

## Air Dispersion Modeling Summary for Permit No. 9295

**Report Date:** 8/3/2021

**NMED/AQB Modeler:** Eric Peters

**Facility Identification:**

Project: Alto Concrete Batch Plant Company: Roper Construction, Inc.

Permit number: 9295 TEMPO ID: 40076

**Location Information:**

The facility is located 5.1 miles north of Ruidoso, in Lincoln County. The facility is located 7.2 miles north-northwest of Ruidoso Downs.

UTM Coordinates: 438,240 m East, 3,697,950 m North, zone 13, Datum: NAD83

Elevation = 7240 feet

Air Quality Control Region (AQCR): 153

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**Project Description:**

**Brief:** Roper Construction, Inc. has applied to the New Mexico Air Quality Bureau for a New Source Review air quality permit for the construction of the Alto Concrete Batch Plant facility (the facility). The facility is a new concrete batch plant.

The following types of emission sources are included in the project: Aggregate Bin Loading (Unit 4), Aggregate Haul Trucks, Aggregate Weigh Batcher and Conveyor (Unit 5,6), Concrete Batch Plant Heater (Unit 12), Concrete Cement Fly Ash Haul Trucks, Concrete Plant Cement Silo Baghouse (Unit 9), Concrete Plant Fly Ash Baghouse (Unit 10), Concrete Plant Truck Load Baghouse (Unit 7,8), Feed Hopper Loading (Unit 2), Feed Hopper Unloading to Conveyor (Unit 3), Storage Piles (Aggregate) (Unit 11), and Storage Piles (Sand) (Unit 11). The emission units are described in Table 1: Table of Emissions and Stack Parameters, below.

For this permit, modeling was required for the following pollutants: Carbon Monoxide (CO), Nitrogen Dioxide (NO<sub>2</sub>), Particulate Matter 10 micrometers or less in aerodynamic diameter (PM<sub>10</sub>), Particulate Matter (2.5 microns or less) (PM<sub>2.5</sub>), and Sulfur Dioxide (SO<sub>2</sub>).

**Table 1: Table of Total Facility Emissions<sup>1</sup>**

NO <sub>2</sub> Rate (lbs/hr)	CO Rate (lbs/hr)	SO <sub>2</sub> Rate (lbs/hr)	PM <sub>10</sub> Rate (lbs/hr)	PM <sub>2.5</sub> Rate (lbs/hr)
0.063	0.053	0.001	0.980	0.184

<sup>1</sup> All values copied or converted from Alto Concrete Batch Plant Permit Application.

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**Table 2: Table of PointHor Sources<sup>1</sup>**

Stack Number	Description	Stack Height (ft)	Diameter (ft)	Velocity (ft/s)	Temperature (°F)	PM10 Rate (lbs/hr)	PM2.5 Rate (lbs/hr)
TMBH	Concrete Plant Truck Load Baghouse (Unit 7,8)	20.0	1.2	66.3	-460	0.018	0.003
CSBH	Concrete Plant Cement Silo Baghouse (Unit 9)	71.0	0.4	36.5	-460	0.014	0.003
FASBH	Concrete Plant Fly Ash Baghouse (Unit 10)	71.0	0.4	36.5	-460	0.009	0.002

**Table 3: Table of PointCap Sources<sup>1</sup>**

Stack Number	Description	Stack Height (ft)	Diameter (ft)	Velocity (ft/s)	Temperature (°F)	NO <sub>2</sub> Rate (lbs/hr)	CO Rate (lbs/hr)	SO <sub>2</sub> Rate (lbs/hr)	PM10 Rate (lbs/hr)	PM2.5 Rate (lbs/hr)
CBPH	Concrete Batch Plant Heaters (3 units modeled as 1, Unit 12)	14.0	1.5	9.4	90	0.063	0.053	0.001	0.005	0.005

**Table 4: Table of Volume Sources<sup>1</sup>**

Source ID	Description	Release Height (ft)	Horizontal Dimension (ft)	Vertical Dimension (ft)	PM10 Rate (lbs/hr)	PM2.5 Rate (lbs/hr)
AB	Aggregate Bin Loading (Unit 4)	13.1	3.8	7.6	0.009	0.002
AGG_0001	Aggregate Haul Trucks	11.2	19.8	10.4	0.156	0.038
WH	Aggregate Weigh Batcher and Conveyor (Unit 5,6)	6.6	3.8	7.6	0.009	0.002
CON_0001	Concrete Cement Fly Ash Haul Trucks	11.2	19.8	10.4	0.120	0.029
FH	Feed Hopper Loading (Unit 2)	19.7	3.8	7.6	0.274	0.041
TP	Feed Hopper Unloading to Conveyor (Unit 3)	6.6	1.5	3.1	0.009	0.002
SP1	Storage Piles (Aggregate) (Unit 11)	8.0	11.6	7.4	0.179	0.027
SP4	Storage Piles (Sand) (Unit 11)	8.0	11.6	7.4	0.179	0.027

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### **Modeling Assumptions:**

The facility operates from 3AM to 9PM with seasonal operation limited to the following scenarios.

**Table 5: Table of Operating Scenarios**

Model Scenario	Time Segments 9-Hour Blocks November - February	Time Segments 12-Hour Blocks March & October	Time Segments 14-Hour Blocks April & September	Time Segments 15-Hour Blocks May - August
1	7 AM to 4 PM	5 AM to 5 PM	4 AM to 6 PM	3 AM to 6 PM
2	9 AM to 6 PM	7 AM to 7 PM	6 AM to 8 PM	5 AM to 8 PM
3	9 AM to 6 PM	7 AM to 7 PM	7 AM to 9 PM	6 AM to 9 PM
Permit limit	7 AM to 6 PM	5 AM to 7 PM	4 AM to 9 PM	3 AM to 9 PM

**Permit Conditions:** Permit conditions are required to limit the seasonal operations to maximum daily production which is specified by month. The cubic yards per hour limits are listed in the Table 6, below. In addition, earliest start time and latest end time by month are required conditions and are described in Table 5, above.

**Table 6: Table of Maximum Operations**

Month	Cubic Yards Per Day	At Max Hourly Throughput – Hours per Day
November - February	1125	9
March, October	1500	12
April, September	1750	14
May - August	1875	15

### **Conclusion:**

This modeling analysis demonstrates that operation of the facility described in this report neither causes nor contributes to any exceedances of applicable air quality standards. The standards relevant at this facility are NAAQS for CO, NO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, and SO<sub>2</sub>; NMAAQs for CO, NO<sub>2</sub>, and SO<sub>2</sub>; and Class I and Class II PSD increments for NO<sub>2</sub>, and PM<sub>10</sub>.

**Action:** The permit can be issued based on this modeling analysis.

Modeling report submitted by Montrose Air Quality Services (dated 6/22/2021)  
The air quality analysis demonstrates compliance with applicable regulatory requirements.

Model(s) Used: AERMOD version 19191 was used to run the modeling analysis.

**Note:** Complete modeling input and output files can be made available and are located in the

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Modeling Archives in the folder, "9295\_Roper Construction, Inc.\_Alto Concrete Batch Plant".

**Number of Model Runs:** AERMOD - 42 modeling runs were reviewed by NMED.

### **Modeling Parameters:**

The AERMOD regulatory default parameters were included in assumptions made by the model.

Building downwash produced by buildings at the facility was considered. The following buildings were included in the modeling.

**Table 7: Table of Buildings**

Building Name	Height (m)	Diagonal Length (m)
Office	3.7	27.3
Silo	21.0	4.6

### **Complex Terrain Data:**

Both simple and complex types of terrain were used to model the facility. Elevations of receptors, facility sources, and surrounding sources were obtained from USGS data. Flat terrain was used for fugitive sources and elevated terrain was used for other sources.

**Receptor Grid:** The following grids were used to determine the maximum concentration for each pollutant.

**Table 8: Table of Receptors**

Grid Type	Description	Shape	Spacing	Radius
Cartesian	Intermediate	Round	250 meters	3 kilometers
Cartesian	Fine	Round	100 meters	1 kilometers
Cartesian	Very fine	Round	50 meters	0.5 kilometers
Fence line	Very, very fine	Fence line	25 meters	Fence line

Receptors outside of the radii of impact were discarded for the surrounding source runs.

**Meteorological Data:** AERMOD – Holloman Air Force Base 2016-2020.

### **Adjacent Sources:**

The Division 's Modeling Guidance was used to select 26 sources within 50 km of the facility. The facility is 5.4 km from Roper Construction - Rio Bonita Aggregate. The facility is 10.9 km from Mesa Verde - Ruidoso Batch Plant GCP5-4858. The facility is 17.0 km from Fisher - Portable Crusher GCP2-3981. The facility is 63.8 km from Transwestern - Corona Compressor

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Station. The facility is 77.6 km from Lincoln Compressor Station. The facility is 106.9 km from Roswell Ready Mix - Delaware Basin Concrete Plant GCP5-1514.

### **PSD Increment Information:**

The facility is a minor source (for PSD purposes) located in AQCR 153. The minor source baseline dates here are 8/2/1995 for NO<sub>2</sub>, not yet established for SO<sub>2</sub>, 6/16/2000 for PM<sub>10</sub>, and not yet established for PM<sub>2.5</sub>.

The facility is 1.9 km from the Class I area White Mountain Wilderness Area. Class I area modeling is required.

### **Results Discussion:**

Facility alone concentrations are highest modeled values from the facility. Modeled concentrations with surrounding sources are design value concentrations related to the form of the standard. Thus, facility concentrations may appear higher than the concentrations determined in the cumulative analysis.

### **CO Analysis:**

The 1-hour CO concentration was below the significance level. No cumulative analysis is required. The maximum source alone 1-hour CO concentration was 50.490 µg/m<sup>3</sup>, which occurred 83 m west from the center of the facility. This was 0.3% of the NMAAQs.

The 8-hour CO concentration was below the significance level. No cumulative analysis is required. The maximum source alone 8-hour CO concentration was 12.791 µg/m<sup>3</sup>, which occurred 66 m south from the center of the facility. This was 0.1% of the NMAAQs.

### **NO<sub>2</sub> Analysis:**

ARM2 was used with default options (0.5 minimum ratio, 0.9 maximum ratio) to determine the conversion of NO<sub>x</sub> to NO<sub>2</sub>.

Compliance with 1-hour NO<sub>2</sub> NAAQS automatically demonstrates compliance with air quality standards of other periods. The maximum total 1-hour NO<sub>2</sub> concentration was 65.299 µg/m<sup>3</sup>, which occurred 66 m south from the center of the facility. This was 34.7% of the NAAQS. The maximum source alone 1-hour NO<sub>2</sub> concentration was 27.631 µg/m<sup>3</sup>, which occurred 66 m south from the center of the facility. This was 14.7% of the NAAQS.

The maximum total annual NO<sub>2</sub> concentration was 39.515 µg/m<sup>3</sup>, which occurred 66 m south from the center of the facility. This was 42.0% of the NMAAQs. The maximum source alone annual NO<sub>2</sub> concentration was 0.872 µg/m<sup>3</sup>, which occurred 66 m south from the center of the facility. This was 0.9% of the NMAAQs.

The annual NO<sub>2</sub> concentration in Class I areas was below the Class I significance level. No cumulative analysis is required.

### **PM<sub>10</sub> Analysis:**

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The maximum total 24-hour PM<sub>10</sub> concentration was 114.387 µg/m<sup>3</sup>, which occurred 84 m north from the center of the facility. This was 76.3% of the NAAQS. A background concentration of 83.300 µg/m<sup>3</sup> was added from the monitor 6WM, at Las Cruces-West Mesa Well #46. The maximum source alone 24-hour PM<sub>10</sub> concentration was 37.780 µg/m<sup>3</sup>, which occurred 84 m north from the center of the facility. This was 25.2% of the NAAQS.

The maximum total 24-hour PM<sub>10</sub> concentration at a Class I area was 0.672 µg/m<sup>3</sup>, which occurred 3781 m north-northwest from the center of the facility. This was 8.4% of the PSD Class I increment. The maximum source alone 24-hour PM<sub>10</sub> concentration at a Class I area was 0.542 µg/m<sup>3</sup>, which occurred 2796 m north-northwest from the center of the facility. This was 6.8% of the PSD Class I increment.

The annual PM<sub>10</sub> concentration in Class I areas was below the Class I significance level. No cumulative analysis is required. The maximum source alone annual PM<sub>10</sub> concentration was 0.018 µg/m<sup>3</sup>, which occurred 2018 m north-northwest from the center of the facility. This was 0.4% of the PSD Class I increment.

The maximum total 24-hour PM<sub>10</sub> concentration was 29.800 µg/m<sup>3</sup>, which occurred 84 m north from the center of the facility. This was 99.3% of the PSD Class II increment. The maximum source alone 24-hour PM<sub>10</sub> concentration was 27.291 µg/m<sup>3</sup>, which occurred 86 m north from the center of the facility. This was 91.0% of the PSD Class II increment.

The maximum total annual PM<sub>10</sub> concentration was 12.051 µg/m<sup>3</sup>, which occurred 84 m north from the center of the facility. This was 70.9% of the PSD Class II increment. The maximum source alone annual PM<sub>10</sub> concentration was 12.051 µg/m<sup>3</sup>, which occurred 84 m north from the center of the facility. This was 70.9% of the PSD Class II increment.

### **PM<sub>2.5</sub> Analysis:**

The maximum total 24-hour PM<sub>2.5</sub> concentration was 19.032 µg/m<sup>3</sup>, which occurred 84 m north from the center of the facility. This was 54.4% of the NAAQS. A background concentration of 14.900 µg/m<sup>3</sup> was added from the monitor 6Q, at Las Cruces-Environ Dept-1170 N. Solano. The maximum source alone 24-hour PM<sub>2.5</sub> concentration was 5.114 µg/m<sup>3</sup>, which occurred 84 m north from the center of the facility. This was 14.6% of the NAAQS.

The maximum total annual PM<sub>2.5</sub> concentration was 7.235 µg/m<sup>3</sup>, which occurred 84 m north from the center of the facility. This was 60.3% of the NAAQS. A background concentration of 5.100 µg/m<sup>3</sup> was added from the monitor 6Q, at Las Cruces-Environ Dept-1170 N. Solano. The maximum source alone annual PM<sub>2.5</sub> concentration was 2.010 µg/m<sup>3</sup>, which occurred 84 m north from the center of the facility. This was 16.7% of the NAAQS.

### **SO<sub>2</sub> Analysis:**

Compliance with 1-hour SO<sub>2</sub> NAAQS automatically demonstrates compliance with air quality standards of other periods. The 1-hour SO<sub>2</sub> concentration was below the significance level. No cumulative analysis is required. The maximum source alone 1-hour SO<sub>2</sub> concentration was

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0.644  $\mu\text{g}/\text{m}^3$ , which occurred 83 m west from the center of the facility. This was 0.3% of the NAAQS.

The 3-hour  $\text{SO}_2$  concentration was below the significance level. No cumulative analysis is required. The maximum source alone 3-hour  $\text{SO}_2$  concentration was 0.244  $\mu\text{g}/\text{m}^3$ , which occurred 83 m east-southeast from the center of the facility. This was 0.0% of the NAAQS.

The 24-hour  $\text{SO}_2$  concentration was below the significance level. No cumulative analysis is required. The maximum source alone 24-hour  $\text{SO}_2$  concentration was 0.067  $\mu\text{g}/\text{m}^3$ , which occurred 66 m south from the center of the facility. This was 0.0% of the NMAAQs.

The annual  $\text{SO}_2$  concentration was below the significance level. No cumulative analysis is required. The maximum source alone annual  $\text{SO}_2$  concentration was 0.010  $\mu\text{g}/\text{m}^3$ , which occurred 66 m south from the center of the facility. This was 0.0% of the NMAAQs.

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**Table 9: Table of Ambient Impact from Emissions**

Pollutant	Period	Modeled Facility Concentration (µg/m <sup>3</sup> )	Modeled Concentration with Surrounding Sources (µg/m <sup>3</sup> )	Background Concentration (µg/m <sup>3</sup> )	Cumulative Concentration (µg/m <sup>3</sup> )	Standard	Value of Standard (µg/m <sup>3</sup> )	Percent of Standard	UTM East (m)	UTM North (m)	Elevation (ft)
CO	1-hour	50.490	50.490		50.490	NMAAQS	14997.5	0.3	438,158.0	3,697,938.0	4158
CO	8-hour	12.791	12.791		12.791	NMAAQS	9960.1	0.1	438,252.0	3,697,885.0	4158
NO <sub>2</sub>	1-hour	27.631	65.299		65.299	NAAQS	188.03	34.7	438,252.0	3,697,885.0	7248
NO <sub>2</sub>	annual	0.872	39.515		39.515	NMAAQS	94.02	42.0	438,252.0	3,697,885.0	7248
NO <sub>2</sub>	annual		0.005		0.005	PSD Class I	2.5	0.2	437,055.0	3,699,584.0	7292
NO <sub>2</sub>	annual		0.934		0.934	PSD Class II	25	3.7	438,252.0	3,697,885.0	7248
PM <sub>10</sub>	24-hour	37.780	31.087	83.300	114.387	NAAQS	150	76.3	438,234.0	3,698,034.0	7247
PM <sub>10</sub>	24-hour	0.542	0.672		0.672	PSD Class I	8	8.4	436,196.0	3,701,131.0	7037
PM <sub>10</sub>	24-hour	27.291	29.800		29.800	PSD Class II	30	99.3	438,234.0	3,698,034.0	7247
PM <sub>10</sub>	annual	0.018	0.023		0.023	PSD Class I	4	0.6	437,142.0	3,699,642.0	7205
PM <sub>10</sub>	annual	12.051	12.051		12.051	PSD Class II	17	70.9	438,234.0	3,698,034.0	4158
PM <sub>2.5</sub>	24-hour	5.114	4.132	14.900	19.032	NAAQS	35	54.4	438,234.0	3,698,034.0	4158
PM <sub>2.5</sub>	annual	2.010	2.135	5.100	7.235	NAAQS	12	60.3	438,234.0	3,698,034.0	4158
SO <sub>2</sub>	1-hour	0.644	0.644		0.644	NAAQS	196.4	0.3	438,158.0	3,697,938.0	4158
SO <sub>2</sub>	3-hour	0.244	0.244		0.244	NAAQS	1309.3	0.0	438,319.0	3,697,925.0	4158
SO <sub>2</sub>	24-hour	0.067	0.067		0.067	NMAAQS	261.9	0.0	438,252.0	3,697,885.0	4158
SO <sub>2</sub>	annual	0.010	0.010		0.010	NMAAQS	52.4	0.0	438,252.0	3,697,885.0	4158