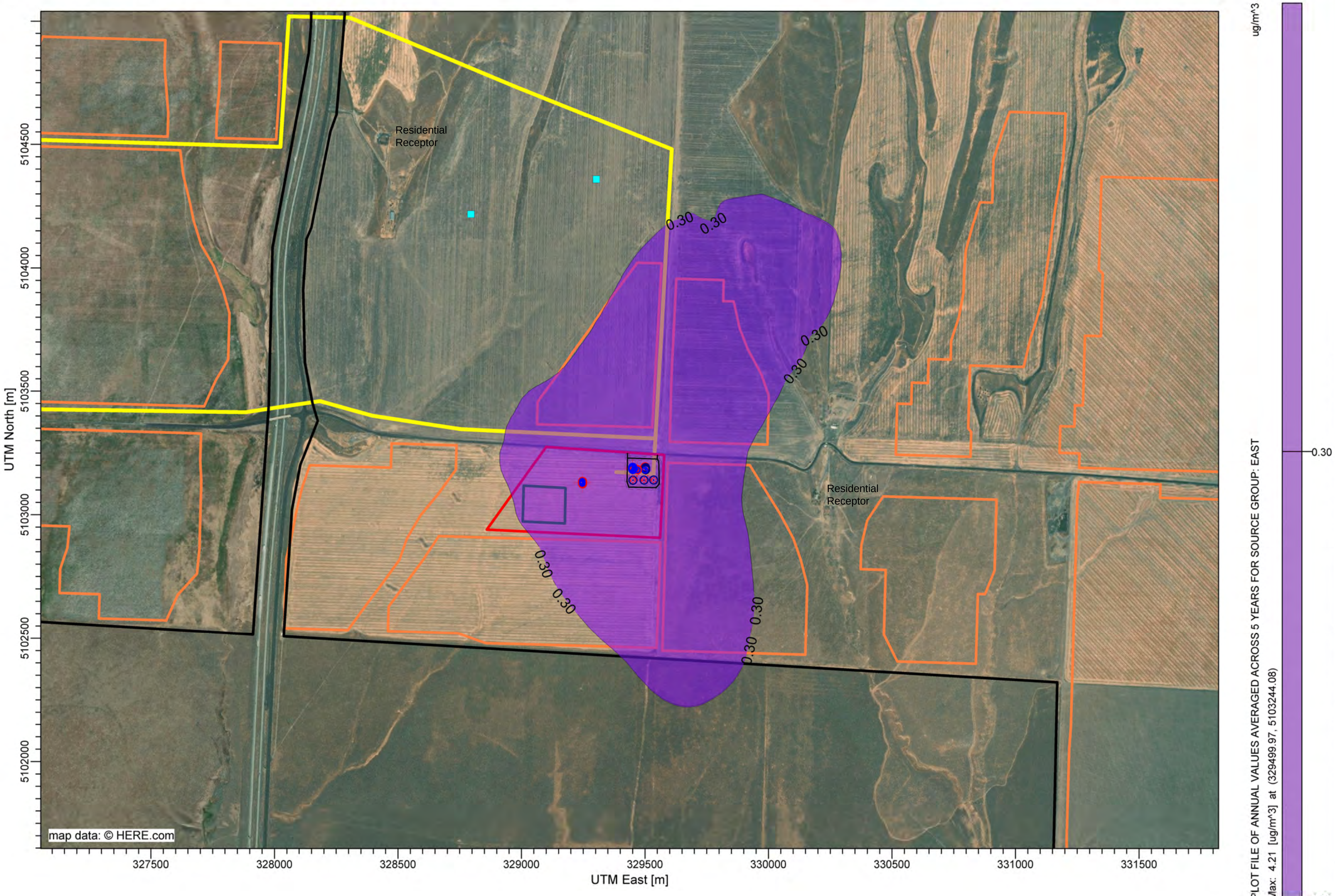
MODELER:

DATE:
6/12/2023

SCALE: 1:150,000
0 — 5 km

PROJECT NO.:

Figure C-8
Horse Heaven - Air Quality Dispersion Modeling Evaluation
Stationary Engines and East Concrete Batch Plant (Phase 1) - Annual PM2.5



LEGEND

- Project Boundary
- Solar Siting Area
- Proposed BESS
- Proposed Substation
- Proposed Transmission Line
- Option 1 Turbine Location
- Annual PM2.5 Maximum Impact Area 50% of NAAQS

SOURCES:
56

RECEPTORS:
20275

OUTPUT TYPE:
Concentration

MAX:
4.21 ug/m^3

COMPANY NAME:

MODELER:

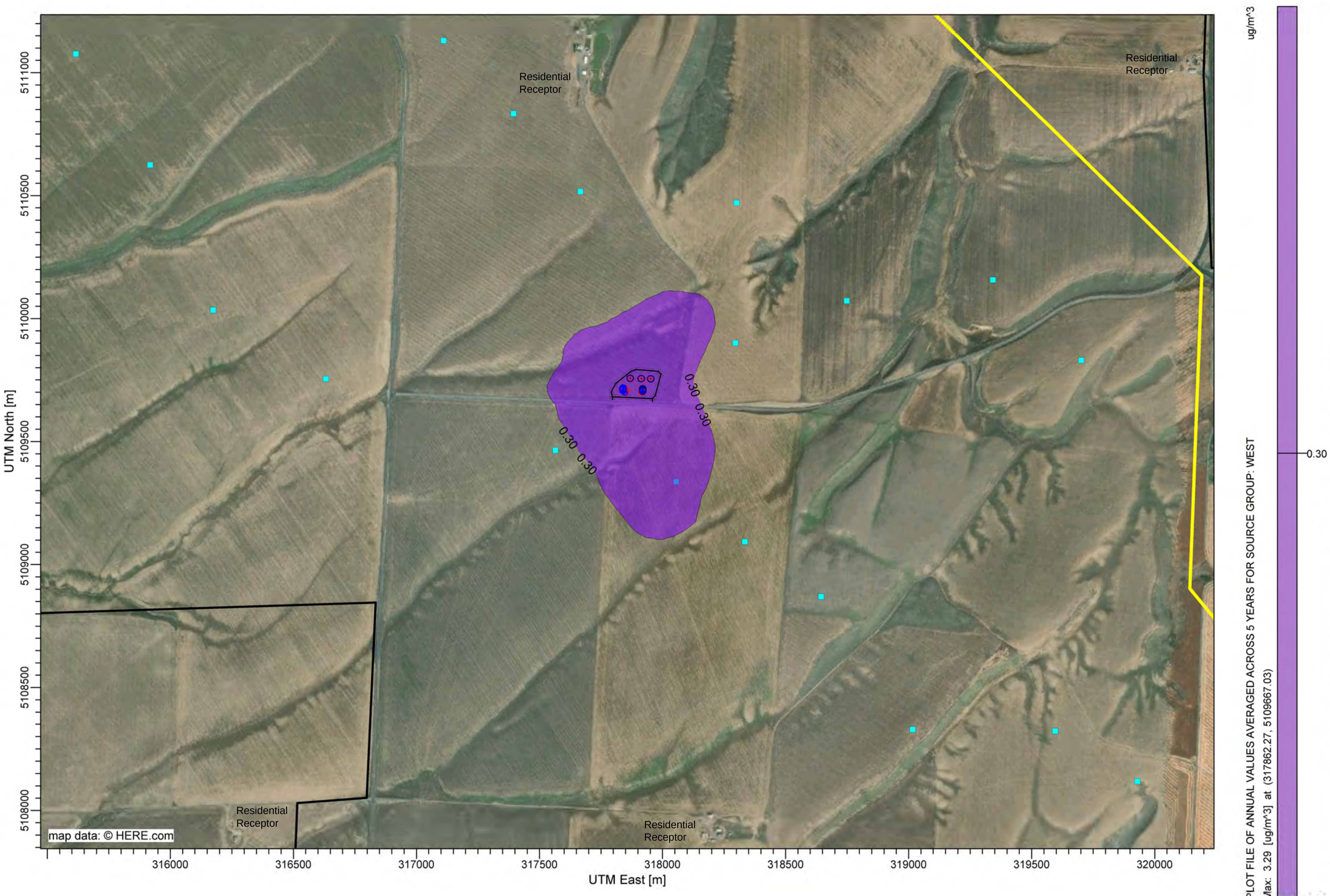
DATE:
6/12/2023

SCALE: 1:15,000
0 0.4 km

PROJECT NO.:

AERMOD View - Lakes Environmental Software

Figure C-9
Horse Heaven - Air Quality Dispersion Modeling Evaluation
West Concrete Batch Plant (Phase 2) - Annual PM2.5



LEGEND

- Project Boundary
- Proposed Transmission Line
- Option 1 Turbine Location
- Annual PM2.5 Maximum Impact Area 50% of NAAQS

SOURCES:	56
RECEPTORS:	20275
OUTPUT TYPE:	Concentration
MAX:	3.29 ug/m^3
COMPANY NAME:	
MODELER:	
DATE:	6/12/2023
SCALE:	1:15,000 (0 – 0.4 km)
PROJECT NO.:	

AERMOD View - Lakes Environmental Software

Figure C-10
Horse Heaven - Air Quality Dispersion Modeling Evaluation
Stationary Engines - West Substation - Annual PM2.5

LEGEND

- Project Boundary
- Solar Siting Area
- Proposed BESS
- Proposed Substation
- Proposed Transmission Line
- Annual PM2.5 Maximum Impact Area 50% of NAAQS

SOURCES: **56**

RECEPTORS: **20275**

OUTPUT TYPE: **Concentration**

MAX: **3.29 ug/m^3**

COMPANY NAME:

MODELER:

DATE: **6/12/2023**

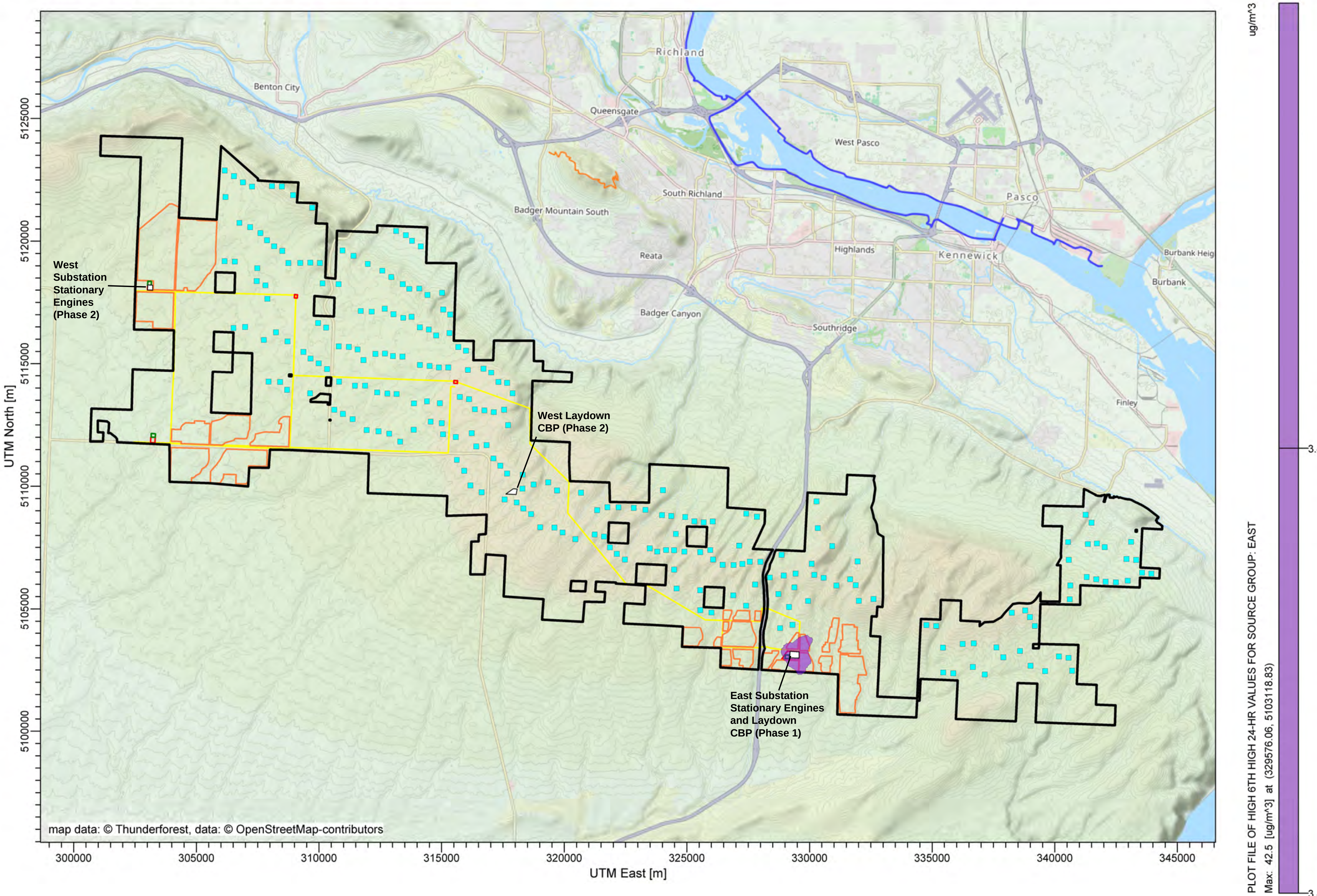
SCALE: 1:15,000

0 — 0.4 km

PROJECT NO.:

AERMOD View - Lakes Environmental Software

Figure C-11
Horse Heaven - Air Quality Dispersion Modeling Evaluation
East Stationary Engines and Concrete Batch Plant (Phase 1) - 24-hour PM10



LEGEND

- Project Boundary
- Solar Siting Area
- Proposed BESS
- Proposed Substation
- Proposed Transmission Line
- Option 1 Turbine Location
- 24-hour PM10 Maximum Impact Area 50% of NAAQS

SOURCES:
56

RECEPTORS:
20275

OUTPUT TYPE:
Concentration

MAX:
42.5 ug/m^3

COMPANY NAME:

MODELER:

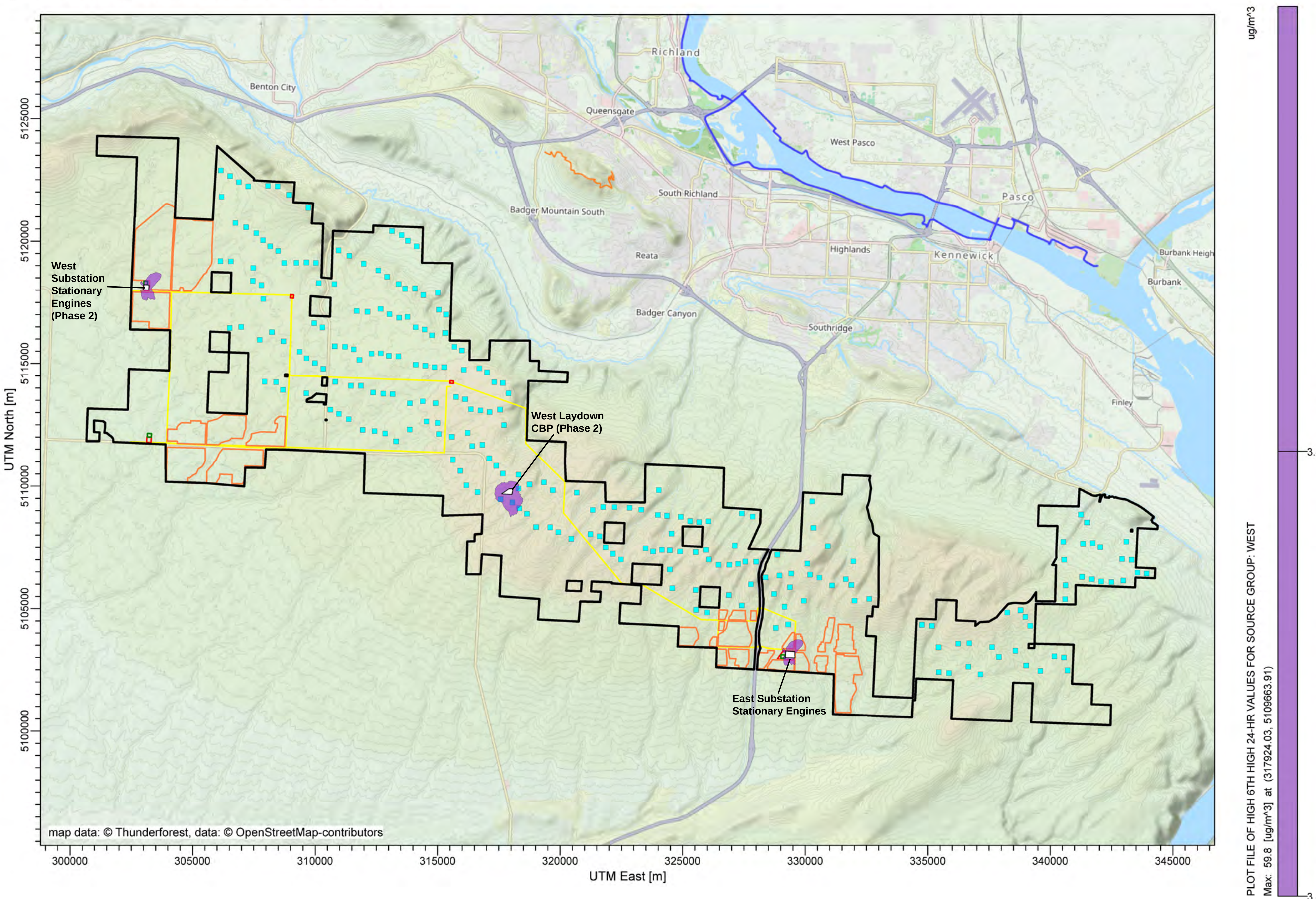
DATE:
6/13/2023

SCALE: 1:150,000
0 — 5 km

PROJECT NO.:

AERMOD View - Lakes Environmental Software

Figure C-12
Horse Heaven - Air Quality Dispersion Modeling Evaluation
Stationary Engines and West Concrete Batch Plant (Phase 2) - 24-hour PM10



LEGEND

- Project Boundary
- Solar Siting Area
- Proposed BESS
- Proposed Substation
- Proposed Transmission Line
- Option 1 Turbine Location
- 24-hour PM10 Maximum Impact Area 50% of NAAQS

SOURCES:
56

RECEPTORS:
20275

OUTPUT TYPE:
Concentration

MAX:
59.8 ug/m^3

COMPANY NAME:

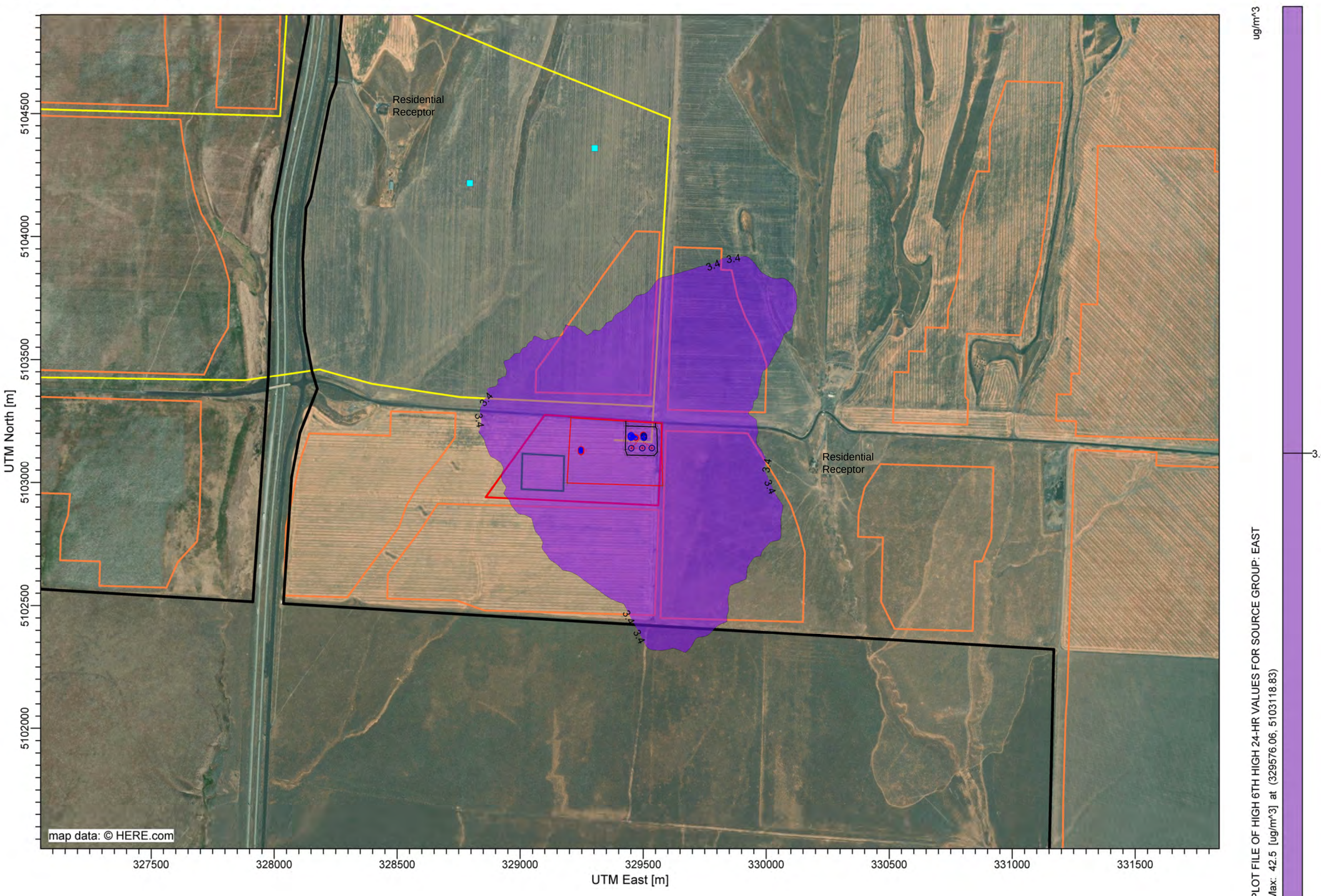
MODELER:

DATE:
6/12/2023

SCALE: 1:150,000
0 5 km

PROJECT NO.:

Figure C-13
Horse Heaven - Air Quality Dispersion Modeling Evaluation
Stationary Engines and East Concrete Batch Plant (Phase 1) - 24-hour PM10



LEGEND

- Project Boundary
- Solar Siting Area
- Proposed BESS
- Proposed Substation
- Proposed Transmission Line
- Option 1 Turbine Location
- 24-hour PM10 Maximum Impact Area 50% of NAAQS

SOURCES:
56

RECEPTORS:
20275

OUTPUT TYPE:
Concentration

MAX:
42.5 ug/m^3

COMPANY NAME:

MODELER:

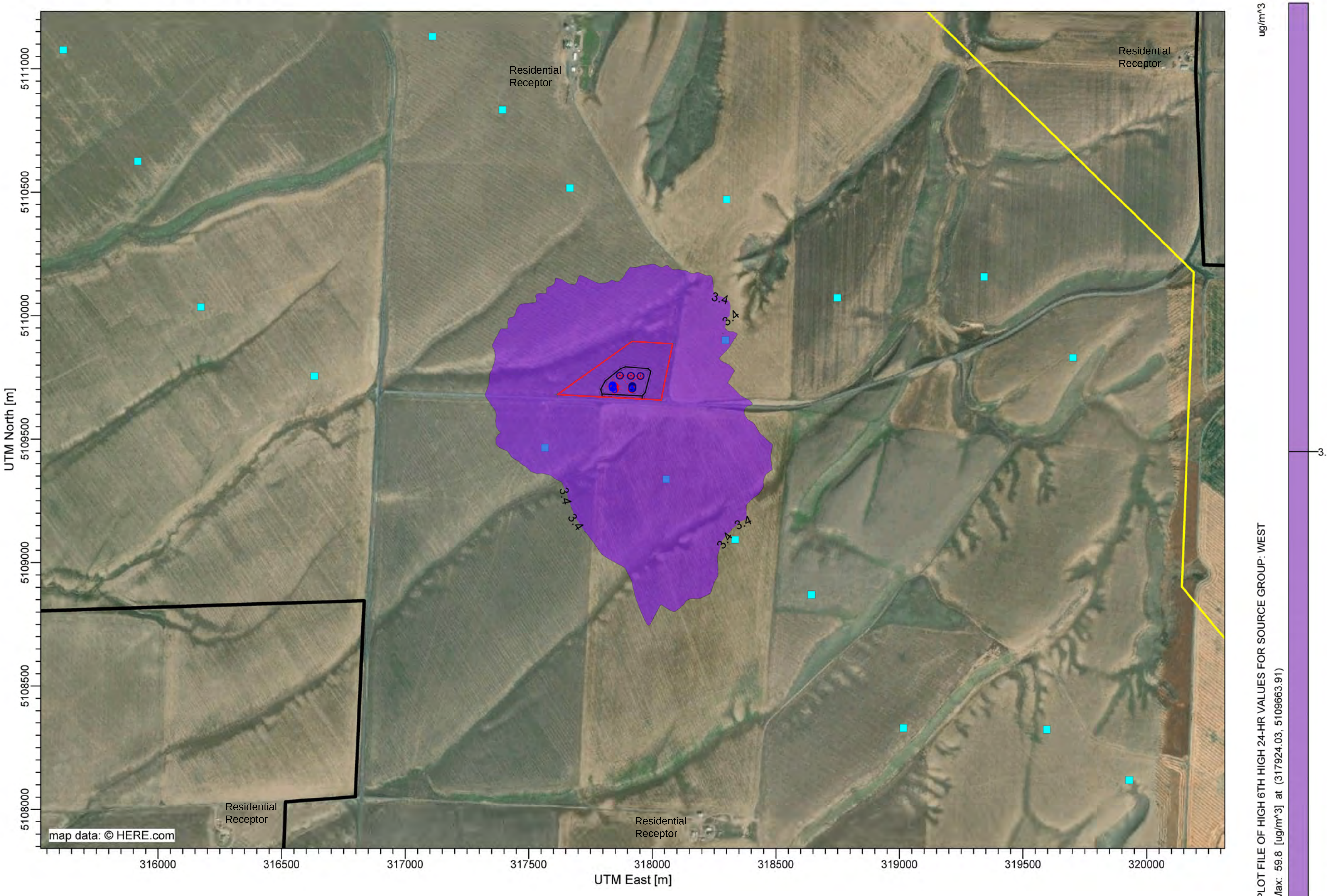
DATE:
6/12/2023

SCALE: 1:15,000
0 0.4 km

PROJECT NO.:

AERMOD View - Lakes Environmental Software

Figure C-14
Horse Heaven - Air Quality Dispersion Modeling Evaluation
West Concrete Batch Plant (Phase 2) - 24-hour PM10



LEGEND

- Project Boundary
- Proposed Transmission Line
- Option 1 Turbine Location
- 24-hour PM10 Maximum Impact Area 50% of NAAQS

SOURCES:
56

RECEPTORS:
20275

OUTPUT TYPE:
Concentration

MAX:
59.8 ug/m^3

COMPANY NAME:

MODELER:

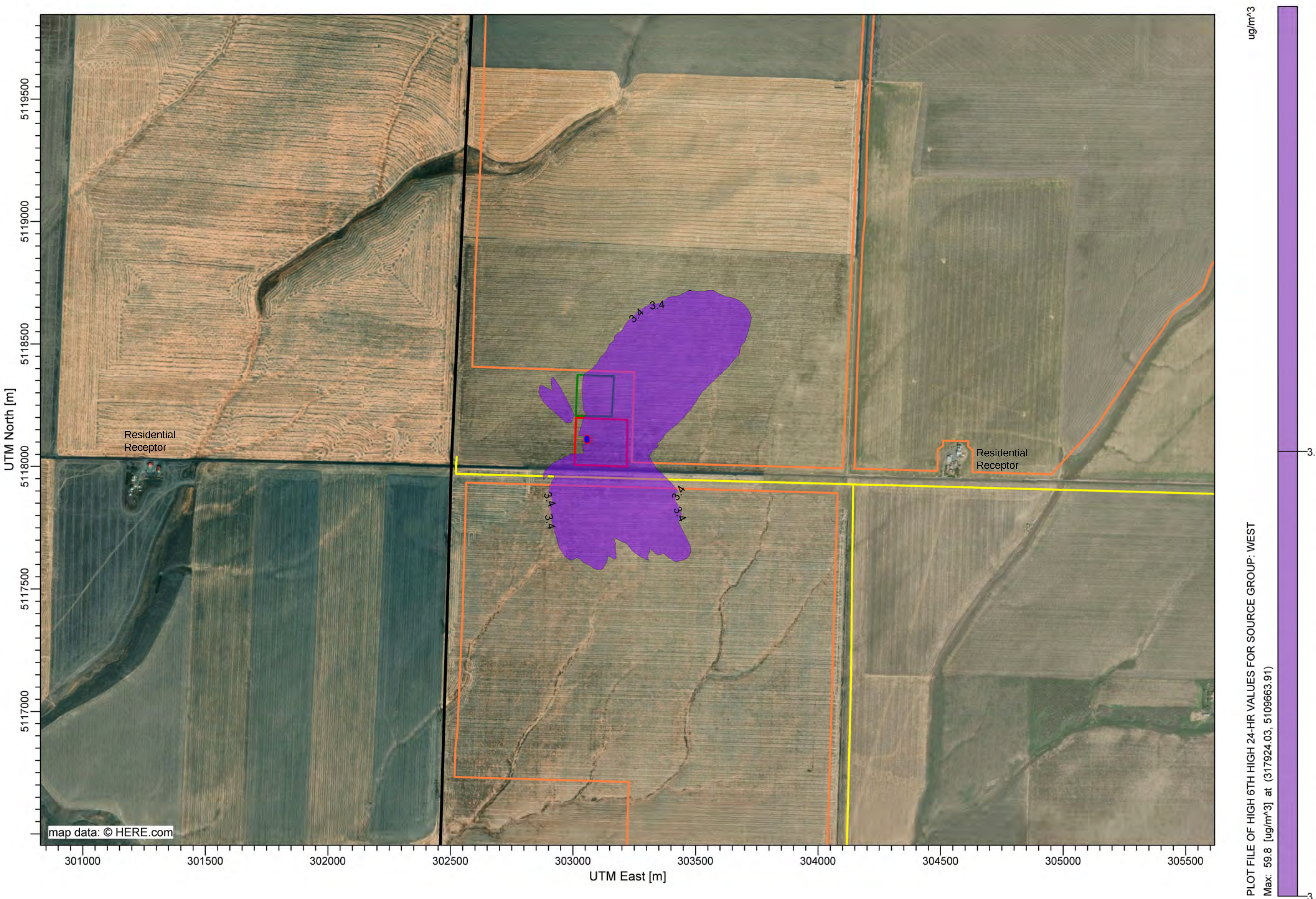
DATE:
6/12/2023

SCALE: 1:15,000
0 — 0.4 km

PROJECT NO.:

AERMOD View - Lakes Environmental Software

Figure C-15
Horse Heaven - Air Quality Dispersion Modeling Evaluation
Stationary Engines - West Substation - 24-hour PM10



LEGEND

- Project Boundary
- Solar Siting Area
- Proposed BESS
- Proposed Substation
- Proposed Transmission Line
- 24-hour PM10 Maximum Impact Area 50% of NAAQS

SOURCES:
56

RECEPTORS:
20275

OUTPUT TYPE:
Concentration

MAX:
59.8 ug/m^3

COMPANY NAME:

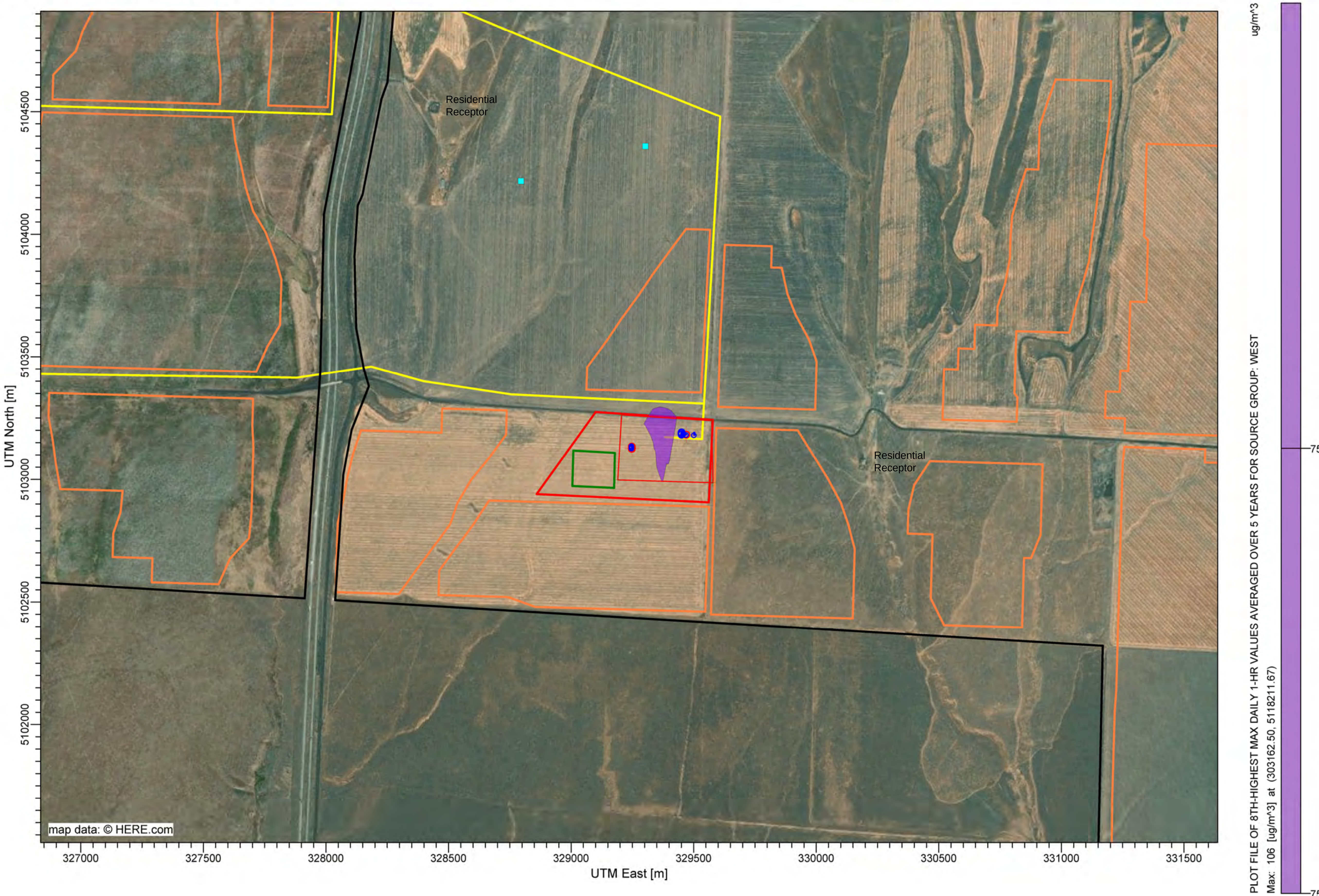
MODELER:

DATE:
6/12/2023

SCALE: 1:15,000
0 0.4 km

PROJECT NO.:

Figure C-16
Horse Heaven - Air Quality Dispersion Modeling Evaluation
Stationary Engines and East Concrete Batch Plant (Phase 1) - 1-hour NO2



LEGEND

- Project Boundary
- Solar Siting Area
- Proposed BESS
- Proposed Substation
- Proposed Transmission Line
- Option 1 Turbine Location
- 1-hour NO2 Maximum Impact Area 50% of NAAQS

SOURCES:
8

RECEPTORS:
20275

OUTPUT TYPE:
Concentration

MAX:
106 ug/m^3

COMPANY NAME:

MODELER:

DATE:
6/12/2023

SCALE: 1:15,000
0 0.4 km

PROJECT NO.:

AERMOD View - Lakes Environmental Software

Figure C-17
Horse Heaven - Air Quality Dispersion Modeling Evaluation
West Concrete Batch Plant (Phase 2) - 1-hour NO2

LEGEND

- Project Boundary
- Proposed Transmission Line
- Option 1 Turbine Location
- 1-hour NO2 Maximum Impact Area 50% of NAAQS (no areas with greater than 50% of NAAQS)

SOURCES:	8
RECEPTORS:	20275
OUTPUT TYPE:	Concentration
MAX:	106 ug/m^3
COMPANY NAME:	
MODELER:	
DATE:	6/12/2023
SCALE:	1:15,000 (0 – 0.4 km)
PROJECT NO.:	

Figure C-18
Horse Heaven - Air Quality Dispersion Modeling Evaluation
Stationary Engines - West Substation - 1-hour NO2

LEGEND

- Project Boundary
- Solar Siting Area
- Proposed BESS
- Proposed Substation
- Proposed Transmission Line
- 1-hour NO2 Maximum Impact Area 50% of NAAQS

SOURCES:
8

RECEPTORS:
20275

OUTPUT TYPE:
Concentration

MAX:
106 ug/m^3

COMPANY NAME:

MODELER:

DATE:
6/12/2023

SCALE: 1:15,000
0 0.4 km

PROJECT NO.:

AERMOD View - Lakes Environmental Software