Air Quality Impacts Analysis (AQIA)
for
Basin Electric Power Cooperative
Bison Generation Station

6261 121st Ave NW
Ray, ND 58849

Permit No.: ACP-18273 v1.0
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North Dakota Department of Environmental Quality
Division of Air Quality

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1 Executive Summary

Basin Electric Power Cooperative (Basin) conducted air dispersion modeling for the proposed Bison Generation Station (Bison) facility located in Williams County, near Ray, ND. The modeling efforts were conducted to demonstrate compliance with both state and federal Ambient Air Quality Standards (AAQS) and Prevention of Significant Deterioration (PSD) increment consumption regulations.

The Permit to Construct (PTC) application was submitted on February 10, 2025 and the Class I area modeling analysis was submitted on June 6, 2025. Based on the data provided in these documents, and the Department's independent review and modeling analysis, it is expected that the proposed facility will comply with the applicable AAQS and PSD Increments. The Department's results of the modeled impacts for the AAQS and PSD increment consumption are outlined in Table 1 and Table 2, respectively. Pollutants not included in the following tables were below the corresponding significant impact level (SIL). Those results can be found in Table 17.

Table 1- Ambient Air Quality Standards (AAQS) Results Summary[1]

Pollutant	Averaging Time	Modeled Impact ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	NDAAQS ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Passed (Y/N)
PM_{10}	24-HR	9.03	30	39.03	150	150	Y
$PM_{2.5}$	Annual	0.64	4.76	5.40	-	9	Y
	24-HR	2.80	13.836	16.64	-	35	Y
NO_2	1-HR	138.3	35	173.30	-	188	Y

Table 2 - PSD Class II Increment Results Summary[2]

Pollutant	Averaging Time	Modeled Impact ($\mu g/m^3$)	Class II Increment ($\mu g/m^3$)	Increment Consumed	Passed (Y/N)
PM_{10}	Annual	2.17	17	13%	Y
	24-HR	9.53	30	32%	Y
$PM_{2.5}$	Annual	0.69	4	17%	Y
	24-HR	6.40	9	71%	Y

[1] See Table 22 for AAQS averaging times.

[2] See Table 23 for PSD Increment averaging times.

2 Introduction

On February 10, 2025, the North Dakota Department of Environmental Quality, Division of Air Quality (Department) received an application for a PTC from Basin for the proposed construction of a combined-cycle power plant near Ray, ND, located in Williams County. The application included a modeling analysis to confirm compliance with the North Dakota Ambient Air Quality Standards (NDAAQS), the National Ambient Air Quality Standards (NAAQS), and Class II PSD increment standards. Basin submitted the Class I area modeling analysis on June 17, 2025. Modeling efforts were carried out for CO, NO_x, SO_2, PM_{10} and $PM_{2.5}$. This AQIA summarizes the Department's findings based on a thorough review and independent modeling analysis of the project.

3 Project Background

The proposed Bison facility will be located approximately 6 miles southwest of Ray, ND. The facility will utilize combined-cycle turbine technology and will consist of two natural gas combustion turbines along with various support equipment. Each turbine will produce approximately 745 megawatts (MW), for a total of 1,490 MW.

Initial construction of the Project will ensue after the PSD baseline dates for Region No. 172 (Table 3). Therefore, all the emission units proposed as a part of the Project will consume PSD increment.

Table 3 - PSD Minor Source Baseline Dates[3]

Pollutant	PSD Baseline Date Region No. 172 (all counties except Cass County)	PSD Baseline Date Region No. 130 (Cass County)	Source Included in Baseline (Y/N)
CO	No PSD Class II Increment	No PSD Class II Increment	N/A
NO_2	October 31, 1989	September 13, 2007	N
SO_2	December 19, 1977	November 30, 1979	N
PM_{10}	January 13, 1978	November 30, 1979	N
$PM_{2.5}$	August 23, 2012	April 28, 2022	N
Lead (Pb)	No PSD Class II Increment	No PSD Class II Increment	N/A

[3] May 13, 2022, *Department Memo, North Dakota Prevention of Significant Deterioration (PSD) Minor Source Baseline Dates*. Available at: https://deq.nd.gov/publications/AQ/policy/Modeling/2022MEMO_PSD_BASELINE_DATES.pdf (Last visited October 24, 2025)

4 Model Requirements

Bison qualifies as a major source according to the PSD rules[4,5] and consequently falls under the purview of PSD review requirements. Per the Department Memo[6] dated October 6, 2014, sources that are subject to the PSD rules require dispersion modeling for criteria pollutants prior to the issuance of a PTC if the projected emissions exceed PSD significant emission rates (SERs) (Table 4).

Furthermore, any new source subject to PSD review that is situated within 250 kilometers (km) of a Class I area is required to include a Class I increment analysis. Table 5 provides a list of the Class I areas in closest proximity to the facility. Basin is located approximately 73 km from the nearest Class I area; therefore, a Class I increment analysis was required. The nearest Class I areas were located outside the recommended 50 km range for AERMOD dispersion modeling software, so CALPUFF software was utilized to evaluate the Class I impacts. These modeling details are outlined in Section 7. All other areas within North Dakota are designated Class II areas and Class II increment analysis applies.

Table 4 - Significant Emission Rates (SERs) in Tons per Year (TPY)

Pollutant	SER (TPY)	Final Project Emission Increase (TPY)	Modeling Required (Y/N)
PM_{10}	15	485	Y
$PM_{2.5}$	10	485	Y
SO_2	40	65	Y
NO_x	40	615	Y
CO	100	1,023	Y

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[4] *NDAC 33.1-15-15*. Available at: https://www.ndlegis.gov/information/acdata/pdf/33.1-15-15.pdf (Last visited October 24, 2025)

[5] *40 CFR §52.21*. Available at: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-52/subpart-A/section-52.21 (Last visited October 24, 2025)

[6] *Criteria Pollutant Modeling Requirements for a Permit to Construct.* Available at: https://deq.nd.gov/publications/AQ/policy/Modeling/Criteria_Modeling_Memo.pdf (Last visited October 24, 2025)

Table 5 - Class I Areas Near Source

Class I Area	Distance From Project (km)	Modeling Required (Y/N)
Medicine Lake Wilderness Area (MT)	76	Y
Fort Peck (MT)	95	Y
Theodore Roosevelt National Park-North Unit (ND)	78	Y
Theodore Roosevelt National Park-Elkhorn Ranch Unit (ND)	122	Y
Theodore Roosevelt National Park-South Unit (ND)	151	Y
Lostwood Wilderness Area (ND)	73	Y

Basin is subject to the requirements of NDAC 33.1-15-02[7] and Ambient Air Quality Standards. Cumulative modeling was conducted to demonstrate compliance with applicable state and federal standards.

5 Model Input Values

5.1 Model Version

The U.S. Environmental Protection Agency (EPA) has developed the *Guideline on Air Quality Models*[8] (40 CFR 51 Appendix W) wherein they list preferred models for pre-construction permitting reviews. At the time of the application submittal, Appendix W (2017) was the most current revision in use.

EPA's preferred model is AERMOD, which Basin and the Department used for the analysis and review, in accordance with Appendix W. The model versions utilized in the Department review are shown in Table 6. CALPUFF was utilized for the Class I analysis and is detailed in Section 7.

Table 6 - Model Versions Used

Model	Version	Model	Version
AERMOD	24142	BPIP-PRIME	4274
AERMET	23132	AERMINUTE	15272
AERMAP	18081	AERSURFACE	20060

5.2 Meteorological Data (MET)

In the modeling process, both surface and upper-air meteorological (met) data are pre-processed through

[7] Available at: https://www.ndlegis.gov/information/acdata/pdf/33.1-15-02.pdf (Last visited October 24, 2025)
[8] Available at: https://www.epa.gov/sites/default/files/2020-09/documents/appw_17.pdf (Last visited October 24, 2025)

AERMET. This pre-processing generates the boundary layer parameters required by AERMOD to estimate plume dispersion. AERMET processes hourly meteorological data to determine plume transport and dispersion downwind from a source.

Per Appendix W (2017) 8.4.2.e, the choice of meteorological data should be based on ensuring a sufficiently conservative and representative result, considering hourly and seasonal variations in meteorological conditions throughout the year, which directly influence plume movement due to atmospheric conditions. The options for selecting meteorological data include:

1. One year of site-specific data: This involves using data collected onsite from a monitoring station.
2. Five years of representative National Weather Service (NWS) data: This data source typically provides long-term, historical weather information.
3. At least 3 years of prognostic meteorological data: This type of data involves using predictive meteorological models to estimate future conditions.

The analysis used the second option, five years of representative NWS data. The specific MET stations used for input in AERMET for this analysis are listed in Table 7. AERMET processes hourly surface observations, including parameters such as wind speed and direction, ambient temperature, sky cover (opacity), and local air pressure (optionally). It combines these observations with the pre-processed AERSURFACE output values (Table 8) to compile the necessary surface met inputs for AERMOD.

Table 7 - MET Data Used

MET Data	Location	Station No.	Years	Distance From Source*	Source of Data
Surface Air	Tioga Municipal Airport	720863	2019 -2023	31 km E	NDDEQ
Upper Air	Bismarck, ND	24011	2019 - 2023	254 km SE	NDDEQ

* Approximate distances using Google Earth's measuring tool.

5.3 Surface Inputs

AERMET relies on certain key values, including surface roughness length, albedo, and Bowen ratio when pre-processing met data for use in AERMOD.

AERSURFACE allows users to generate these values based on inputs related to seasonal variation in the vegetative landscape (e.g., landcover). To facilitate this process, the Department has compiled a set of recommended inputs specifically designed for various regions within the state. These recommendations are outlined in the document titled *"Recommended AERSURFACE Inputs North Dakota* (March 2017)".[9]

[9] Available at: https://deq.nd.gov/publications/AQ/policy/Modeling/AERSURFACE_InputsND.pdf (Last visited October 24, 2025)

Table 8 - AERSURFACE Input Values

Parameter	Value Used
Radius of study area used for surface roughness:	1.0 km
Define the surface roughness length for multiple sectors?	Yes
Number of sectors:	12
Temporal resolution of surface characteristics	Monthly
Continuous snow cover for at least one month?	Yes
Reassign the months to different seasons?	Yes
Specify months for each season:	Yes
Late autumn after frost and harvest, or winter with no snow	Oct, Nov, Dec, Mar
Winter with continuous snow cover	Jan, Feb
Transitional spring	Apr, May
Midsummer with lush vegetation	Jun, Jul, Aug
Autumn with unharvested cropland	Sep
Is this site at an airport?	Yes
Is the site in an arid region?	No
Surface moisture condition at the site:	Average

5.4 Receptor Grid

Receptors serve as the designated locations where the air quality model calculates ground-level pollutant concentrations. These receptors are strategically placed within a receptor grid, and their distribution is determined by factors such as terrain characteristics and pollutant emission rates. While the exact configuration may vary, it typically forms a rectangular pattern radiating outward from the emission source. The goal is to ensure that the receptor grid effectively captures the dispersion and distribution of pollutants in the vicinity of the facility, as this is where the predicted maximum concentrations are likely to occur.

Further specifics on the receptor grid are shown in Table 9.

Table 9 - Receptor Grid Spacing

Distance Out From Source	Distance Between Receptors
Fence line	25 meters
0 to 1000 meters (0 to 1.0 km)	50 meters
1,001 to 2,000 (1 to 2 km)	100 meters
2,001 to 5,000 meters (2 to 5 km)	250 meters
5,001 to 10,000 meters (5 to 10 km)	500 meters
10,000 to 30,000 meters (10 to 30 km)	1000 meters
TOTAL NUMBER OF RECEPTORS	5,340

The receptor points are placed at ground level, and their elevation is determined using the United States Geological Survey (USGS) National Elevation Dataset (NED) terrain and land-use data. The Universal Transverse Mercator (UTM) map projection with the North American Datum of 1983 (NAD83) is used for both the source input locations and the receptor grid location. To ensure accurate placement at ground level, the USGS NED 2017 data at a 1/3 arcsecond (10-meter) resolution is processed through the AERMAP pre-processor. This pre-processor adjusts the receptor points' elevations based on terrain data, aligning them with the actual topography of the area.

Receptor points located within the plant boundary are not modeled, as they do not represent ambient air.[10] Ambient air is defined as air situated outside of a boundary (e.g., a fence), which restricts general public access to a facility or source. Basin will utilize fencing, signage, or other approved techniques around the plant boundary to preclude access to the general public. This exclusion ensures that the modeling analysis focuses on assessing the impact of emissions on the air quality in areas accessible to the public.

5.5 Background

Basin used fixed background concentrations to predict the total ambient effect on AAQ. These fixed background concentrations are not included as inputs in the modeling process, and as a result, they are not included in the values output for concentrations (i.e., not included in Modeled Impact, but added in after under the Total Impact in Table 1 and Table 17). Fixed background concentrations shown in Table 10 are considered reasonably representative of the entire state, and while they are conservative, they play a significant role in ensuring a comprehensive and conservative assessment of the total ambient effect on AAQS due to emissions from the facility. To demonstrate the conservative nature of the fixed values the Department evaluated ambient concentrations from the Theodore Roosevelt National Park (TRNP) and the Lostwood National Wildlife Refuge (NWR) ambient monitors. While these areas will include some

[10] *§40 CFR 50.1(e).* Available at: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-50/section-50.1 (Last visited October 24, 2025)

anthropogenic contributions, they are low population areas that are closest to true representations of background in North Dakota. Ambient data was acquired from the EPA Outdoor Air Quality data[11] and averaged over the 5-year period from 2018-2022. An average of the ambient data is most representative of a background concentration. Table 11 shows that the Department's fixed ambient background concentrations are conservative in comparison to the ambient air concentrations.

Table 10 - Fixed Background Concentrations[12]

Pollutant	Averaging Time	Background ($\mu g/m^3$)
PM_{10}	24-HR	30
$PM_{2.5}$	Annual	4.75
	24-HR	13.7
SO_2	Annual	3
	24-HR	9
	3-HR	11
	1-HR	13
NO_2	Annual	5
	1-HR	35
CO	8-HR	1,149
	1-HR	1,149

Table 11: Ambient Air Concentrations 2018-2022

Parameter	**PM_{10}**	**$PM_{2.5}$**		**SO_2**		**CO**	**NO_2**	
Averaging Period	24-hr	24-hr	Annual	1-hr	Annual	8-hr	1-hr	Annual
Monitoring Stations in North Dakota's Highest Population Areas – 5-Year Average (2018-2022)								
Fargo	12.44	7.54	5.58	3.11	0.84	-	33.61	4.17
Bismarck	19.45	6.99	6.46	11.11	0.41	221.28	34.56	4.71
Monitoring Stations in North Dakota's Lower Population Areas – 5-Year Average (2018-2022)								
TRNP	-	4.35	4.35	4.33	1.35	-	9.89	1.46
Lostwood NWR	11.36	-	-	-	-	-	-	-
Background	**30.00**	**13.70**	**4.75**	**13.00**	**3.00**	**1149.00**	**35.00**	**5.00**

Sources: https://www.epa.gov/outdoor-air-quality-data/download-daily-data
https://www.epa.gov/outdoor-air-quality-data/monitor-values-report

5.5.1 Nearby Sources

The Department reviewed records pertaining to sources that could potentially share a significant concentration gradient with the proposed Basin facility in North Dakota. Air dispersion models were

[11] Available at: https://www.epa.gov/outdoor-air-quality-data/download-daily-data (Last visited October 24, 2025)
[12] Available at: https://deq.nd.gov/publications/AQ/policy/Modeling/ND_Air_Dispersion_Modeling_Guide.pdf (Last visited October 24, 2025)

conducted to analyze potentially significant sources within 20 km of the proposed facility and evaluate major sources within 50 km. Of the sources evaluated, eight were identified as potentially sharing a significant NO_2 concentration gradient. One facility was identified for PM and SO_2. The facilities included in the cumulative analysis are listed in Table 12, with the modeling parameters listed in Table 16.

Table 12 – Nearby Sources Sharing Significant Concentration Gradient

Facility	Location	Source Type
Nesson Gathering System, LLC - Rough Rider Compressor Station	Williston, Williams County, ND	Compressor Station
1804 Ltd. LLC - Springbrook Gas Plant	Williston, Williams County, ND	Natural Gas Processing
Hess Tioga Gas Plant LLC - Tioga Gas Plant	Tioga, Williams County, ND	Natural Gas Processing
Nesson Gathering System, LLC - Nesson Gas Plant	Tioga, Williams County, ND	Natural Gas Processing
ONEOK Rockies Midstream, L.L.C. - Epping Compressor Station	Epping, Williams County, ND	Compressor Station
1804 Ltd. LLC - Stockyard Creek Compressor Station	Springbrook, Williams County, ND	Compressor Station
Hess North Dakota Pipelines LLC - Wheelock Compressor Station	Ray, Williams County, ND	Compressor Station
Hiland Partners Holdings LLC - Sacramento Compressor Station	Tioga, Williams County, ND	Compressor Station

5.6 Emission Source Modeling Parameters

AERMOD requires specific source data to model air pollutant dispersion accurately. This data includes:

1. Type and location of each emission point
2. Base elevation of each stack
3. Emission height and rate
4. Gas exit velocity and temperature
5. Other stack/emission parameters depending upon source type

To ensure the accuracy of model input values, a comparison was made between the emission rates and stack parameters provided in the application and the corresponding information in the modeling files. A conservative modeling approach was taken with this project, with multiple modeling scenarios being conducted for the natural gas combustion turbines at full and partial loads to ensure that the operation of the project will not result in impacts which violate the NAAQS and PSD Increments. Emission rates represent projected worst-case ambient conditions under various operating loads and include start-up and shutdown emissions. Annual emissions are based on worst-case annual emissions. The modeling parameters for Basin's point sources are shown in Table 13 and Table 14. Table 13 details the different operating scenarios for the natural gas turbines. Volume source parameters are detailed in Table 15 with further detail located in Section 6.3.2 of the permit application.

Table 13 - Combustion Turbine Emissions and Modeling Parameters lists the model input parameters for emission rates of each scenario, stack temperature, exit velocity, location (UTM X-Y coordinates), height (i.e., release height), and stack exit diameter for the combustion turbines at the Basin facility.

Table 14 - Auxiliary Equipment and Modeling Parameters lists the model input parameters for emission rates, stack temperature, exit velocity, height (i.e., release height), and stack exit diameter for the auxiliary equipment at the Basin facility.

Table 15Table 15 – Volume Source Parameters and Emission Rates lists the volume source parameters for relative height, initial lateral dimension, initial vertical dimension, and emission rates at the Basin facility.

Table 16 - Nearby Source Parameters and Emission Rates lists the model input parameters for location (UTM X-Y coordinates), elevation, height (i.e., release height), exit temperature, exit velocity, stack exit diameter, stack exit orientation, and emission rates at the nearby facilities identified in Table 12.

Table 13 - Combustion Turbine Emissions and Modeling Parameters

Pollutant	Averaging Period	Units	100% Load With Duct Firing	100% Load	75% Load	MECL Load	Start-up/ Shutdown
NO2	1-HR	lb/hr	39.5	31.2	28.25	17.76	1218
	Annual		63.23	63.23	63.23	63.23	63.23
CO	1-HR		19.24	14.25	12.9	8.11	3778
	8-HR						
PM10/PM2.5	24-HR		54.81	37.84	34.5	33.55	37.84
	Annual						
SO2	1, 3, 24-HR, Annual		7.4	5.85	5.29	5.71	5.85
Stack Parameters							
Stack temperature (F)			165.00	171.90	164.98	165.00	171.61
Exit velocity (ft/s)			66.48	67.20	49.93	48.40	66.42
UTM X, Y Coordinates (m)			625157.49, 625153.75		5353691.58, 5353844		
Stack height (ft)			250.00				
Exit diameter (ft)			23.75				

Table 14 - Auxiliary Equipment and Modeling Parameters

Pollutant	Averaging Period	Units	Auxiliary Boiler [A]	Natural Gas Heaters [B]
NO2	1-HR	lb/hr	2.74	0.15
	Annual		0.63	0.15
CO	1-HR		9.21	0.56
	8-HR			
PM10/PM2.5	24-HR		1.86	0.11
	Annual			
SO2	1, 3, 24-HR, Annual		0.15	0.0089
Stack Parameters				
Stack temperature (F)			300.00	350.00
Exit velocity (ft/s)			50.00	14.65
Stack height (ft)			165.00	20.00
Exit diameter (ft)			6.00	2.67

[A] Auxiliary boiler located at UTM X-Y (625159.07, 5353737.46)

[B] Natural gas heaters located at UTM X-Y (625081.34, 5353529.97), (625067.60, 5353529.63), (625053.90, 5353529.30)

Table 15 – Volume Source Parameters and Emission Rates

Emission Points	Emission Point Description	Relative Height (ft)	Initial Lateral (ft)	Initial Vertical (ft)	PM_{10} (lb/hr)	$PM_{2.5}$ (lb/hr)
HR_0001-HR_0199	Haul Roads	10.203	18.47	9.48	0.00215	0.000527

Table 16 - Nearby Source Parameters and Emission Rates

Emission Point	Emission Point Description	UTM X (m)	UTM Y (m)	Elev. (m)	Height (ft)	Temp (F)	Velocity (ft/s)	Exit Dia. (ft)	Orient. (vert/horiz)	NOx (lb/hr)	$PM_{2.5}$ (lb/hr)	SO_2 (lb/hr)
RRW1	Rough Rider - Williston - Reboiler	591923.3	5330851.0	615.59	24.00	1000	3.77	2.00	Vertical	0.03	-	-
RRW2	Rough Rider - Williston - Heater	591923.3	5330851.0	615.59	24.00	800	172.40	2.00	Vertical	0.21	-	-
RRW3	Rough Rider - Williston - Engine #1	591923.3	5330851.0	615.59	33.00	816	97.54	1.33	Vertical	1.52	-	-
RRW4	Rough Rider - Williston - Engine #2	591923.3	5330851.0	615.59	33.00	816	97.54	1.33	Vertical	1.52	-	-
RRW5	Rough Rider - Williston - Engine #3	591923.3	5330851.0	615.59	33.00	816	97.54	1.33	Vertical	1.52	-	-
RRW6	Rough Rider - Williston - Engine #4	591923.3	5330851.0	615.59	33.00	816	97.54	1.33	Vertical	1.52	-	-
RRW7	Rough Rider - Williston - Engine #5	591923.3	5330851.0	615.59	33.00	816	97.54	1.33	Vertical	1.52	-	-
RRW8	Rough Rider - Williston - Engine #6	591923.3	5330851.0	615.59	33.00	816	97.54	1.33	Vertical	1.52	-	-
RRW9	Rough Rider - Williston - Engine #7	591923.3	5330851.0	615.59	33.00	816	97.54	1.33	Vertical	1.52	-	-
RRW10	Rough Rider - Williston - Engine #8	591923.3	5330851.0	615.59	33.00	816	97.54	1.33	Vertical	1.52	-	-
RRW11	Rough Rider - Williston - Combustor	591923.3	5330851.0	615.59	8.50	180	7.50	2.50	Vertical	0.06	-	-
SG1	1804 Springbrook Gas - Engine #1	610020.2	5342787.3	647.60	46.50	990	114.00	1.30	Vertical	2.76	-	-
SG2	1804 Springbrook Gas - Engine #2	610020.3	5342779.2	647.66	46.50	990	114.00	1.30	Vertical	1.86	-	-
SG3	1804 Springbrook Gas - Engine #3	610014.5	5342928.8	646.07	24.00	842	122.00	1.60	Vertical	0.67	-	-
SG4	1804 Springbrook Gas - Engine #4	610014.8	5342912.5	646.21	46.50	877	121.10	1.60	Vertical	0.95	-	-
SG5	1804 Springbrook Gas - Engine #5	610015.0	5342901.5	646.40	46.50	878	193.10	1.30	Vertical	1.23	-	-
SG6	1804 Springbrook Gas - Engine #6	609985.3	5342938.3	645.49	28.60	813	91.60	1.60	Vertical	1.16	-	-
SG7	1804 Springbrook Gas - Engine #7	609964.4	5342867.6	646.77	46.50	1012	138.30	1.00	Vertical	0.87	-	-

Emission Point	Emission Point Description	UTM X (m)	UTM Y (m)	Elev. (m)	Height (ft)	Temp (F)	Velocity (ft/s)	Exit Dia. (ft)	Orient. (vert/horiz)	NOx (lb/hr)	$PM_{2.5}$ (lb/hr)	SO_2 (lb/hr)
SG8	1804 Springbrook Gas - Engine #8	609957.7	5342867.5	646.76	46.50	1012	138.90	1.00	Vertical	0.90	-	-
SG9	1804 Springbrook Gas - Engine #9	610015.2	5342893.6	646.57	46.50	992	168.70	1.00	Vertical	0.93	-	-
SG10	1804 Springbrook Gas - Engine #10	610015.3	5342884.9	646.71	46.50	992	168.60	1.00	Vertical	0.96	-	-
SG11	1804 Springbrook Gas - Engine #11	610015.5	5342875.7	646.79	46.50	999	168.30	1.00	Vertical	0.78	-	-
SG12	1804 Springbrook Gas - Reboiler	609939.4	5342934.5	645.00	12.00	800	371.10	1.00	Vertical	0.14	-	-
SG14	1804 Springbrook Gas - Oil heater #1	609939.1	5342948.0	644.58	14.00	500	11.30	2.60	Vertical	0.93	-	-
SG15	1804 Springbrook Gas - Oil heater #2	609939.1	5342948.0	644.58	15.00	500	101.80	1.00	Vertical	0.23	-	-
TG1	Hess - Tioga Gas Plant - Boiler #1	654389.3	5362817.6	683.85	50.00	395	31.48	2.25	Vertical	1.20	-	-
TG2	Hess - Tioga Gas Plant - Boiler #2	654389.3	5362817.6	683.85	50.00	395	31.48	2.25	Vertical	0.85	-	-
TG3	Hess - Tioga Gas Plant - Boiler #3	654389.3	5362817.6	683.85	50.00	395	31.48	2.25	Vertical	0.71	-	-
TG4	Hess - Tioga Gas Plant - Boiler #4	654389.3	5362817.6	683.85	50.00	395	31.48	2.25	Vertical	1.97	-	-
TG5	Hess - Tioga Gas Plant - Heater #1	654389.3	5362817.6	683.85	118.00	437	4.00	4.10	Vertical	0.68	-	-
TG6	Hess - Tioga Gas Plant - Heater #2	654389.3	5362817.6	683.85	137.00	441	16.00	6.83	Vertical	4.22	-	-
TG7	Hess - Tioga Gas Plant - Heater #3	654389.3	5362817.6	683.85	137.00	441	16.00	6.83	Vertical	4.22	-	-
TG14	Hess - Tioga Gas Plant - Turbine #1	654389.3	5362817.6	683.85	40.00	800	21.93	3.00	Vertical	2.05	-	-
TG15	Hess - Tioga Gas Plant - Turbine #2	654389.3	5362817.6	683.85	40.00	800	21.93	3.00	Vertical	2.46	-	-
TG16	Hess - Tioga Gas Plant - Turbine #3	654389.3	5362817.6	683.85	40.00	800	21.93	3.00	Vertical	1.46	-	-
NGP1	Nesson Gas Plant - Engine #2	645082.3	5358751.9	726.74	32.00	731	52.18	1.25	Vertical	1.07	0.12	0.13
NGP2	Nesson Gas Plant - Engine #3	645096.3	5358752.0	728.34	32.00	759	81.47	1.31	Vertical	1.57	0.11	0.13
NGP3	Nesson Gas Plant - Engine #4	645110.4	5358753.0	728.79	32.00	767	91.19	1.29	Vertical	0.84	0.11	0.13
NGP4	Nesson Gas Plant - Engine #5	645123.8	5358753.9	727.62	32.00	615	72.29	1.38	Vertical	0.70	0.12	0.13
NGP5	Nesson Gas Plant - Engine #6	645137.6	5358753.7	726.27	32.00	618	75.35	1.38	Vertical	0.79	0.12	0.13
NGP6	Nesson Gas Plant - Heater #1	645024.0	5358688.8	725.95	24.67	427	11.41	1.29	Vertical	0.28	0.03	0.04
NGP7	Nesson Gas Plant - Heater #2	645024.0	5358671.2	726.07	48.50	471	17.00	1.96	Vertical	1.46	0.09	0.13
NGP8	Nesson Gas Plant - Oil Heater #1	645108.0	5358665.0	725.52	38.75	538	22.00	2.00	Vertical	1.71	0.12	0.16
NGP9	Nesson Gas Plant - Oil Heater #2	645108.0	5358665.0	725.52	30.83	502	29.00	2.30	Vertical	3.38	0.21	0.19

Emission Point	Emission Point Description	UTM X (m)	UTM Y (m)	Elev. (m)	Height (ft)	Temp (F)	Velocity (ft/s)	Exit Dia. (ft)	Orient. (vert/horiz)	NOx (lb/hr)	$PM_{2.5}$ (lb/hr)	SO_2 (lb/hr)
EC1	ONEOK - Epping Compressor - Engine #1	624110.3	5346197.9	673.20	44.50	1005	135.97	1.20	Vertical	0.74	-	-
EC2	ONEOK - Epping Compressor - Engine #2	624123.5	5346203.7	673.12	44.50	1005	135.97	1.20	Vertical	0.88	-	-
EC3	ONEOK - Epping Compressor - Engine #3	624134.0	5346202.9	673.03	44.50	1005	135.97	1.20	Vertical	1.15	-	-
EC4	ONEOK - Epping Compressor - Engine #4	624152.5	5346202.2	672.89	44.50	1005	135.97	1.20	Vertical	1.19	-	-
EC5	ONEOK - Epping Compressor - Engine #5	624163.6	5346204.6	672.82	44.50	1005	135.97	1.20	Vertical	1.02	-	-
EC6	ONEOK - Epping Compressor - Engine #6	624177.0	5346203.8	672.72	44.50	1005	135.97	1.20	Vertical	0.82	-	-
SCC1	1804 - Stockyard Creek Compressor - Engine #1	617056.3	5333132.6	724.25	28.00	690	6.66	2.00	Vertical	0.52	-	-
SCC2	1804 - Stockyard Creek Compressor - Engine #2	617056.5	5333140.4	725.13	28.00	765	6.16	2.00	Vertical	1.64	-	-
SCC3	1804 - Stockyard Creek Compressor - Engine #3	617055.6	5333148.4	725.96	28.00	961	0.79	2.00	Vertical	0.08	-	-
SCC4	1804 - Stockyard Creek Compressor - Engine #4	617063.0	5333140.1	724.92	28.00	1041	0.78	2.00	Vertical	0.09	-	-
SCC5	1804 - Stockyard Creek Compressor - Reboiler	617118.1	5333104.8	722.38	7.90	800	127.99	0.43	Vertical	0.11	-	-
WC1	Wheelock Compressor Station - Engine #1	632483.1	5359183.7	726.89	9.50	750	127.95	3.00	Vertical	1.17	-	-
WC2	Wheelock Compressor Station - Engine #2	632468.4	5359183.8	726.30	9.50	750	127.95	3.00	Vertical	0.85	-	-
WC3	Wheelock Compressor Station - Engine #3	632453.6	5359183.0	726.12	9.50	750	127.95	3.00	Vertical	0.97	-	-
WC4	Wheelock Compressor Station - Dehydrator	632473.7	5359148.2	725.49	18.00	800	8.20	0.90	Vertical	0.06	-	-
HS1	Highland - Sacramento CS - TEG Reboiler	627794.1	5344634.7	697.94	32.00	400	9.34	1.00	Vertical	0.06	-	-
HS2	Highland - Sacramento CS - Engine #1	627794.1	5344634.7	697.94	40.00	1149	184.26	1.00	Vertical	0.27	-	-
HS3	Highland - Sacramento CS - Engine #2	627794.1	5344634.7	697.94	40.00	1149	184.26	1.00	Vertical	0.25	-	-
HS4	Highland - Sacramento CS - Engine #3	627794.1	5344634.7	697.94	40.00	1149	184.26	1.00	Vertical	0.20	-	-
HS5	Highland - Sacramento CS - Engine #4	627794.1	5344634.7	697.94	40.00	1149	184.26	1.00	Vertical	0.27	-	-
HS6	Highland - Sacramento CS - Engine #5	627794.1	5344634.7	697.94	40.00	1149	184.26	1.00	Vertical	0.12	-	-
HS7	Highland - Sacramento CS - Engine #6	627794.1	5344634.7	697.94	40.00	1149	184.26	1.00	Vertical	0.17	-	-

6 Model Execution and Results

6.1 Single-Source Impact Analysis (AAQS & PSD Increments)

A single-source impact analysis (SSIA) may be conducted at a facility on a pollutant-by-pollutant basis to determine if a full cumulative analysis for individual pollutants is required. A SSIA compares the modeled impact of the standalone project against the applicable SIL; see Table 17 for a listing of Class II and NAAQS SILs. If the SSIA is below the NAAQS and Class II PSD Increment SILs, the analysis demonstrates the project is not expected to cause or contribute to a NAAQS or PSD increment violation.

Basin conducted an SSIA for CO, NO_2, PM_{10}, $PM_{2.5}$, and SO_2. The NAAQS and Class II PSD Increment SSIA results are shown in Table 17 below. SO_2, Annual NO_2, and CO were all below SIL levels and did not require a cumulative analysis.

Table 17 -Single Source Impacts Analysis Results

Pollutant	Averaging Time	Maximum Modeled Impact (µg/m³)	AAQS SIL[13] (µg/m³)	PSD Class II SIL[14] (µg/m³)	NAAQS/NDAAQS Modeling Required (Y/N)	PSD Modeling Required (Y/N)
PM_{10}	Annual	2.17	-	1.00	N	Y
	24-HR	11.40	5.00	5.00	Y	Y
$PM_{2.5}$[A]	Annual	0.65	0.13[15]	0.13[15]	Y	Y
	24-HR	5.56	1.20	1.20	Y	Y
SO_2	Annual	0.06	1.00	1.00	N	N
	24-HR	1.06	5.00	5.00	N	N
	3-HR	1.90	25.00	25.00	N	N
	1-HR	1.97	7.80	-	N	N
NO_2	Annual	0.92	1.00	1.00	N	N
	1-HR	148.90	7.50	-	Y	N
CO	8-HR	228.70	500.00	-	N	N
	1-HR	1012.00	2000.00	-	N	N

[A] Secondary formation of $PM_{2.5}$ included in Maximum Modeled Impact

[13] NAAQS SILs can be found in NDAC 33.1-15-14-02.5a. Available at: https://www.ndlegis.gov/information/acdata/pdf/33.1-15-14.pdf (Last visited October 29, 2025)

[14] *§40 CFR 51.165(b)(2)* Available at: https://www.ecfr.gov/current/title-40/part-51/subpart-I#p-51.165(b)(2) (Last visited October 29, 2025)

[15]SIL found in *Updates to the Guidance for Ozone and Fine Particulate Matter Permit Modeling* Available at: https://www.epa.gov/system/files/documents/2024-05/clarification-memorandum-o3-pm25-permit-modeling-guidance-04302024.pdf (Last visited October 29, 2025)

6.1.1 $PM_{2.5}$ Secondary Formation

The secondary formation of $PM_{2.5}$ resulting from emissions of precursor pollutants NO_x and SO_2 was accounted for by utilizing the following equation:

$$\text{Project Impact } (\mu g/m^3) = \text{Project Emission Rate (tpy)} \times \frac{\text{Modeled Impact from Hypothetical Source } (\mu g/m3)}{\text{Modeled Emission Rate from Hypothetical Source (tpy)}}$$

Basin's PTE of 614 tons per year and 66 tons per year of NO_x and SO_2, respectively, were utilized along with a hypothetical representative source in Williams County, ND from the EPA's database of modeled sources.[16] Class I secondary formation calculations utilized a hypothetical Williams County source data at a distance of 60 km. The nearest Class I area to the facility is 73 km. Both calculations used 1,000 ton per year and 10 m stack data. The resulting project impact values are shown in Table 18 and Table 19. For a more in-depth examination of the Modeled Emission Rates for Precursors (MERPs) calculations, refer to Section 6.4 of the permit application.

Table 18 - $PM_{2.5}$ MERPs Summary

Averaging Period	Precursor	Calculated Impact (µg/m3)	Cumulative Impact (µg/m3)
24-Hour	NO_x	0.066	0.136
	SO_2	0.07	
Annual	NO_x	0.00406	0.00531
	SO_2	0.00125	

Table 19 - Class I $PM_{2.5}$ MERPs Summary

Averaging Period	Precursor	Calculated Impact (µg/m3)	Cumulative Impact (µg/m3)
24-Hour	NO_x	0.045	0.069
	SO_2	0.024	
Annual	NO_x	0.0018	0.0021
	SO_2	0.0003	

[16] Available at: https://www.epa.gov/scram/merps-view-qlik (Last visited October 24, 2025)

6.1.2 O_3 Secondary Formation

The secondary formation of O_3 resulting from emissions of precursor pollutants NO_x and VOC was accounted for by utilizing the same equation used for the $PM_{2.5}$ secondary formation calculation. Basin's PTE of 614 tons per year and 416 tons per year of NO_x and VOC, respectively, were utilized along with a hypothetical representative source in Williams County, ND from the EPA's database of modeled sources. The final project impacts were determined through a comparison of the calculated MERPs to design concentration monitoring data. For a more in-depth examination of MERPs calculations, refer to Section 6.4.3 of the permit application.

Table 20 - O_3 MERPs Summary

Averaging Period	Precursor	Calculated Impact (ppb)	Cumulative Impact (ppb)
24-Hour	NO_x	1.025	1.118
	VOC	0.093	

Table 21 shows a summary of the 4th-high 8-hour O_3 monitoring data for the nearest representative site in North Dakota.[17] The 3-year average O_3 concentration recorded for Burke County in North Dakota is 0.060 ppm. Adding the calculated O_3 MERPs of 0.0011 ppm (1.1 ppb) to the monitoring data results in a total O_3 concentration of 0.0611 ppm. The total O_3 concentration remains below the design concentration of 0.07 ppm for O_3, demonstrating compliance with the NAAQS.

Table 21 - O_3 Monitoring Data Summary

County	2022 (ppm)	2023 (ppm)	2024 (ppm)	3-Year Average (ppm)
Burke	0.053	0.072	0.056	0.060

6.2 Ambient Air Quality Standards (AAQS) and PSD Increment Analysis

State[18] and federal[19] AAQS and the Class II PSD Increment analyses were modeled per the parameters listed in Section 5.6. The model analysis results are shown in Table 22 and Table 23. SO_2, Annual NO_2, and CO were all below SIL levels and were not included in the cumulative analysis. NO_2 modeling utilized Tier II of the Ambient Ratio Method (ARM2). Default minimum and maximum ratios of 0.5 and 0.9 were applied to determine the predicted ground-level concentration of NO_2.

[17] *Outdoor Air Quality Data - Monitor Value Report.* Available at: https://www.epa.gov/outdoor-air-quality-data/monitor-values-report (Last visited October 24, 2025)
[18] *NDAC 33.1-15-02*. Available at: https://www.ndlegis.gov/information/acdata/pdf/33.1-15-02.pdf?20150602082326 (Last visited October 24, 2025)
[19] *§40 CFR 50.* Available at: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-50?toc=1 (Last visited October 24, 2025)

Table 22 – AAQS Results Summary

Pollutant	Averaging Time	Modeled Impact (µg/m^3)	Background (µg/m^3)	Total Impact (µg/m^3)	NDAAQS (µg/m^3)	NAAQS (µg/m^3)	Passed (Y/N)
PM_{10}	24-HR[A]	9.03	30	39.03	150	150	Y
$PM_{2.5}$	Annual[B]	0.64	4.76 [E]	5.40	-	9	Y
	24-HR[C]	2.80	13.836 [F]	16.64	-	35	Y
NO_2	1-HR[D]	138.3	35	173.30	-	188	Y

[A] Modeled concentration is the highest-sixth-highest 24-hour average across five years of meteorological data.
[B] Modeled concentration is the highest annual average concentration of five modeled years of meteorological data.
[C] Modeled concentration is the 98th percentile (eighth-high) of the annual distribution of maximum 24-hour concentrations averaged across five years of meteorological data.
[D] Modeled concentration is the 98th percentile (eighth-high) of the annual distribution of daily maximum 1-hr concentrations averaged across five years of meteorological data.
[E] Includes MERP adjustment of 0.005 µg/m3 to account for secondary formation.
[F] Includes MERP adjustment of 0.14 µg/m3 to account for secondary formation.

Table 23 – PSD Class II Increment Results Summary

Pollutant	Averaging Time	Modeled Impact (µg/m^3)	Class II Increment (µg/m^3)	Increment Consumed	Passed (Y/N)
PM_{10}	Annual[A]	2.17	17	13%	Y
	24-HR[B]	9.53	30	32%	Y
$PM_{2.5}$	Annual[A]	0.69 [C]	4	17%	Y
	24-HR[B]	6.40 [D]	9	71%	Y

[A] Modeled concentration is the highest annual average concentration of five modeled years of meteorological data.
[B] Modeled concentration is the highest-second-high concentration of five modeled years of meteorological data.
[C] Includes MERP adjustment of 0.005 µg/m3 to account for secondary formation.
[D] Includes MERP adjustment of 0.14 µg/m3 to account for secondary formation.

7 Class I Area Modeling

7.1 Background

The proposed Basin facility is in proximity to several Class I areas: Fort Peck Indian Reservation (Fort Peck), Medicine Lake National Wildlife Refuge (Medicine Lake), Theodore Roosevelt National Park (TRNP), and Lostwood National Wildlife Refuge (Lostwood). The distance of these Class I areas to the Basin facility is shown in Table 5. Due to the 50 km modeling limitation of AERMOD, CALPUFF software was used for the Class I analysis, following the FLAG 2010 guidance document.[20,21] The National Park

[20] *Federal Land Managers' Air Quality Related Values Work Group (FLAG) Phase I Report* Available at: https://www.nps.gov/subjects/air/permitresources.htm (Last visited October 24, 2025)
[21] *Federal Land Managers' Interagency Guidance for Nitrogen and Sulfur Deposition Analyses: https://www.nps.gov/subjects/air/permitresources.htm* (Last visited October 24, 2025)

Service and U.S. Fish and Wildlife Service reviewed the modeling methodologies and results and requested no further analysis.

The analysis evaluated four key impacts for each Class I area: ambient air quality, visibility, ozone, and deposition of nitrogen and sulfur. The results are summarized below, with more detailed information available in the PSD Class I Visibility and Deposition Modeling Report and the PSD Class I Increment Modeling Report included in the permit application.

7.2 CALPUFF Meteorological Data

A CALPUFF-ready Weather Research and Forecasting (WRF) dataset with a horizontal grid spacing of 12 km was utilized. That data consisted of 3 years of hourly output data from 2019-2021. The National Park Service and U.S. Fish and Wildlife Service provided input regarding the development of the meteorological data and did not request any further analysis after final review.

7.3 Class I Increment Significant Impact Levels

Modeling was conducted to determine if the project's impacts were below Class I Significant Impact Levels (SILs). The results of this evaluation are shown in Table 24. Further details of the modeling evaluation are provided in Section 6.8 of the permit application and the PSD Class I Increment Modeling Report. PM_{10} and $PM_{2.5}$ 24-HR concentrations were modeled using CALPUFF. All other pollutants and averaging times were modeled using AERMOD with receptors placed in a ring 50 km from the facility site. 50 km is the maximum recommended range for AERMOD, and all Class I areas were located further than 50 km. The modeled impacts included secondary formation for $PM_{2.5}$ based on MERPs and did not exceed the respective Class I SILs at any of the evaluated Class I areas.

Table 24 - Significant Impact Level (SIL) Modeling Summary

Pollutant	Averaging Time	Class I SIL (µg/m^3)	Maximum Modeled Concentration (µg/m^3)^A			
			Medicine Lake	Fort Peck	TRNP	Lostwood
NO_2	Annual	0.1	0.016	0.015	0.019	0.018
PM_{10}	Annual	0.2	0.013	0.012	0.015	0.014
	24-HR	0.3	0.07	0.05	0.04	0.05
$PM_{2.5}$	Annual	0.03	0.015	0.014	0.017	0.016
	24-HR	0.27	0.2	0.17	0.14	0.14
SO_2	Annual	0.1	0.002	0.002	0.002	0.002
	24-HR	0.2	0.04	0.03	0.04	0.04
	3-HR	1	0.11	0.1	0.12	0.12

A Modeled level includes the secondary formation of $PM_{2.5}$ determined via MERPs (Table 19)

7.4 Acid Deposition Impacts Analysis

An evaluation of potential impacts on species (flora and fauna) and ecosystems (terrestrial and aquatic) resulting from Basin's SO2 and NOx emissions was conducted per the "Federal Land Managers'

Interagency Guidance for Nitrogen and Sulfur Deposition Analyses."[22] The results are shown in Table 25, with further analysis details provided in PSD Class I Visibility and Deposition Modeling Report in the permit application. The modeled results do not exceed the Deposition Analysis Thresholds (DATs) for any of the evaluated Class I areas.

Table 25 - Screening Analysis Results for Deposition Effects

Class I Area	Year	Project Nitrogen Deposition Rate	Project Sulfur Deposition Rate	Deposition Analysis Threshold[A]
		kilograms per hectare per year (kg/ha/yr)		
Medicine Lake Wilderness	2019	0.0009	0.0005	0.005
	2020	0.0004	0.0001	
	2021	0.0008	0.0004	
Fort Peck	2019	0.0009	0.0005	
	2020	0.0003	0.0001	
	2021	0.0008	0.0004	
Theodore Roosevelt National Park	2019	0.0008	0.0003	
	2020	0.0005	0.0002	
	2021	0.0006	0.0002	
Lostwood Wilderness	2019	0.0008	0.0003	
	2020	0.0007	0.0003	
	2021	0.0009	0.0003	

[A] Deposition Analysis Thresholds based on FLM guidance for the western U.S.

7.5 Visibility Impacts Analysis

The visibility impact analysis followed FLAG guidance[23], with further details available in the PSD Class I Visibility and Deposition Modeling Report in the permit application. Visibility impairment processing was carried out using the CALPOST post-processor using Method 8. The 98th percentile in light extinction was calculated and compared to the level of acceptable change of 5.0%. Table 26 shows these results. The visibility impacts are well below the level of acceptable change and demonstrate that the facility will not have adverse visibility impacts on any of the Class I areas.

[22] *Federal Land Managers' Interagency Guidance for Nitrogen and Sulfur Deposition Analyses:* *https://www.nps.gov/subjects/air/permitresources.htm* (Last visited October 24, 2025)
[23] *Federal Land Managers' Air Quality Related Values Work Group (FLAG) Phase I Report* Available at: https://www.nps.gov/subjects/air/permitresources.htm (Last visited October 24, 2025)

Table 26 - Modeled Visibility Impacts

Class I Area	Year	Maximum 98th Percentile Change in Light Extinction
Medicine Lake Wilderness	2019	1.9
	2020	1.4
	2021	1.5
Fort Peck	2019	2.6
	2020	1.9
	2021	2
Theodore Roosevelt National Park	2019	1.7
	2020	1.3
	2021	1.6
Lostwood Wilderness	2019	1.1
	2020	1.5
	2021	1.2

8 Summary & Conclusions

Upon the Department's review and independent analysis of the modeling submitted by Basin, the following is concluded:

Basin followed all applicable State and Federal guidance in their modeling protocol.

Basin's dispersion modeling was conducted to demonstrate that emissions from the Project are expected to comply with state and federal Ambient Air Quality Standards (AAQS). Emissions associated with operating the facility with the proposed emission units and limits are not expected to cause or contribute to a violation of the NAAQS and NDAAQS as listed in NDAC 33.1-15-02-04. Results of the modeled impacts for the AAQS are displayed in Table 1 and Table 22.

Basin's modeling was conducted to demonstrate that emissions from the Project are expected to comply with federal PSD Class II and Class I Increments. Emissions associated with operating the facility with the proposed emission units and limits are not expected to cause or contribute to a violation of the PSD Increments as incorporated by reference in NDAC 33.1-15-15. Results of the modeled impacts for the Class II PSD Increments are displayed in Table 2 and Table 23.

Basin's CALPUFF modeling analysis demonstrated that the predicted impacts from the new facility will not prevent the attainment or maintenance of any ambient air quality standard and will not exceed any applicable AQRV screening thresholds at a Class I area. The Class I modeling results for SILs, deposition, and visibility impacts are displayed in Table 24, Table 25, and Table 26, respectively.

9 Plots

Model Set-Up

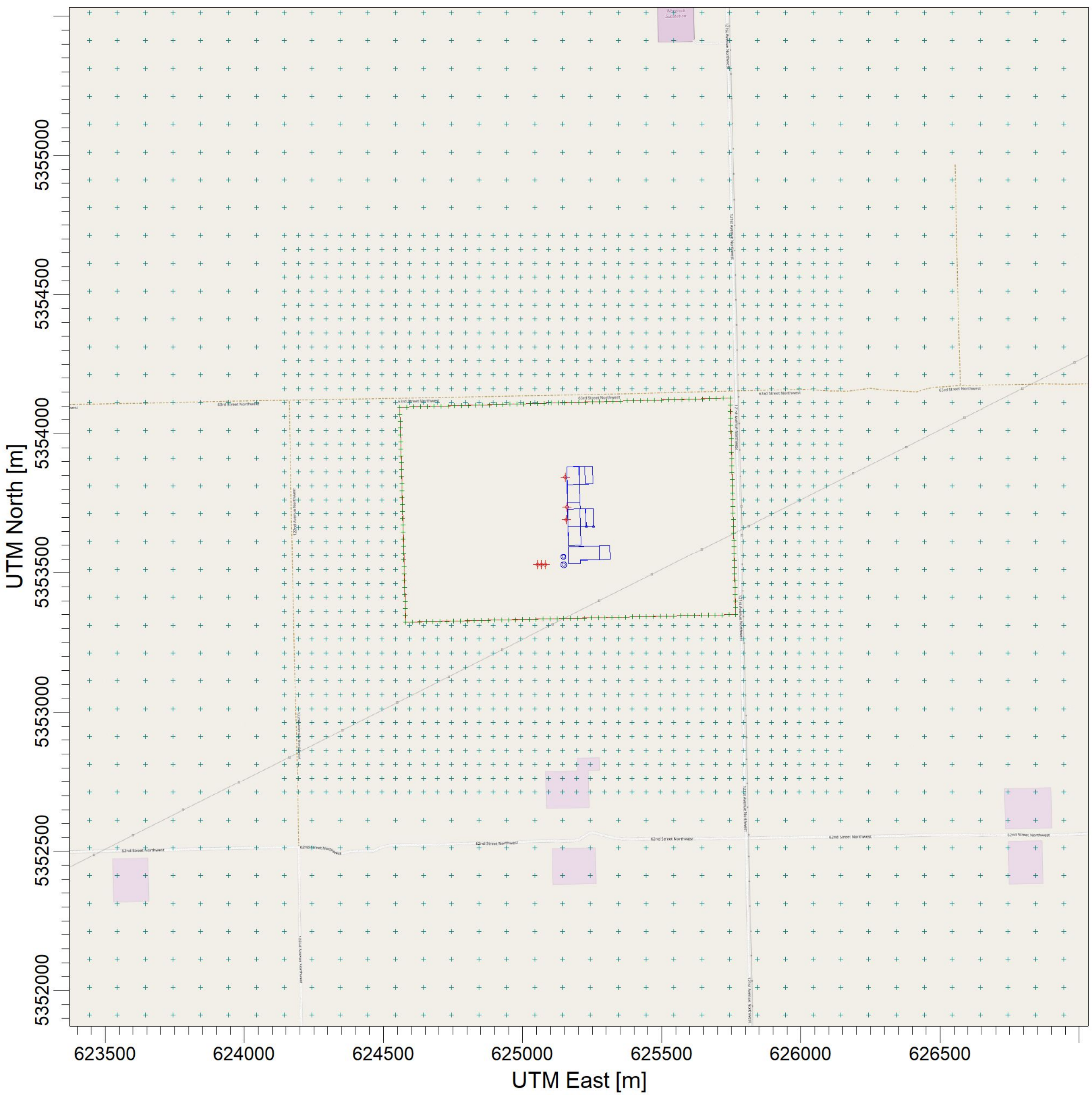
SSIA

AAQS Analysis

PSD Increment Analysis

PROJECT TITLE:

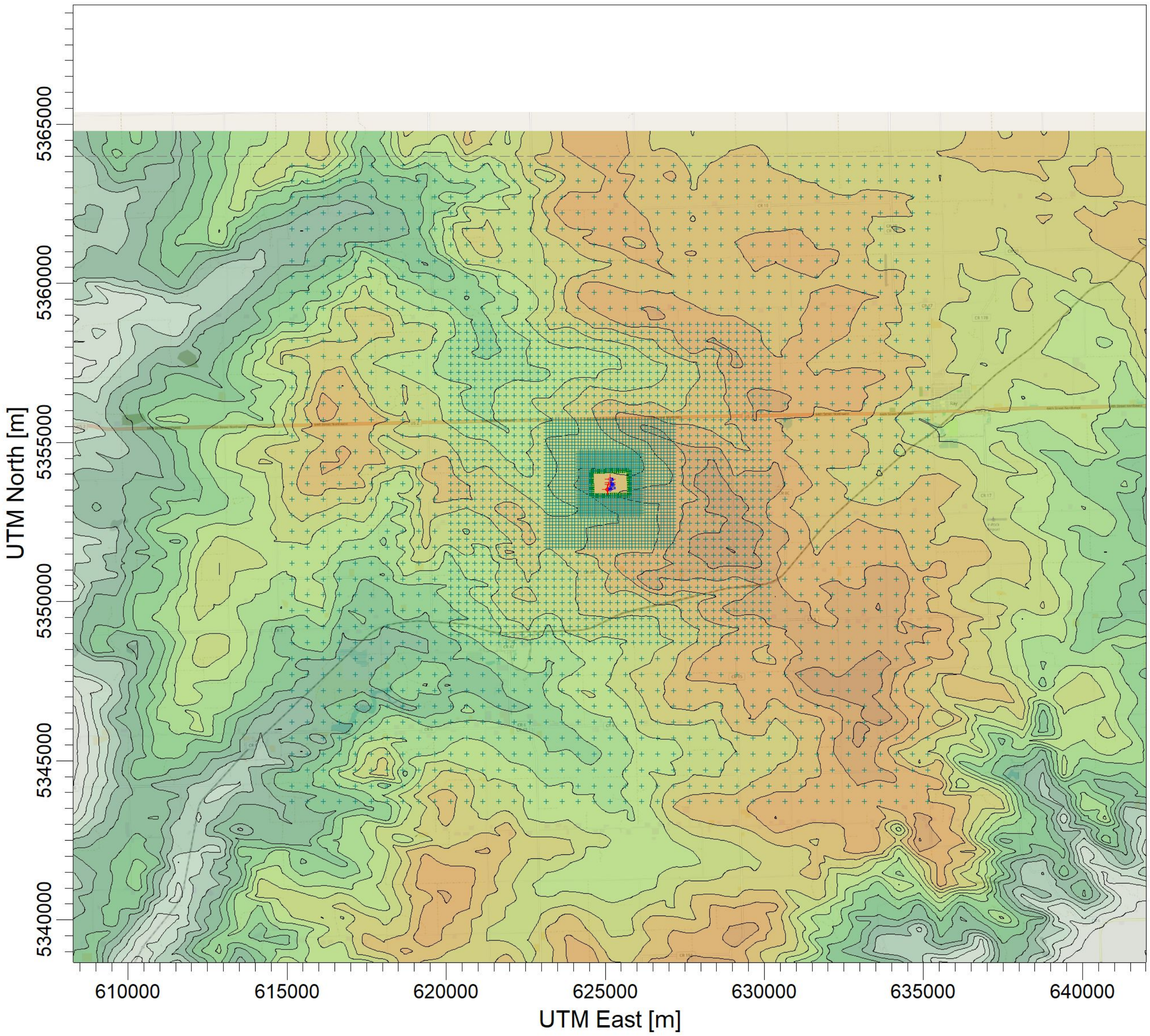
Basin Bison Generation Station
Plot 1 - Site



COMMENTS:	SOURCES:	COMPANY NAME:	
	6	**North Dakota Department of Environmental Quality**	
	RECEPTORS:	MODELER:	NORTH Dakota Be Legendary.™ | Environmental Quality
	5340	**Rhannon Thorton**	
		SCALE: 1:23,022 0 ▬ 0.5 km	
		DATE:	PROJECT NO.:
		11/10/2025	**ACP-18273**

PROJECT TITLE:

Basin Bison Generation Station
Plot 2 - Terrain Contours



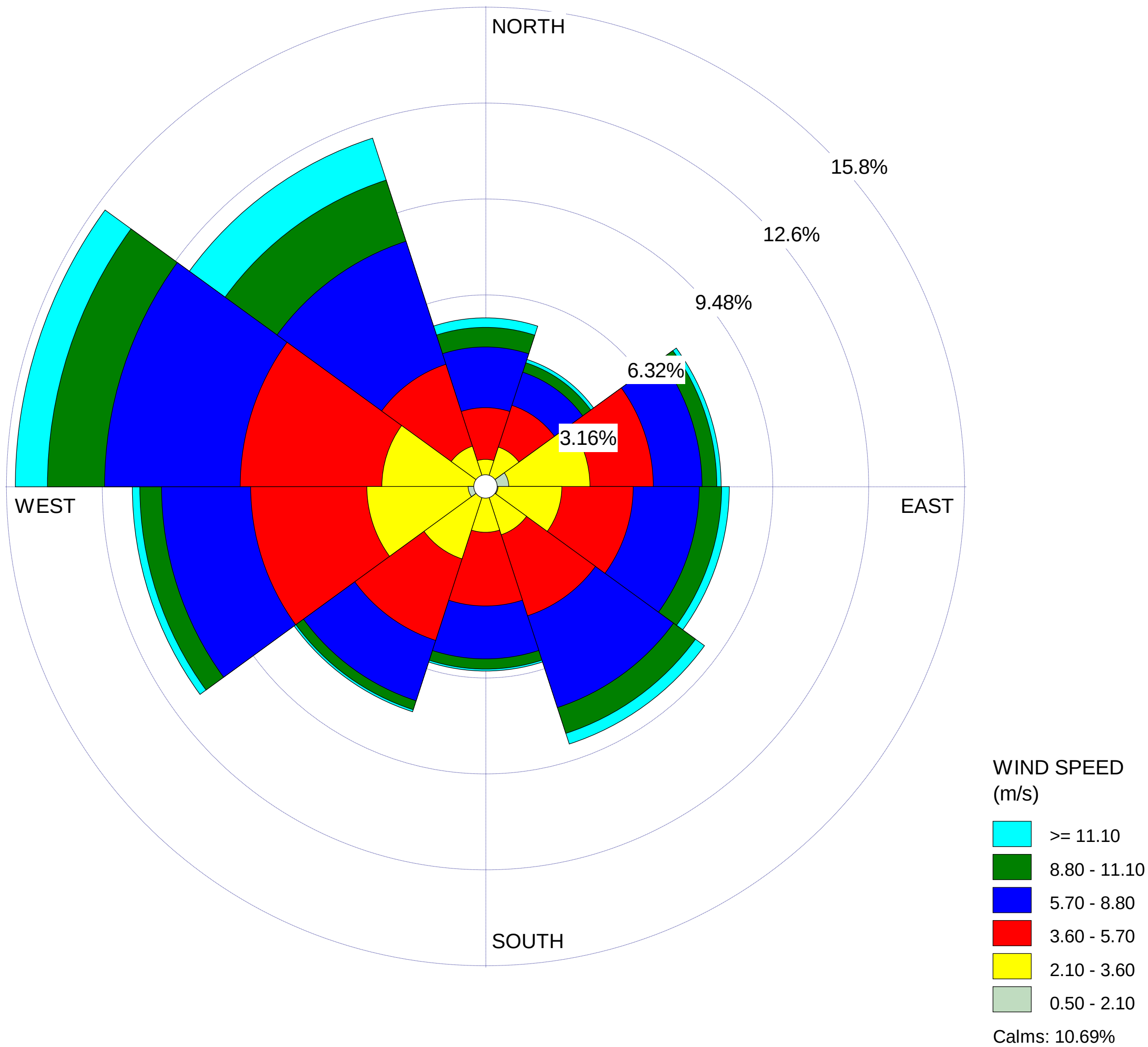
COMMENTS:	SOURCES:	COMPANY NAME:	
	6	**North Dakota Department of Environmental Quality**	
	RECEPTORS: **5340**	MODELER: **Rhannon Thorton**	NORTH Dakota Be Legendary. | Environmental Quality
		SCALE: 1:212,054 — 0 to 5 km	
		DATE: **11/10/2025**	PROJECT NO.: **ACP-18273**

WIND ROSE PLOT:

Basin Bison Generation Station
Plot 3 - Wind Rose

DISPLAY:

Wind Speed
Direction (blowing from)

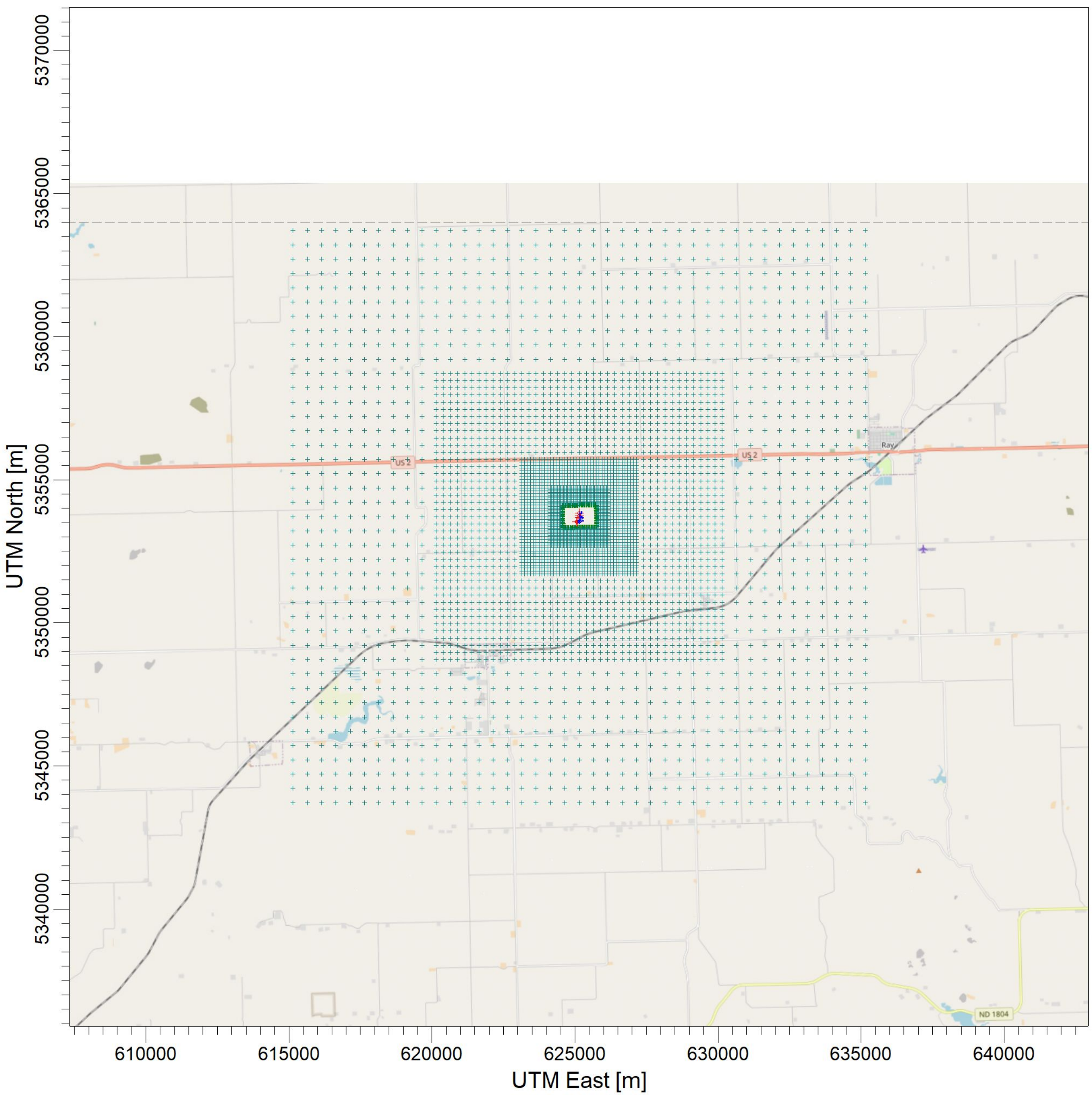


COMMENTS:	DATA PERIOD:	COMPANY NAME:	
Tioga Municipal Airport, ND Station No. 720863 Year: 2019-2023	**Start Date: 1/1/2019 - 00:00** **End Date: 12/31/2023 - 23:59**	**North Dakota Department of Environmental Quality**	
		MODELER: **Rhannon Thorton**	North Dakota Be Legendary.™ | Environmental Quality
	CALM WINDS: **10.69%**	TOTAL COUNT: **43096 hrs.**	
	AVG. WIND SPEED: **5.09 m/s**	DATE: **11/10/2025**	PROJECT NO.: **ACP-18273**

WRPLOT View - Lakes Environmental Software

PROJECT TITLE:

Basin Bison Generation Station
Plot 4 - Receptor Grid

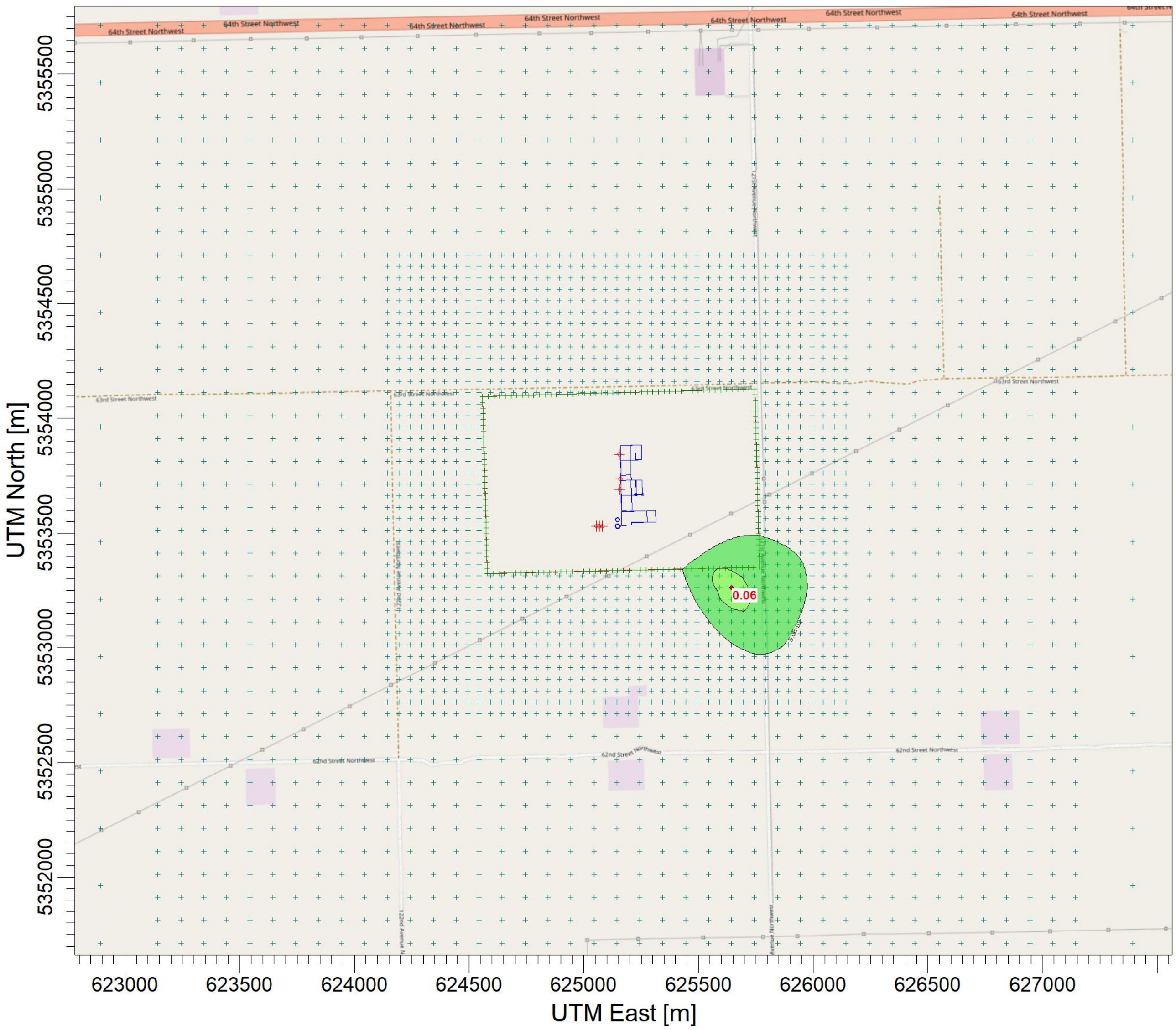


COMMENTS:	SOURCES:	COMPANY NAME:	
	6	**North Dakota Department of Environmental Quality**	
	RECEPTORS: **5340**	MODELER: **Rhannon Thorton**	NORTH Dakota Be Legendary. Environmental Quality
		SCALE: 1:224,007 0 5 km	
		DATE: **11/10/2025**	PROJECT NO.: **ACP-18273**

AERMOD View - Lakes Environmental Software

PROJECT TITLE:

Basin Bison Generation Station
Plot 5 - SO2 Annual (SSIA)



PLOT FILE OF ANNUAL VALUES AVERAGED ACROSS 5 YEARS FOR SOURCE GROUP: MECL ug/m^3

Max: 6.1E-02 [ug/m^3] at (625643.63, 5353262.50)

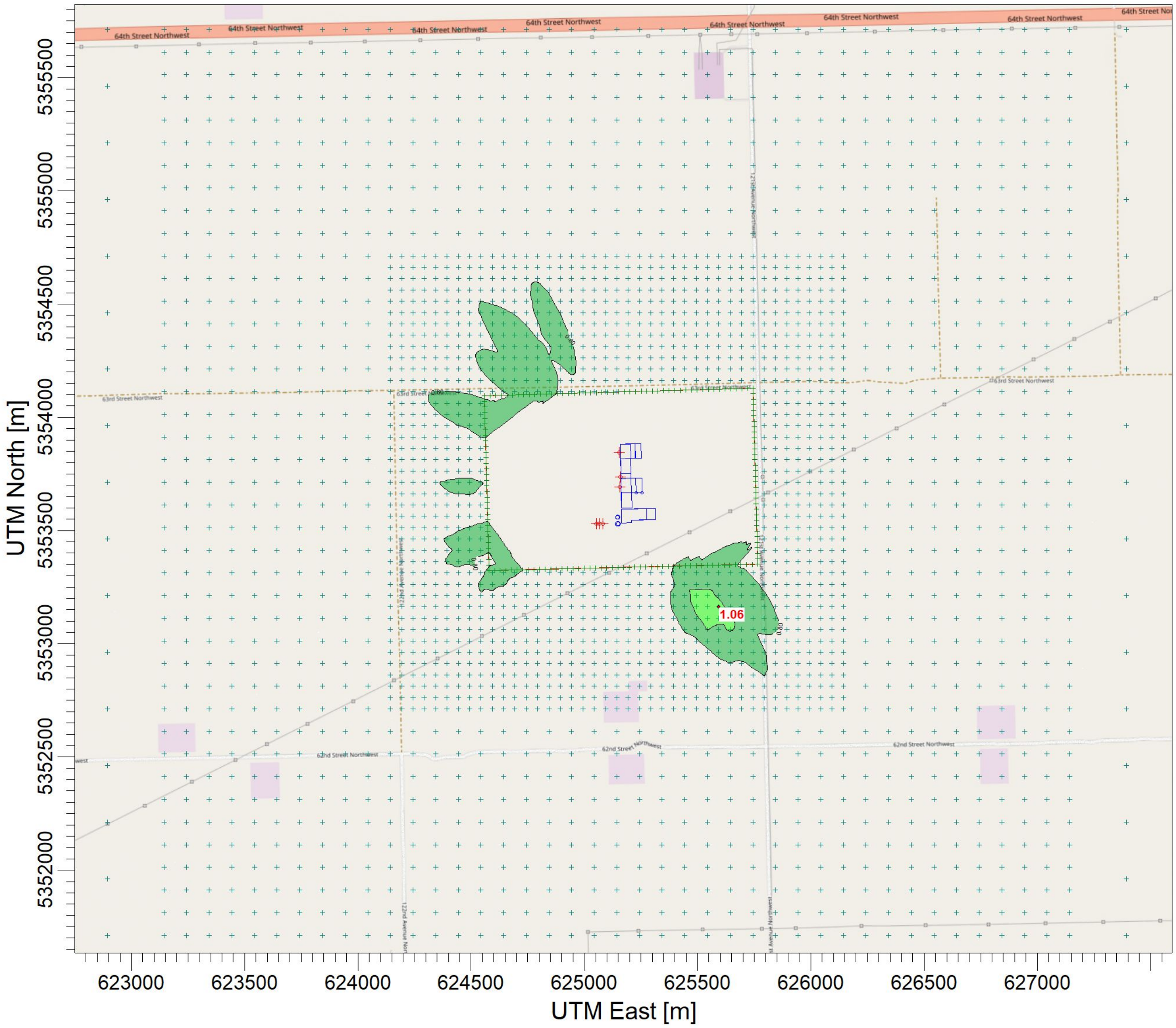
5.0E-02 6.0E-02 6.1E-02

COMMENTS:	SOURCES:	COMPANY NAME:	
Highest modeled scenario: MECL SIL is 1 µg/m3	**14**	**North Dakota Department of Environmental Quality**	
	RECEPTORS: **5340**	MODELER: **Rhannon Thorton**	NORTH Dakota Be Legendary. | Environmental Quality
	OUTPUT TYPE: **Concentration**	SCALE: 1:30,080 0 1 km	
	MAX: **6.1E-02 ug/m^3**	DATE: **11/6/2025**	PROJECT NO.: **ACP-18273**

AERMOD View - Lakes Environmental Software

PROJECT TITLE:

Basin Bison Generation Station
Plot 6 - SO2 24-HR (SSIA)



PLOT FILE OF HIGH 1ST HIGH 24-HR VALUES FOR SOURCE GROUP: MECL ug/m^3

Max: 1.06 [ug/m^3] at (625593.63, 5353162.50)

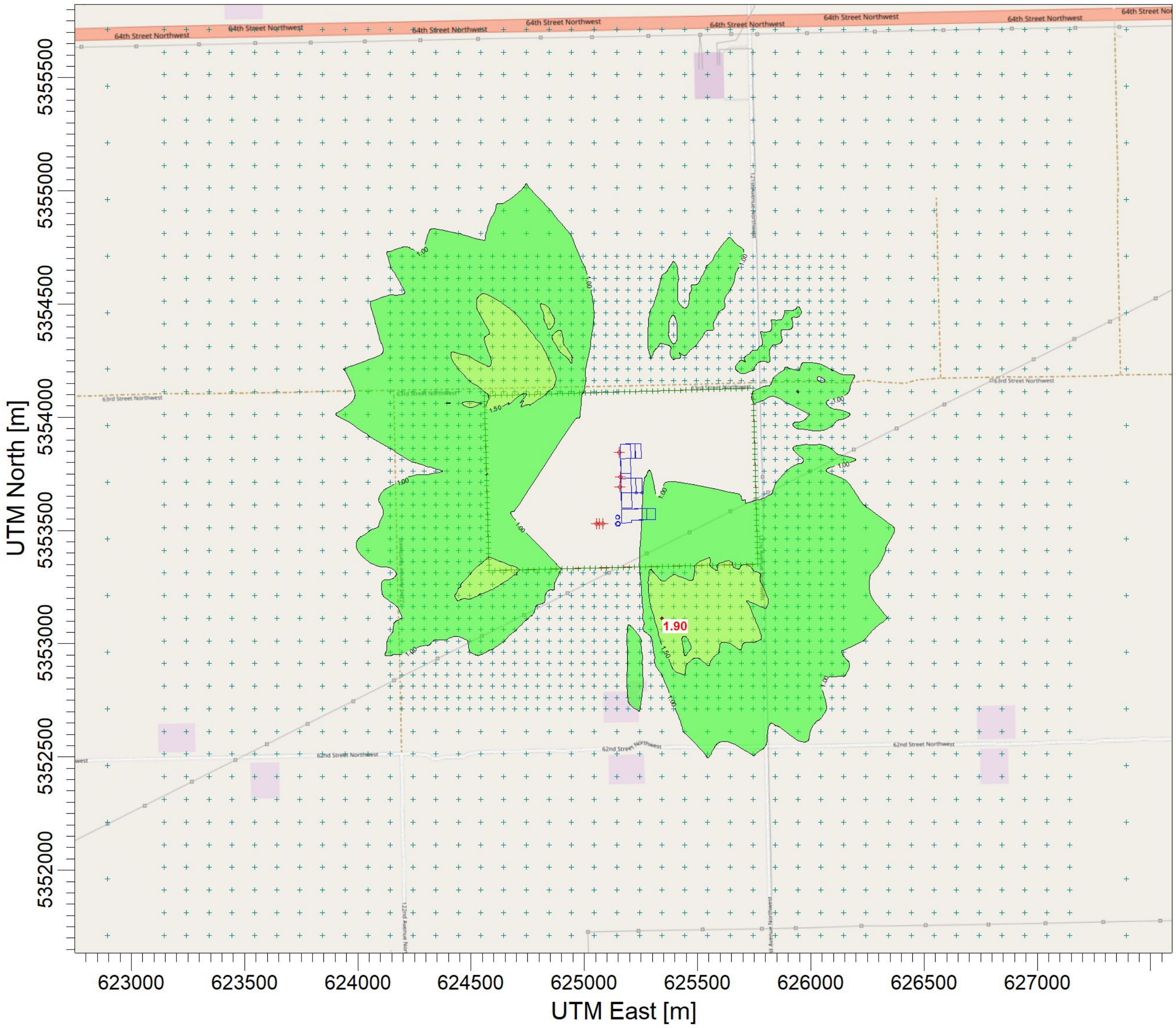
0.80 1.00 1.06

COMMENTS: Highest modeled scenario: MECL SIL is 5 µg/m3	SOURCES: **14**	COMPANY NAME: **North Dakota Department of Environmental Quality**	
	RECEPTORS: **5340**	MODELER: **Rhannon Thorton**	NORTH Dakota Be Legendary.™ | Environmental Quality
	OUTPUT TYPE: **Concentration**	SCALE: 1:30,467 0 1 km	
	MAX: **1.06 ug/m^3**	DATE: **11/6/2025**	PROJECT NO.: **ACP-18273**

AERMOD View - Lakes Environmental Software

PROJECT TITLE:

Basin Bison Generation Station
Plot 7 - SO2 3-HR (SSIA)



PLOT FILE OF HIGH 1ST HIGH 3-HR VALUES FOR SOURCE GROUP: MECL

ug/m^3

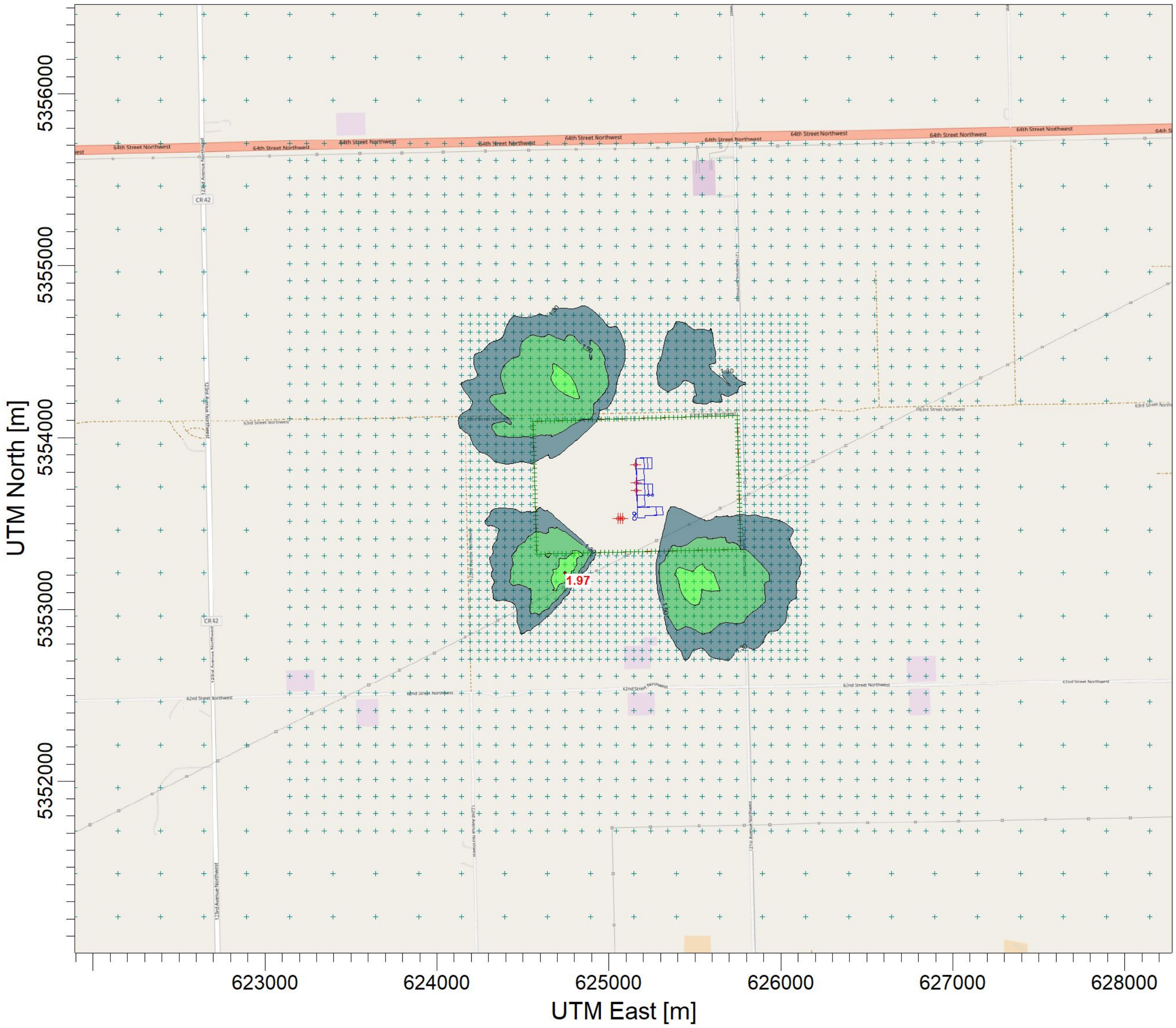
Max: 1.90 [ug/m^3] at (625343.63, 5353112.50)

1.00 | 1.50 | 1.90

COMMENTS:	SOURCES:	COMPANY NAME:	
Highest modeled scenario: MECL SIL is 25 µg/m3	**14**	**North Dakota Department of Environmental Quality**	
	RECEPTORS: **5340**	MODELER: **Rhannon Thorton**	
	OUTPUT TYPE: **Concentration**	SCALE: 1:30,467 0 — 1 km	
	MAX: **1.90 ug/m^3**	DATE: **11/6/2025**	PROJECT NO.: **ACP-18273**

PROJECT TITLE:

Basin Bison Generation Station
Plot 8 - SO2 1-HR (SSIA)



PLOT FILE OF 1ST-HIGHEST MAX DAILY 1-HR VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: MECL ug/m^3

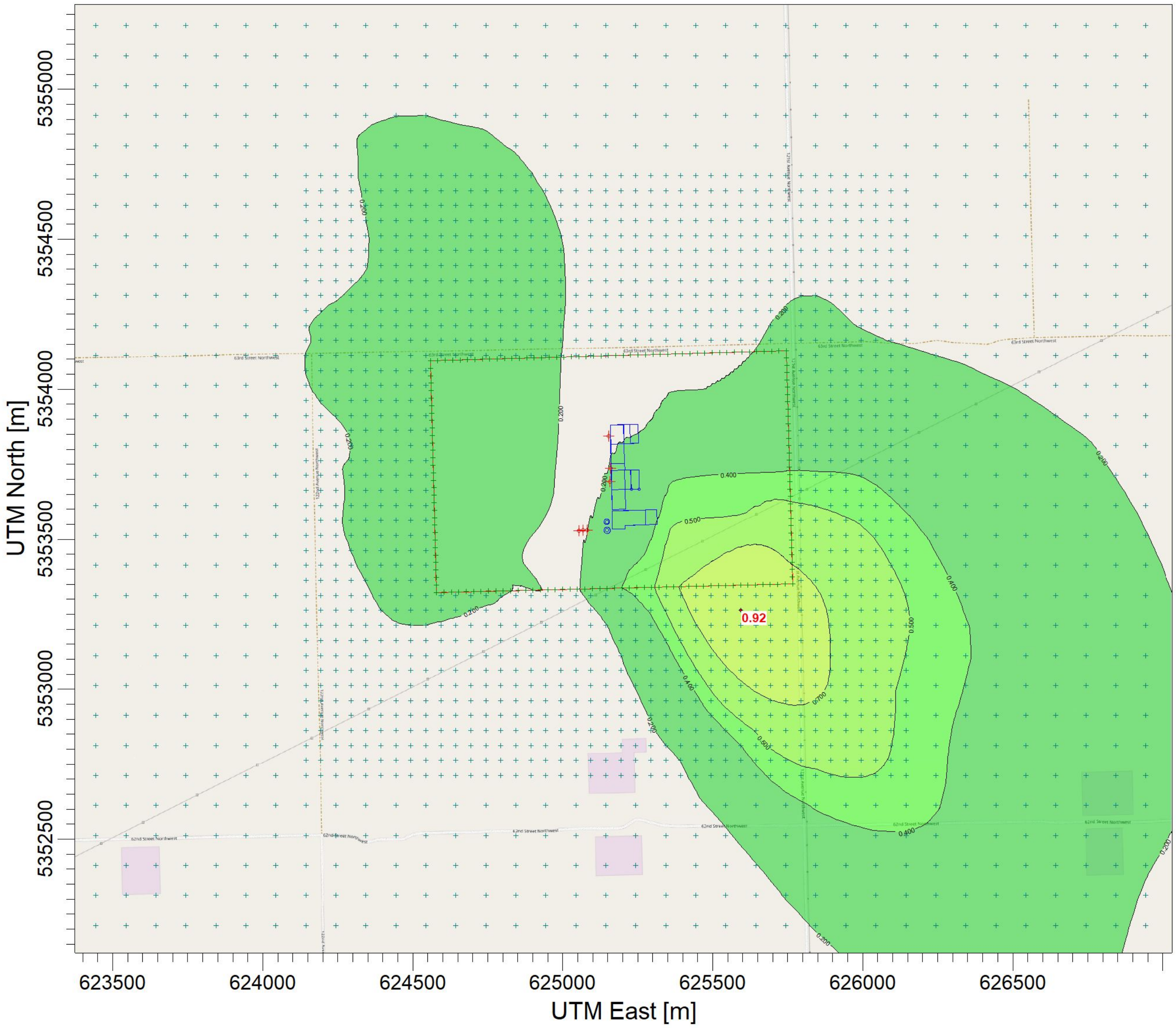
Max: 1.97 [ug/m^3] at (624743.63, 5353212.50)

1.30 1.50 1.80 1.97

COMMENTS:	SOURCES:	COMPANY NAME:	
Highest modeled scenario: MECL SIL is 7.8 µg/m3	**14**	**North Dakota Department of Environmental Quality**	
	RECEPTORS: **5340**	MODELER: **Rhannon Thorton**	NORTH Dakota Be Legendary. | Environmental Quality
	OUTPUT TYPE: **Concentration**	SCALE: 1:40,132 0 1 km	
	MAX: **1.97 ug/m^3**	DATE: **11/6/2025**	PROJECT NO.: **ACP-18273**

PROJECT TITLE:

Basin Bison Generation Station
Plot 9 - NO2 Annual (SSIA)



POST/PLOT FILE OF ANNUAL VALUES FOR YEAR 1 FOR SOURCE GROUP: ALL

ug/m^3

Max: 0.923 [ug/m^3] at (625593.63, 5353262.50)

0.200 | 0.400 | 0.500 | 0.700 | 0.923

COMMENTS:	SOURCES:	COMPANY NAME:	
Highest modeled scenario: MECL SIL is 1 µg/m3	**6**	**North Dakota Department of Environmental Quality**	
	RECEPTORS: **5340**	MODELER: **Rhannon Thorton**	NORTH Dakota Be Legendary. | Environmental Quality
	OUTPUT TYPE: **Concentration**	SCALE: 1:23,003 0 — 0.5 km	
	MAX: **0.923 ug/m^3**	DATE: **11/10/2025**	PROJECT NO.: **ACP-18273**

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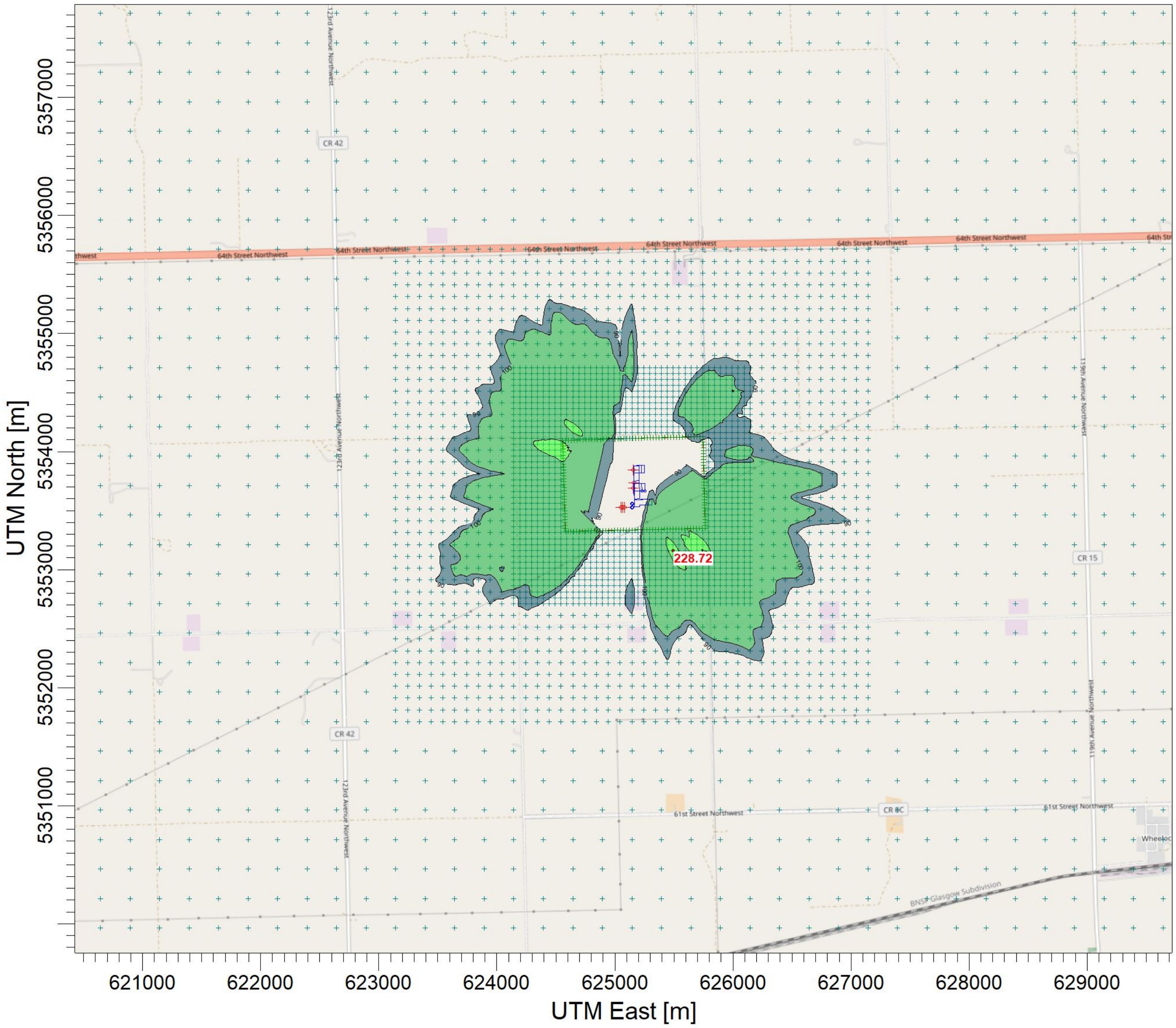
PROJECT TITLE:

Basin Bison Generation Station
Plot 10 - CO 8-HR (SSIA)



PLOT FILE OF HIGH 1ST HIGH 8-HR VALUES FOR SOURCE GROUP: SS

ug/m^3

Max: 229 [ug/m^3] at (625493.63, 5353162.50)

90 | 100 | 200 | 229

COMMENTS: Highest modeled scenario: SS SIL is 500 µg/m3	SOURCES: **14**	COMPANY NAME: **North Dakota Department of Environmental Quality**
	RECEPTORS: **5340**	MODELER: **Rhannon Thorton**
	OUTPUT TYPE: **Concentration**	SCALE: 1:58,446 0 — 2 km
	MAX: **229 ug/m^3**	DATE: **11/6/2025**
		PROJECT NO.: **ACP-18273**

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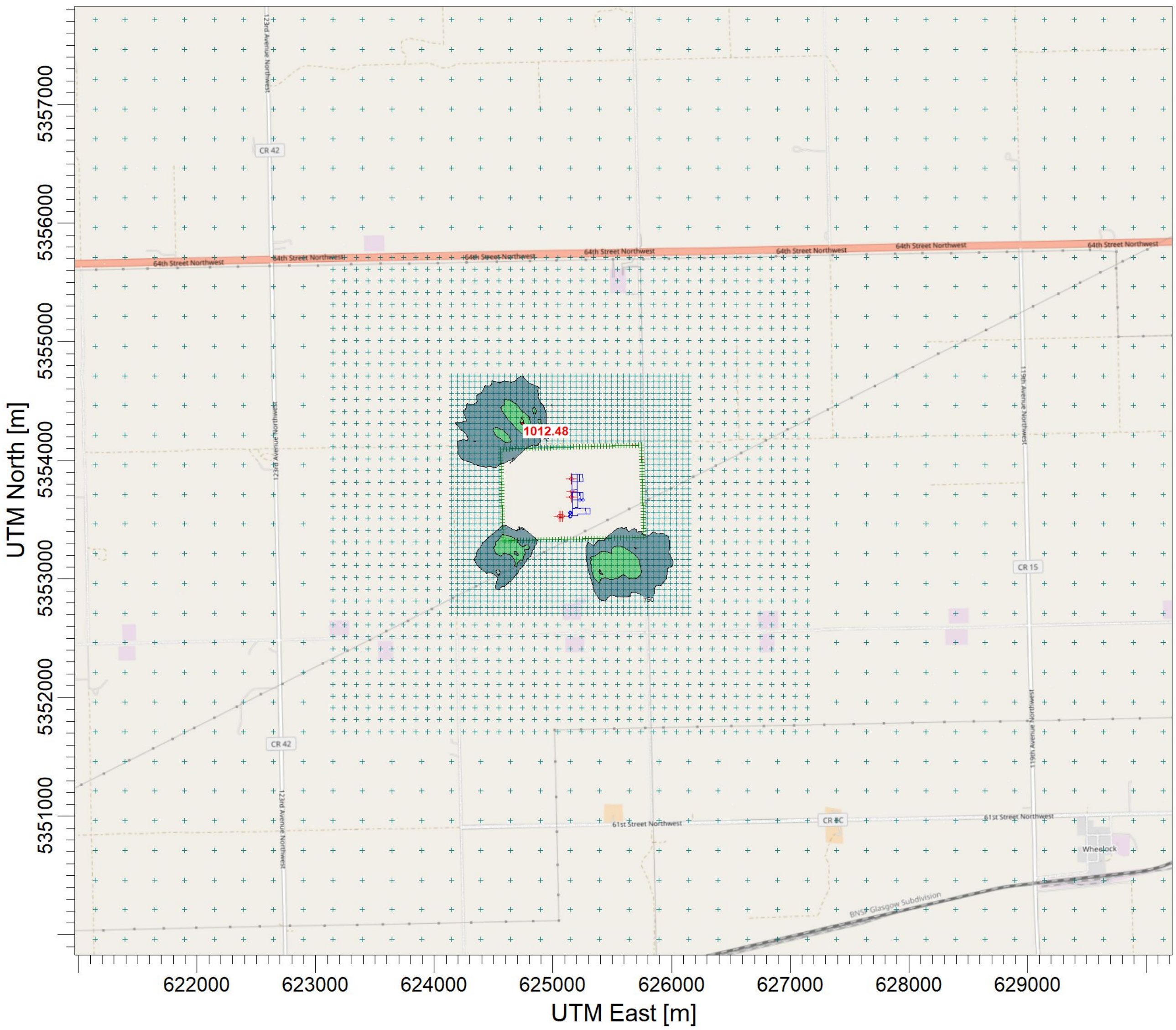
PROJECT TITLE:

Basin Bison Generation Station
Plot 11 - CO 1-HR (SSIA)



PLOT FILE OF HIGH 1ST HIGH 1-HR VALUES FOR SOURCE GROUP: SS

ug/m^3

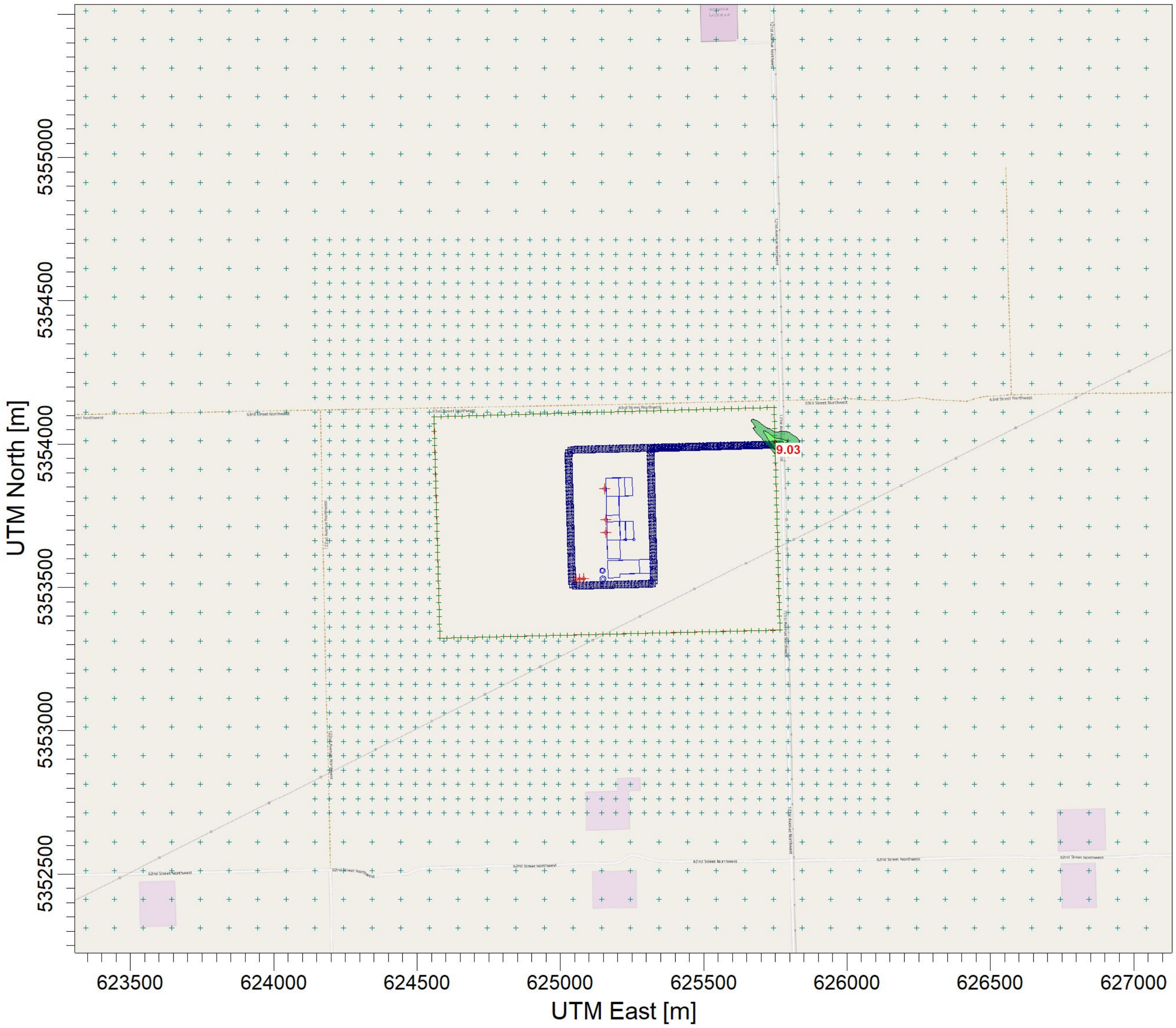
Max: 1012 [ug/m^3] at (624743.63, 5354312.50)

750 | 900 | 1000 | 1012

COMMENTS: Highest modeled scenario: SS SIL is 2,000 µg/m3	SOURCES: **14**	COMPANY NAME: **North Dakota Department of Environmental Quality**	
	RECEPTORS: **5340**	MODELER: **Rhannon Thorton**	NORTH Dakota Be Legendary. | Environmental Quality
	OUTPUT TYPE: **Concentration**	SCALE: 1:58,170 0 ——— 2 km	
	MAX: **1012 ug/m^3**	DATE: **11/6/2025**	PROJECT NO.: **ACP-18273**

PROJECT TITLE:

Basin Bison Generation Station
Plot 12 - PM10 24-HR (NAAQS)



PLOT FILE OF HIGH 6TH HIGH 24-HR VALUES FOR SOURCE GROUP: MECL+INV

ug/m^3

Max: 9.03 [ug/m^3] at (625748.56, 5354006.89)

5.00 7.00 9.00 9.03

COMMENTS:	SOURCES:	COMPANY NAME:	
Highest modeled scenario: MECL	**222**	**North Dakota Department of Environmental Quality**	
Background is 30 µg/m3	RECEPTORS:	MODELER:	
Total Impact is 39.03 µg/m3	**5340**	**Rhannon Thorton**	
NAAQS is 150 µg/m3	OUTPUT TYPE:	SCALE: 1:24,074	
	Concentration	0 0.5 km	
	MAX:	DATE:	PROJECT NO.:
	9.03 ug/m^3	**11/10/2025**	**ACP-18273**

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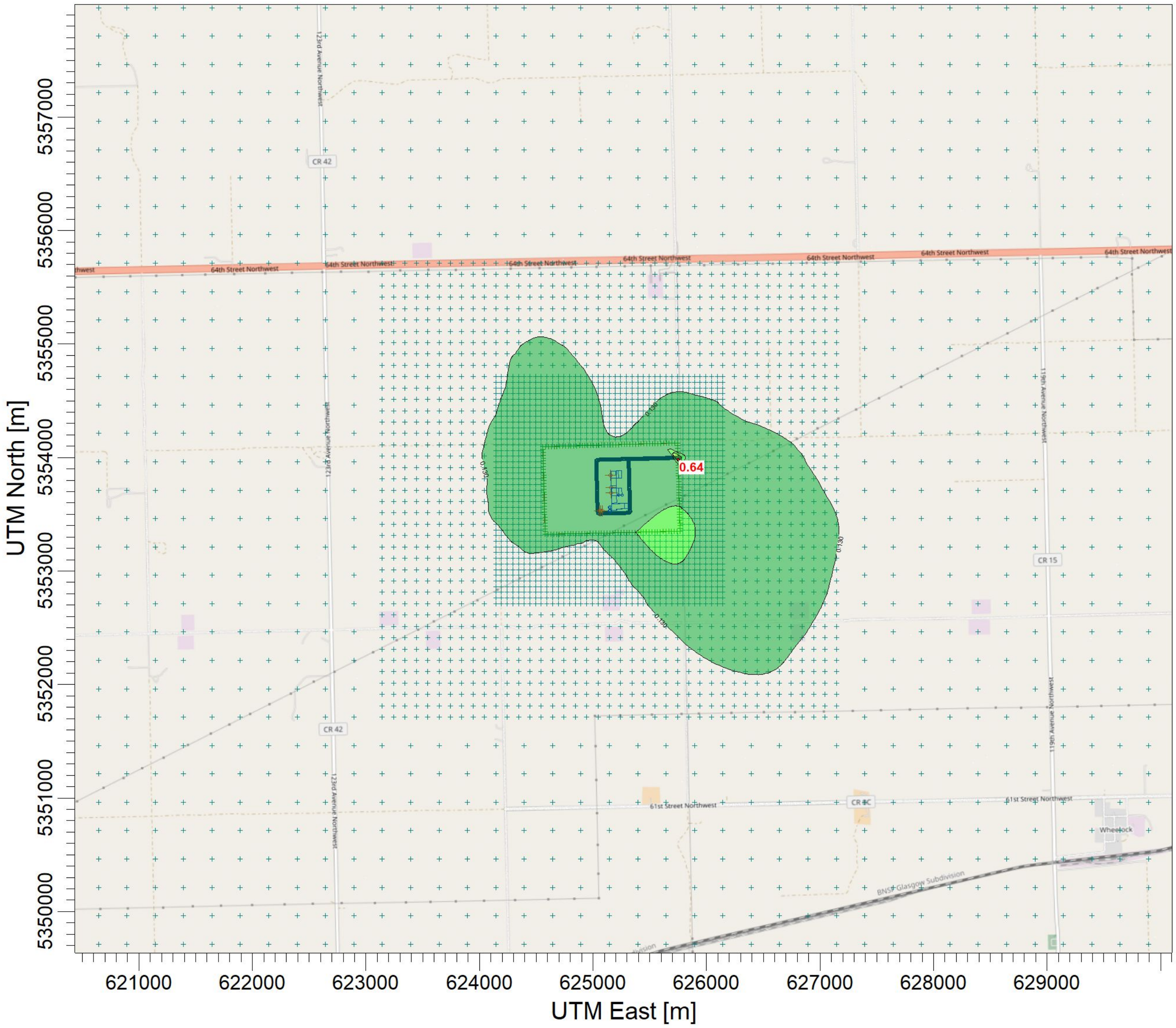
PROJECT TITLE:

Basin Bison Generation Station
Plot 13 - PM2.5 Annual (NAAQS)



PLOT FILE OF ANNUAL VALUES AVERAGED ACROSS 5 YEARS FOR SOURCE GROUP: INV+LW ug/m^3

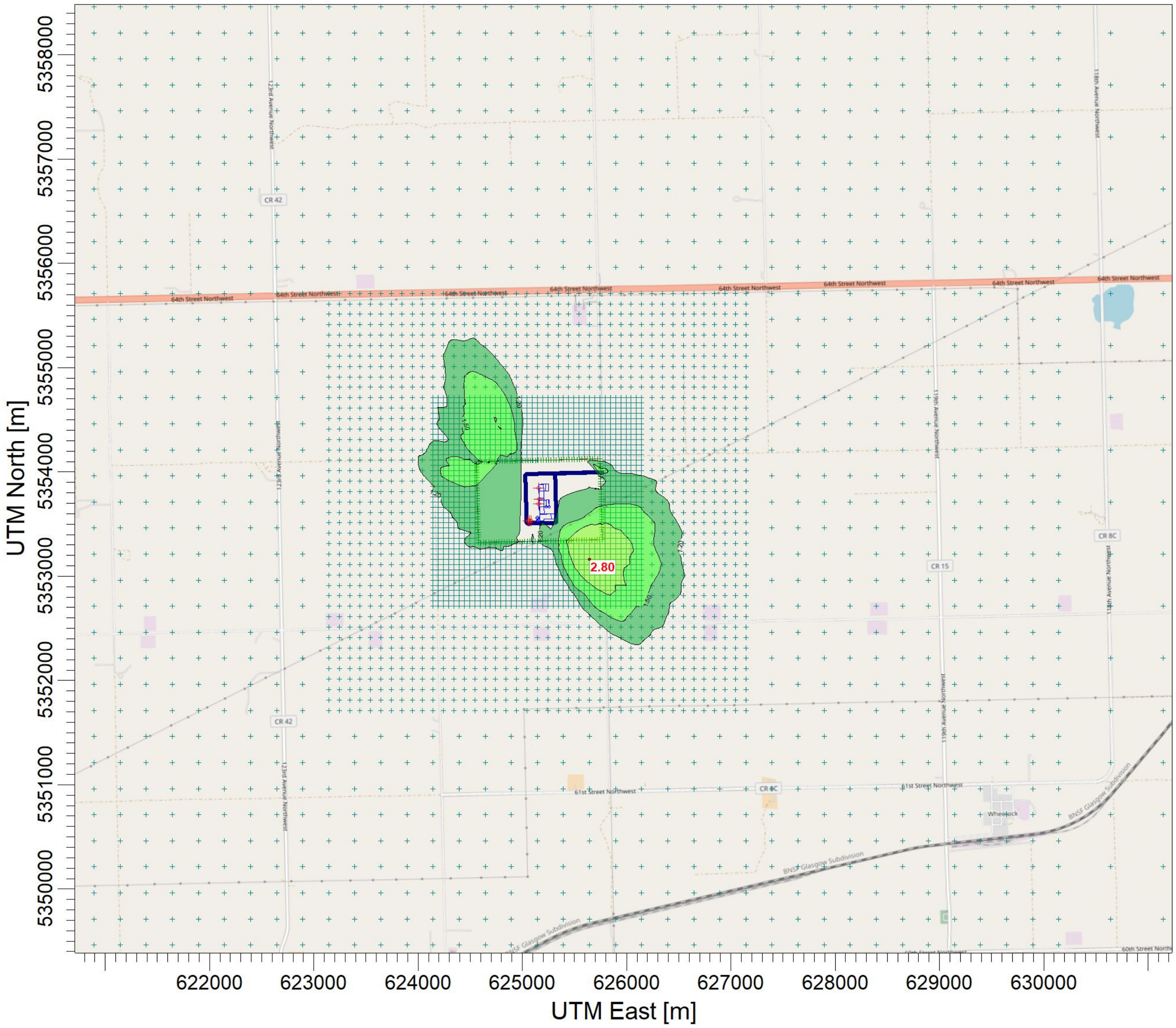
Max: 0.636 [ug/m^3] at (625749.20, 5353982.59)

0.130 0.400 0.500 0.636

COMMENTS:	SOURCES:	COMPANY NAME:	
Highest modeled scenario: MECL	**222**	**North Dakota Department of Environmental Quality**	
Background is 4.76 µg/m3	RECEPTORS: **5340**	MODELER: **Rhannon Thorton**	North Dakota Be Legendary. | Environmental Quality
Total Impact is 5.40 µg/m3	OUTPUT TYPE: **Concentration**	SCALE: 1:60,786 (0 — 2 km)	
NAAQS is 9 µg/m3	MAX: **0.636 ug/m^3**	DATE: **11/10/2025**	PROJECT NO.: **ACP-18273**

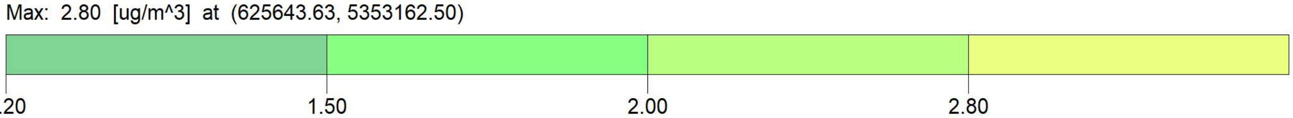
PROJECT TITLE:

Basin Bison Generation Station
Plot 14 - PM2.5 24-HR (NAAQS)



PLOT FILE OF 8TH-HIGHEST MAX DAILY 24-HR VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: INV+DB ug/m^3

Max: 2.80 [ug/m^3] at (625643.63, 5353162.50)



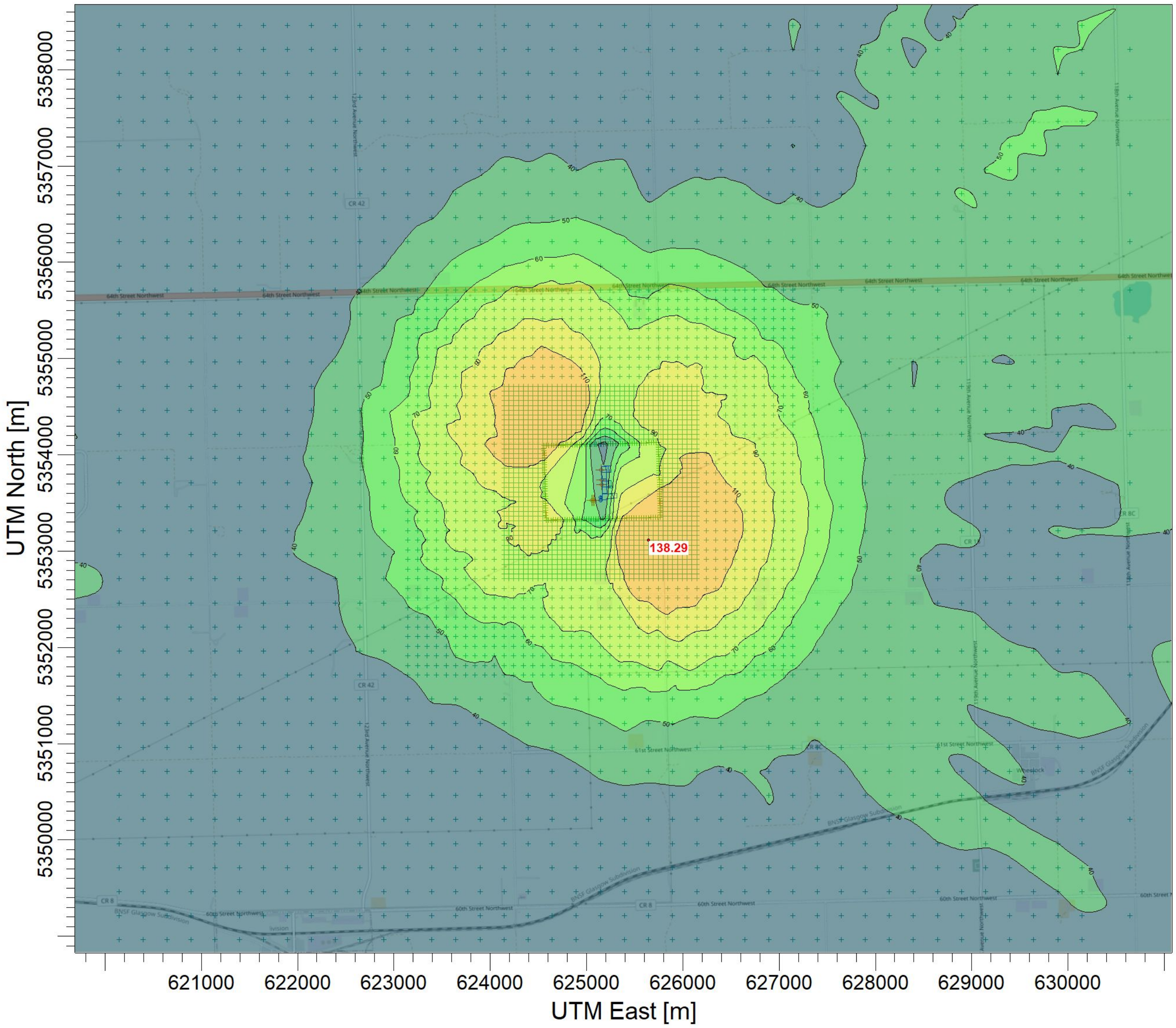
COMMENTS: Highest modeled scenario: 100% Load with duct firing Background is 13.836 µg/m3 Total Impact is 16.64 µg/m3 NAAQS is 35 µg/m3	SOURCES: **222**	COMPANY NAME: **North Dakota Department of Environmental Quality**
	RECEPTORS: **5340**	MODELER: **Rhannon Thorton**
	OUTPUT TYPE: **Concentration**	SCALE: 1:66,174 0 — 2 km
	MAX: **2.80 ug/m^3**	DATE: **11/10/2025**
		PROJECT NO.: **ACP-18273**

North Dakota | Environmental Quality — Be Legendary.

AERMOD View - Lakes Environmental Software

PROJECT TITLE:

Basin Bison Generation Station
Plot 15 - NO2 1-HR (NAAQS)



PLOT FILE OF 8TH-HIGHEST MAX DAILY 1-HR VALUES AVERAGED OVER 5 YEARS FOR SOURCE GROUP: ALL ug/m^3

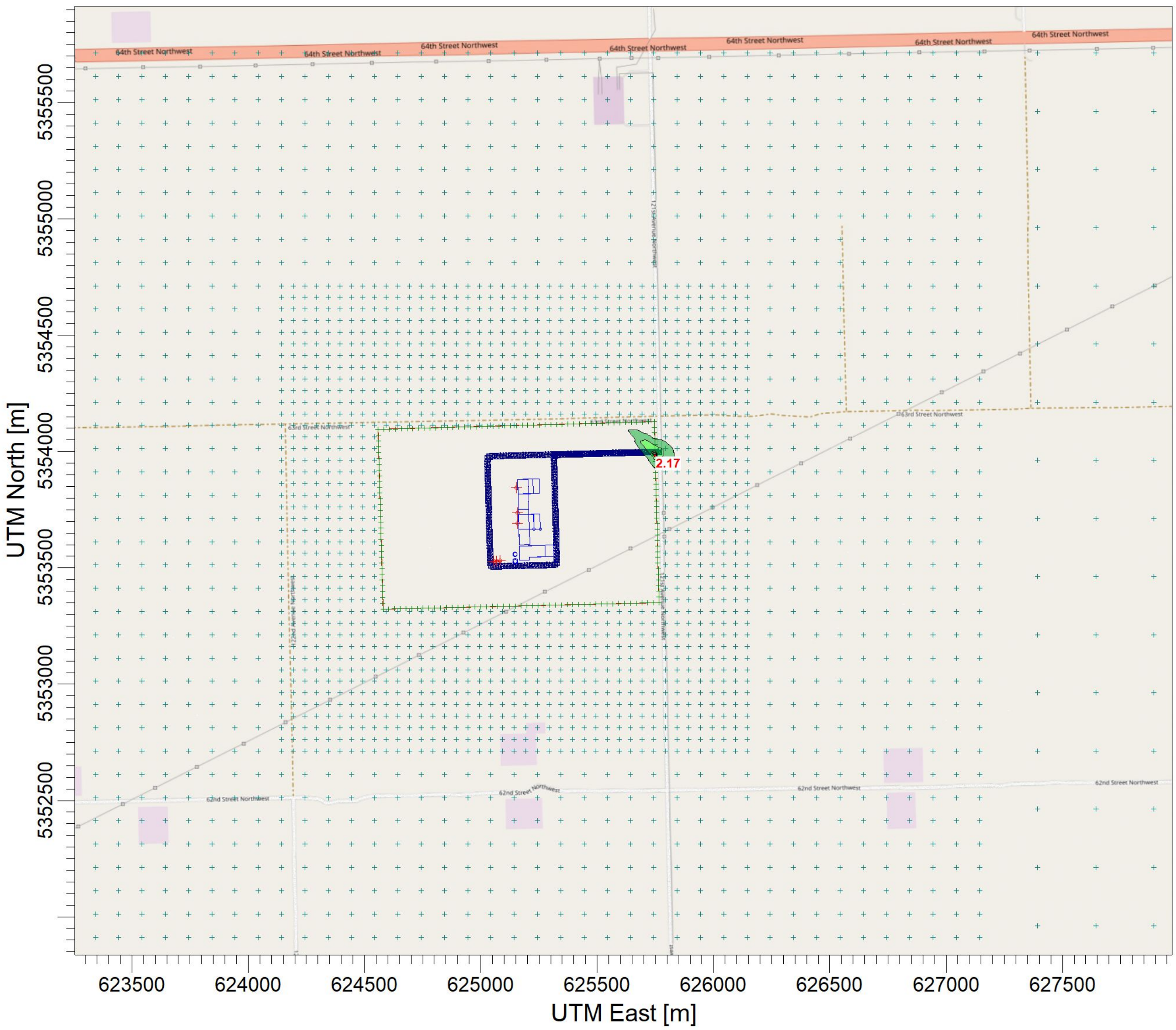
Max: 138 [ug/m^3] at (625643.63, 5353112.50)

20 40 50 60 70 90 110 138

COMMENTS:	SOURCES:	COMPANY NAME:	
Highest modeled scenario: Start-up/Shutdown Background is 35 µg/m3 Total Impact is 173.3 µg/m3 NAAQS is 188 µg/m3	**72**	**North Dakota Department of Environmental Quality**	
	RECEPTORS: **5340**	MODELER: **Rhannon Thorton**	
	OUTPUT TYPE: **Concentration**	SCALE: 1:71,654 0 2 km	
	MAX: **138 ug/m^3**	DATE: **11/17/2025**	PROJECT NO.: **ACP-18273**

PROJECT TITLE:

Basin Bison Generation Station
Plot 16 - PM10 Annual (PSD Increment)



POST/PLOT FILE OF ANNUAL VALUES FOR YEAR 1 FOR SOURCE GROUP: INV+LW

ug/m^3

Max: 2.17 [ug/m^3] at (625749.20, 5353982.59)

1.00	1.50	2.00	2.06

COMMENTS:	SOURCES:	COMPANY NAME:	
Highest modeled scenario: MECL	**222**	**North Dakota Department of Environmental Quality**	
Highest year: 2020	RECEPTORS: **5340**	MODELER: **Rhannon Thorton**	NORTH Dakota Be Legendary.™ | Environmental Quality
Class II standard is 17 µg/m3	OUTPUT TYPE: **Concentration**	SCALE: 1:29,660 (0 — 1 km)	
	MAX: **2.17 ug/m^3**	DATE: **11/10/2025**	PROJECT NO.: **ACP-18273**

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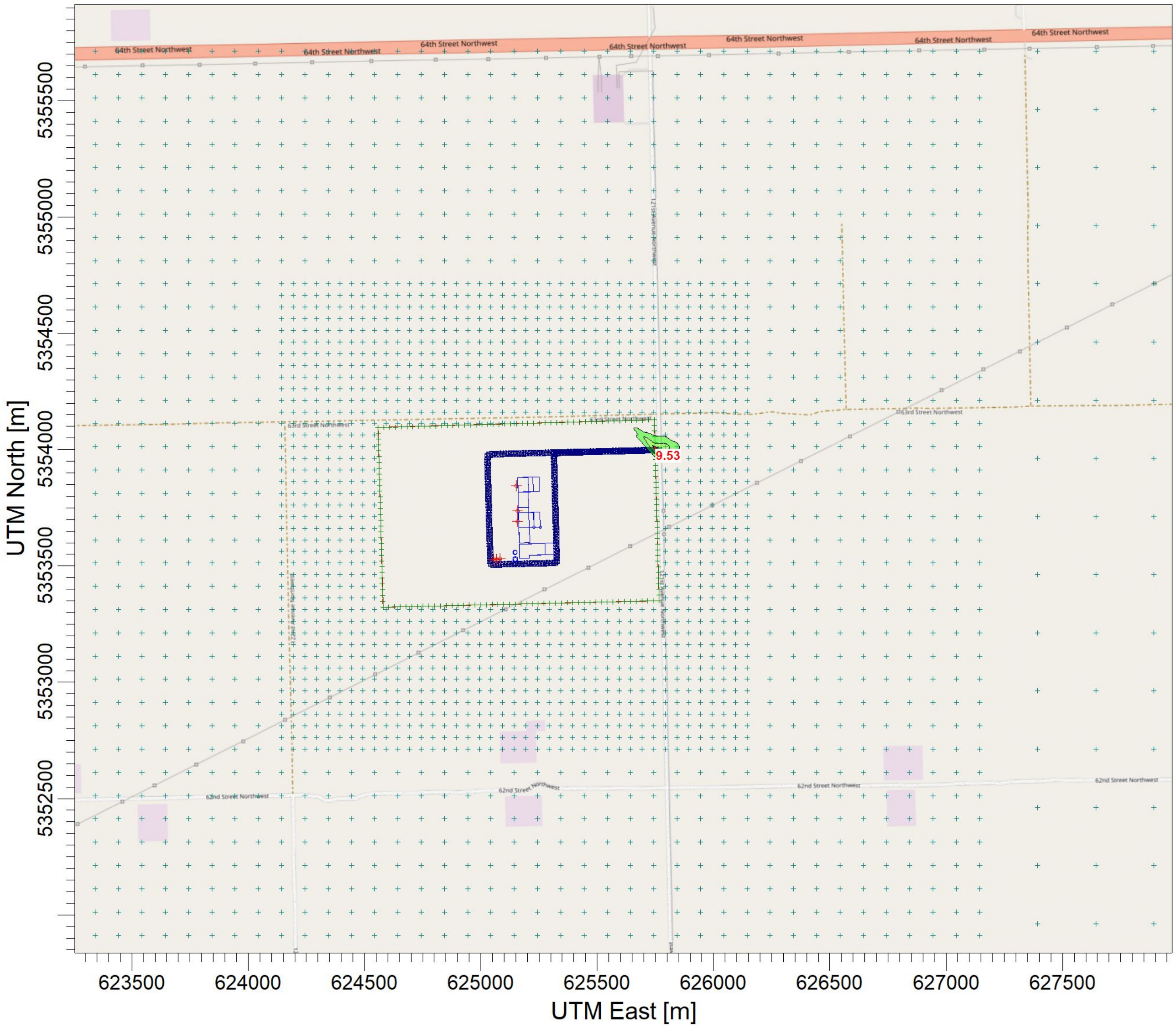
PROJECT TITLE:

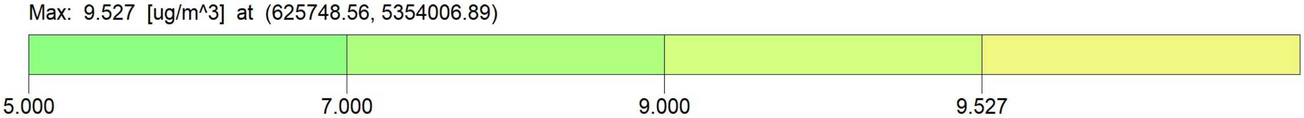
Basin Bison Generation Station
Plot 17 - PM10 24-HR (PSD Increment)



PLOT FILE OF HIGH 2ND HIGH 24-HR VALUES FOR SOURCE GROUP: INV+LW

ug/m^3

Max: 9.527 [ug/m^3] at (625748.56, 5354006.89)



COMMENTS:	SOURCES:	COMPANY NAME:	
Highest modeled scenario: MECL Highest second-high year: 2023 Class II standard is 30 µg/m3	**222**	**North Dakota Department of Environmental Quality**	
	RECEPTORS: **5340**	MODELER: **Rhannon Thorton**	North Dakota Be Legendary. Environmental Quality
	OUTPUT TYPE: **Concentration**	SCALE: 1:29,659 0 1 km	
	MAX: **9.527 ug/m^3**	DATE: **11/10/2025**	PROJECT NO.: **ACP-18273**

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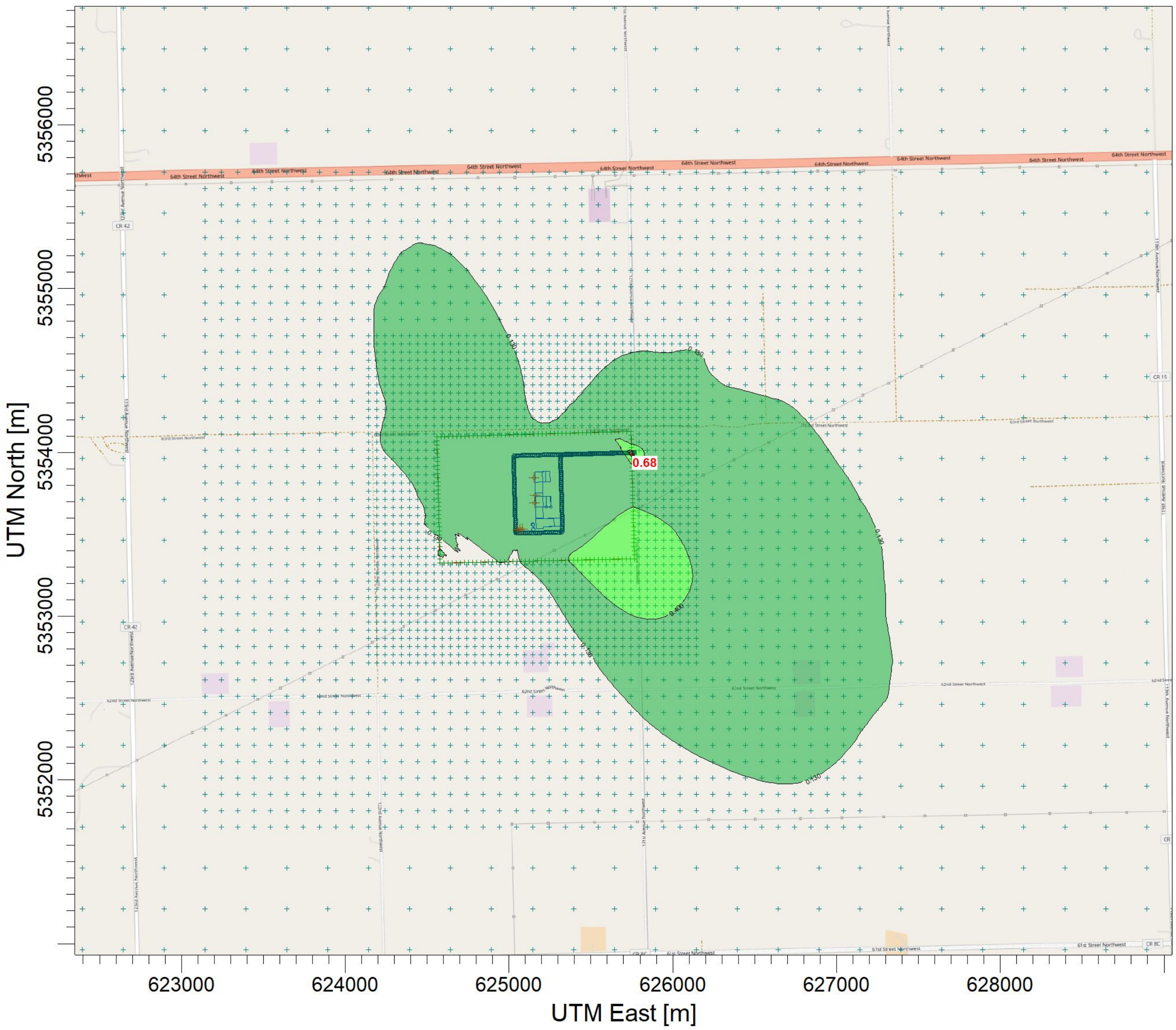
PROJECT TITLE:

Basin Bison Generation Station
Plot 18 - PM2.5 Annual (PSD Increment)



POST/PLOT FILE OF ANNUAL VALUES FOR YEAR 1 FOR SOURCE GROUP: INV+75 ug/m^3

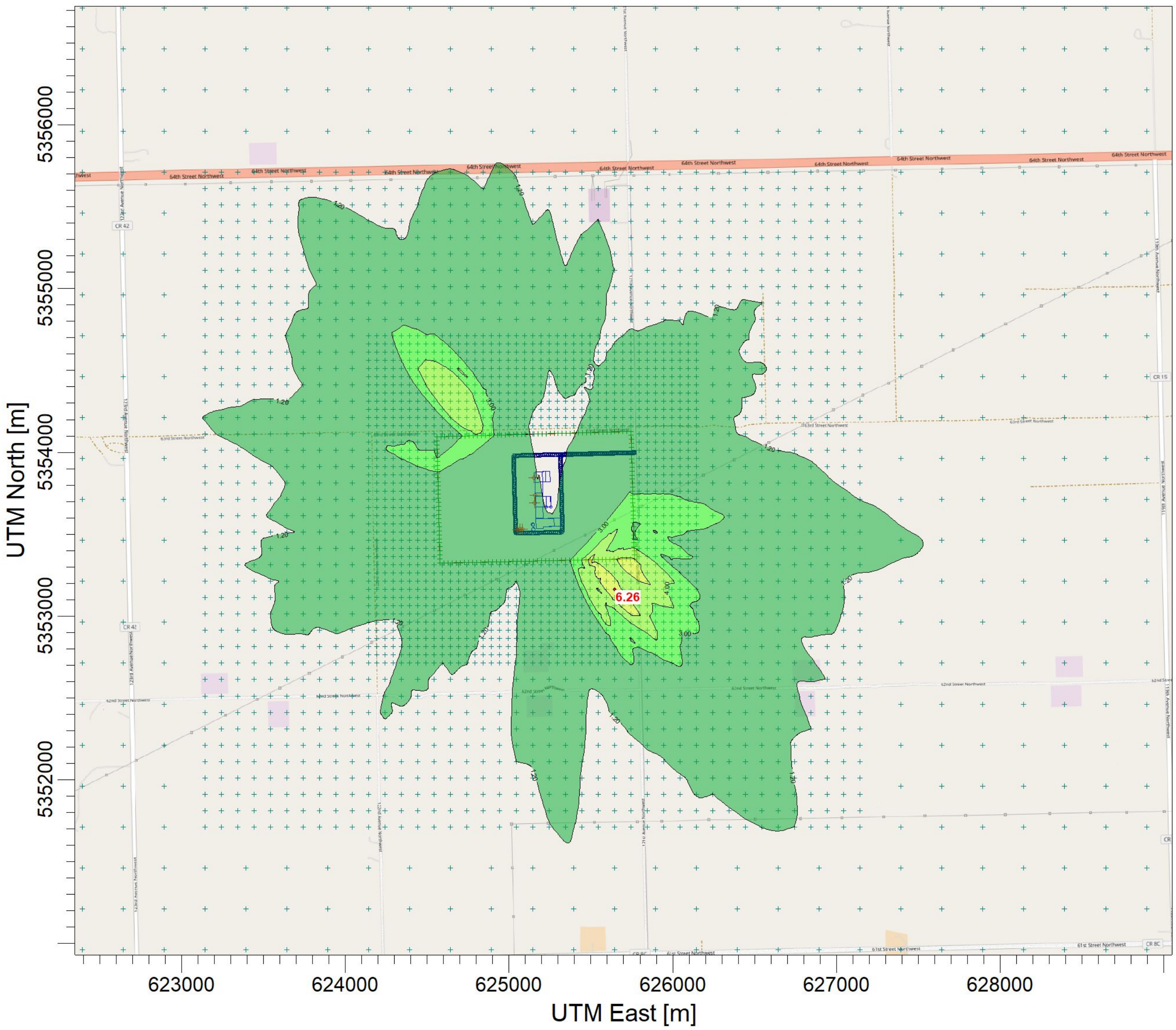
Max: 0.677 [ug/m^3] at (625749.20, 5353982.59)

0.130 | 0.400 | 0.600 | 0.630

COMMENTS:	SOURCES:	COMPANY NAME:	
Highest modeled scenario: 75% Load Highest year: 2020 Class II standard is 4 µg/m3	**222**	**North Dakota Department of Environmental Quality**	
	RECEPTORS: **5340**	MODELER: **Rhannon Thorton**	North Dakota Be Legendary. | Environmental Quality
	OUTPUT TYPE: **Concentration**	SCALE: 1:42,136 0 1 km	
	MAX: **0.677 ug/m^3**	DATE: **11/10/2025**	PROJECT NO.: **ACP-18273**

PROJECT TITLE:

Basin Bison Generation Station
Plot 19 - PM2.5 24-HR (PSD Increment)



PLOT FILE OF HIGH 2ND HIGH 24-HR VALUES FOR SOURCE GROUP: INV+DB

ug/m^3

Max: 6.26 [ug/m^3] at (625643.63, 5353162.50)

1.20 | 3.00 | 4.00 | 5.00 | 6.26

COMMENTS: Highest modeled scenario: 100% Load with duct firing Highest second-high year: 2021 Class II standard is 9 µg/m3	SOURCES: **222**	COMPANY NAME: **North Dakota Department of Environmental Quality**
	RECEPTORS: **5340**	MODELER: **Rhannon Thorton**
	OUTPUT TYPE: **Concentration**	SCALE: 1:42,138 0 — 1 km
	MAX: **6.26 ug/m^3**	DATE: **11/10/2025**
		PROJECT NO.: **ACP-18273**

NORTH Dakota Be Legendary. | Environmental Quality

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