Air Quality Impact Analysis

Proposed Project, 1032 W. 43rd Street, Chicago, Illinois

September 24, 2021

Project 821AR00961

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1 Introduction

1.1 Purpose of this Analysis

This air quality impact analysis (AQIA) report has been prepared to review potential impacts from a proposed multi-tenant industrial building project located at 1032 43rd Street in Chicago, Illinois (Project). The Chicago Air Quality Ordinance Municipal Code Section 17-9-0117-G.1 (March 2021) requires an AQIA to be submitted and approved by City agencies, the Department of Planning and Development (DPD), and the Chicago Department of Public Health (CDPH).

This analysis addresses Project operational impacts at off-site receptor locations from on-site mobile and stationary source NO_X, $PM_{2.5}$, and PM_{10} emissions, as well as off-site mobile source emissions of these pollutants. Air quality impacts were reviewed for NO_2, $PM_{2.5}$, and PM_{10}. Off-site mobile sources at nearby roads and intersections were identified from a Traffic Study prepared by Kenig, Lindgren, O'Hara, Aboona, Inc. (KLOA 2021). Modeled impacts were assessed to determine if the proposed Project would be expected to cause or contribute to an exceedance of the National Ambient Air Quality Standards (NAAQS).

In accordance with the Chicago Air Quality Ordinance, emissions from mobile sources associated with the proposed Project were modeled using output from the US Environmental Protection Agency (USEPA) MOtor Vehicle Emission Simulator (MOVES) emission modeling system (USEPA 2021a). Vehicle emissions from MOVES were provided in an Excel lookup table by the City of Chicago (Chicago DPH 2021) for NO_X, $PM_{2.5}$, and PM_{10}. Vehicle emissions calculated from MOVES were utilized to model air quality impacts with USEPA's air dispersion modeling AERMOD software (USEPA 2021b).

1.2 Proposed Project

The proposed Project consists of the construction of a 103,354 square foot multi-tenant industrial building with loading docks and car/trailer parking lots on a 7.98-acre site. The Project site is located at 1032 West 43rd Street in Chicago, Illinois, and currently sits mostly vacant, with a parking lot located on the southwest side of the site. The Project site is situated north of W. 43rd Street, south of Exchange Avenue, east of S. Racine Avenue, and west of S. Morgan Street. This Project site is in a commercial and industrial area in the south side of Chicago.

2 Methodology and Assumptions

2.1 Models Used

Pursuant to the Chicago Air Quality Ordinance, the USEPA AERMOD atmospheric and air dispersion software was selected for modeling the air quality impacts from on- and off-site emissions (USEPA 2021b) associated with the Project. Impacts of NO_X, $PM_{2.5}$, and PM_{10} emissions from Project-related mobile sources travelling on-site and on off-site roads surrounding the property were analyzed. Emissions from the USEPA MOVES modeling system were selected to calculate the NO_X, $PM_{2.5}$, and PM_{10} emissions from cars and trucks due to traffic generated by Project operations (USEPA 2021a).

2.2 Air Pollutants Evaluated

The proposed Project is the development of a multi-tenant industrial building with loading docks and parking lots for employees, customers, and truck trailers. The main pollutants of concern are NO_2, $PM_{2.5}$, and PM_{10} from Project-generated traffic and from building heaters. The NO_X emissions include NO emissions that are converted to NO_2 in the atmosphere, as well as directly-emitted NO_2.

2.3 Assumptions

The following assumptions were made in the modeling and analysis of air quality impacts due to the operation of the Project.

2.3.1 Facility and Equipment Operating Hours

The operating hours of the facility were assumed to be 6 AM – 6 PM. While a few vehicle trips could occur outside this period, this is the period during each day that most mobile source emissions will occur. On-site combustion emissions from natural gas sources could occur at any time during a 24-hour day.

2.3.2 On-site Equipment Assumptions:

- All forklifts proposed to be used on-site will be electrically powered and will generate no on-site emissions.
- The building heating, ventilation, and air-conditioning (HVAC) units will be natural gas-fired and will generate on-site emissions due to the burning of natural gas.
- Water heaters proposed to be used on-site will be natural gas-powered and will generate on-site emissions due to the burning of natural gas.
- The total amount of natural gas burned for comfort heating and water heaters combined will not exceed 10 MMBtu/hr. This assumption is very conservative, since not more than 6-8 MMBtu/hr of natural gas equipment is expected to be installed, and equipment will not be operated at the maximum rating.

2.3.3 Emissions Assumptions:

- MOVES source types “Passenger Car” and “Combination Short-haul Truck” accurately represent Project passenger car and truck sources, respectively.
- MOVES default fuel inputs represent Project passenger car and truck fuels.
- Workers and visitors were assumed to drive gasoline-powered passenger cars traveling on unrestricted urban roads in Project year 2022 and later.
- Trucks were assumed to be diesel-powered Combination Short-haul Trucks traveling on unrestricted urban roads in Project year 2022 and later.
- Heater emissions during all hours of the 24-hour day will occur at 100% rating. This assumption is very conservative because comfort heaters and water heaters will not be operating at 100% rating all of the time.

2.3.4 AERMOD Assumptions:

- Passenger vehicles and trucks will travel the full north-south length of the property.
- Roadway link lengths were based on distances in the Traffic Study (KLOA 2021) and Google Earth.
- Project-generated vehicle trips to and from each of four intersections (Racine Street and 43rd Street, Morgan Street and 43rd Street, Racine Street and Exchange Avenue, and Morgan Street and Exchange Avenue) were assumed to model off-site vehicle emissions.
- Project-generated traffic was assumed to operate from 6 AM to 6 PM.
- All passenger vehicles will travel on the east side parking lot area of the Project site.
- All trucks will travel on the west side parking and loading dock area of the Project site, and idle in the docking bays.
- Off-site Project-generated traffic was split between 43rd Street, Exchange Avenue, Racine Street, and Morgan Street as per Figures 7, 8, and 9 in the Traffic Study (KLOA 2021).
- The average passenger vehicle height will be 1.53 meters and truck vehicle height will be 4.0 meters.

- Mobile vehicle emissions during travel were modeled as a line volume source in AERMOD.
- Mobile vehicle emissions while idling were modeled as an area source in AERMOD.
- Multiple comfort and water heater sources for the multi-tenant building were modeled as an elevated area source in AERMOD.

2.4 Background Concentrations

The Illinois Environmental Protection Agency (IEPA) operates a network of ambient air monitoring stations throughout Illinois (see Figure 1). The purpose of the monitoring stations is to measure ambient concentrations of pollutants, including criteria pollutants, to determine whether or not the NAAQS are met or exceeded. Monitors within the "Chicago-Naperville-Elgin, IL-IN-WI" Core Based Statistical Areas (CBSA) were evaluated to find a station that best represents the background concentrations for the Project site. Factors considered in selecting the best representative background station for the Project site included distance to the Project, and the similarity of the monitor setting to the Project site, in terms of land use, meteorological conditions, and the mix of nearby emission sources. The surface characteristics at the monitoring stations reviewed were judged to be similar to that at the Project site. Land use distribution indicates that most of the monitoring stations can be described as residential communities of high and low intensity combined with moderate commercial, industrial, and transportation facilities. Without a clear distinction in the topologic and meteorological conditions among these sites, the most representative single monitoring station was selected based on (1) data completeness and (2) the shortest distance to the Project site.

Ambient data for NO_2 was obtained from the IEPA Trailer monitoring station (4743 Mannheim Rd., approximately 15.49 miles northwest of the Project site); and ambient data for PM_{10} was obtained from the Northbrook Water Plant monitoring station (750 Dundee Road, approximately 23.61 miles north of the Project site). $PM_{2.5}$ ambient data was obtained from the Com Ed Maintenance Bldg. (170310076) monitoring station (7801 Lawndale, approximately 5.48 miles Southwest of the Project site). Ambient concentrations over the most recent three monitoring years, 2018 through 2020, are presented in Table 2-1.

Figure 1 Chicago Area Air Quality Monitor Sites

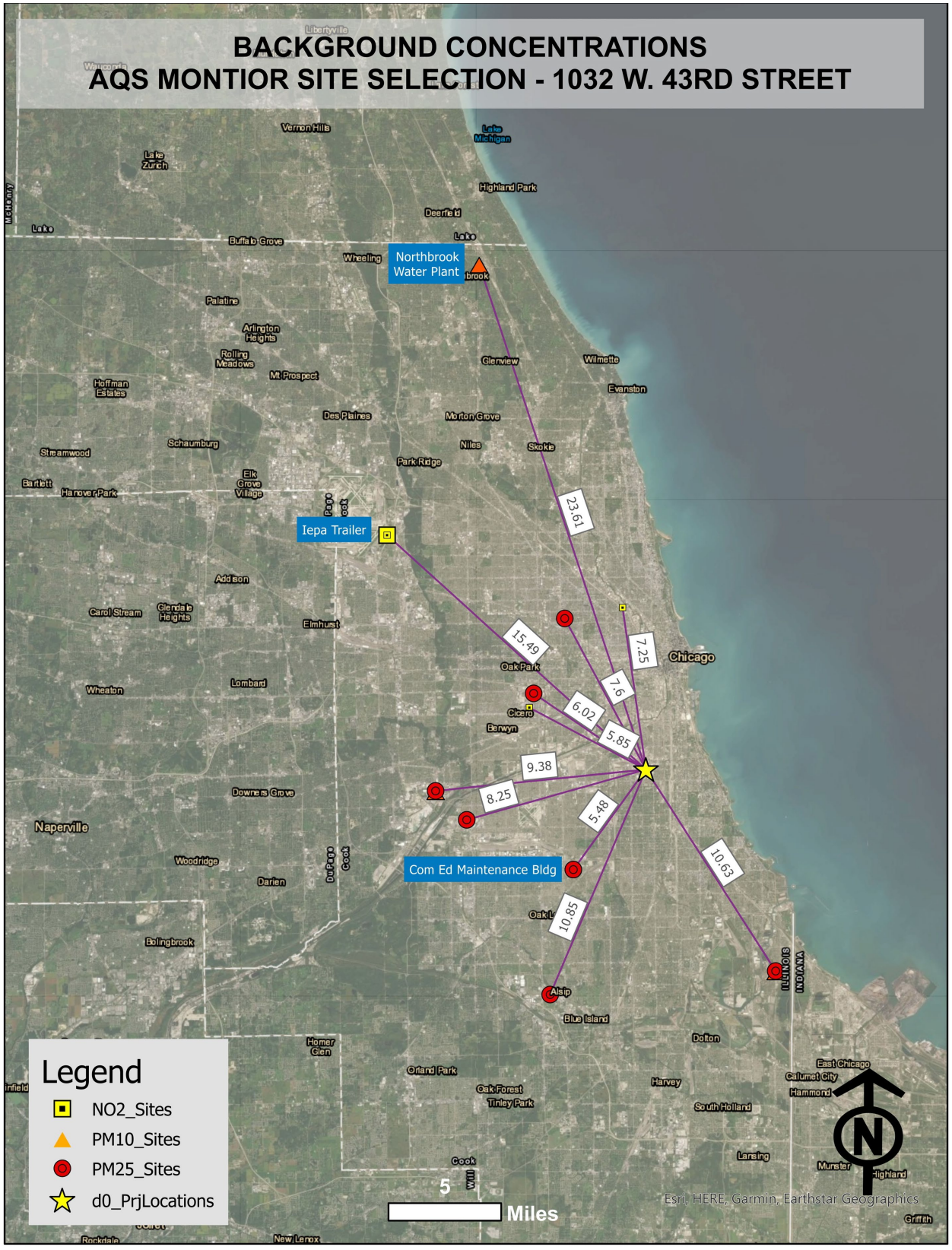


Table 2-1 Ambient Air Background Pollutant Concentration/Standards

Pollutant	2018	2019	2020	Fed Design Value for Modeling (µg/m^3)
Nitrogen Dioxide (NO_2)*				
National 1-hour statistical concentration (ppb)[1]	61.0	54.1	50.2	104
Annual Average (ppb) [2]	17.91	17.43	15.19	33.7
NAAQS 1-hour (>100 ppb)/Annual (>53 ppb)	0 / No	0 / No	0 / No	--
Fine Particulate Matter ($PM_{2.5}$)**				
Maximum 24-hour concentration (µg/m^3) [1]	17.8	24.9	14.5	19.1
Annual average concentration (µg/m^3) [1]	9.025	8.317	8.339	8.6
NAAQS 24-hour (>35 µg/m^3)/Annual (>12.0 µg/m^3)	0 / No	0 / No	0 / No	--
Respirable Particulate Matter (PM_{10})***				
National maximum 24-hour concentration (µg/m^3) [2]	84	53	101	101
NAAQS 24-hour (>150 µg/m^3)	0	0	0	--

Notes:
- µg/m^3 = micrograms per cubic meter; ppb = parts per billion; ppm = parts per million; N/A = Not available.
- NAAQS = National Ambient Air Quality Standard.
- NO_2 measured at the IEPA Trailer monitoring station (4743 Mannheim Rd., approximately 15.49 miles northwest of the project site), Com Ed Maintenance Bldg (170310076), Kennedy Near Road 2 (170310219), and Cook County Trailer (170314002) were also evaluated but did not meet data completeness criteria for 1-hour NO_2.
- ** $PM_{2.5}$ measured at Com Ed Maintenance Bldg (170310076) monitoring station (7801 Lawndale, approximately 5.48 miles Southwest of the Project site).
- *** PM_{10} measured at the Northbrook Water Plant (AQS:170314201) monitoring station (750 Dundee Road, approximately 23.61 miles north of the Project site). Washington HS (170310022) and Village Hall (170311016) stations were also evaluated but did not meet data completeness criteria of 4 complete quarters for three most recent years.

Sources:
- [1] USEPA 2020.
- [2] USEPA 2021c.

2.5 Model Inputs

The MOVES emissions calculations from vehicular traffic and the AERMOD air dispersion modeling were set up and completed using the following inputs:

2.5.1 Emissions Input Summary:

- All trip rates of Project-generated traffic use peak hourly traffic for year 2027 (peak AM traffic, as listed in traffic study) to generate emissions for modeling each hour. These maximum hourly emissions were applied to all operating hours for daily and annual emissions. This assumption is very conservative because trip rates for any given hour each day range from 2 trips/hour in early morning to up to 9 trips/hour during peak hours.
- Emission rates for year 2022 were used, providing a conservative emission rate with full projected 2027 traffic volumes.
- Vehicles will travel off-site at approximately 15 miles per hour (mph) in links approaching entryways, and 25 mph beyond the four intersections bordering the Project site.
- Vehicles will travel on-site at approximately 5 mph.
- No idling of passenger vehicles will occur on-site.

- Trucks will idle for a maximum of 5 minutes on-site.
- All passenger vehicles and trucks were assumed to idle at the four offsite intersections for the amount of delay listed in the traffic report.

2.5.2 AERMOD Input Summary

- Dimensions / locations of the building, parking lots, loading docks, property fence line, and surrounding area streets were obtained from the Project brochure, the Traffic Study, and Google Earth.
- Off-site and on-site roads were modeled as Line-Volume sources. Emissions from each road segment were equally distributed between the volume sources in each segment's Line-Volume source.
- Idling vehicles at the four off-site intersections and in the on-site dock area of the Project site were modeled as Area sources.
- Comfort heaters and water heaters were modeled as one Area source covering the entire footprint of the building. Emissions from these sources were equally distributed across the source's area.
- For NO2 modeling, the ARM2 option was chosen with a default NO2/NOX in-stack ratio (ISR) of minimum 0.5 and maximum 0.9 following USEPA guidance (USEPA 2017).
- Urban dispersion coefficient with a population of 2,700,000 was chosen (US Census 2019).
- For all roadway Line-Volume and vehicle idling Area sources, emissions were modeled during the hours of 6 AM – 6 PM, seven days/week.
- For the Area source representing the heaters, emissions were modeled for 24 hrs/day, 365 days/yr.
- Five years (2016-2020) of hourly prognostic meteorological data were generated from the Weather Research Forecasting (WRF) model and processed into AERMOD-ready format using the Mesoscale Model Interface Program (MMIF) (Ramboll 2021) for coordinates 41.817351 N, -87.652562 W, which is on-site at the 1032 W. 43rd Street Project site. The meteorological data are representative of meteorological conditions at the Project site. See Figure 2 in Section 4.3 for the meteorological data wind rose.

3 Emission Sources and Factors

3.1 Emission Sources

The following emissions sources were modeled using parameters provided by the Applicant, the 2021 KLOA Inc. Traffic Impact Study, and Google Earth.

Emission sources were modeled as Line-Volume sources in AERMOD:

On-site:

- Line-Volume sources plume width = 9 meters (29.5 ft).
- East employee drive area to enter/exit/reach parking spots (approximately 950 ft).
- West truck drive area to enter/exit/reach docking bays (approximately 950 ft).
- West Truck Loading Bays (approximately 60 ft x 615 ft).

Off-site:

- Line-Volume sources plume width = 13.83 meters (45.4 ft).
- Exchange Avenue between Racine and Morgan (1,270 ft).
- 43rd Street between Racine and Morgan (1,270 ft).

- Exchange Avenue continuing to the east ¼ mile from site boundary.
- 43rd Street continuing to the west ¼ mile from site boundary.
- Morgan Street continuing to the north ¼ mile from site boundary.
- Morgan Street continuing to the south ¼ mile from site boundary.
- Racine Avenue continuing to the north ¼ mile from site boundary.
- Racine Avenue continuing to the south ¼ mile from site boundary.

3.2 Emission sources modeled as Area sources in AERMOD

On-site:

- Comfort heating and water heater (approximately 130,000 ft2).

Off-site:

- Area sources cover the roadways approximately 25 meters (82 ft) from the center point of the intersections and the entire 2-lane roadway width (10 meters or 32.8 ft).
- Idling area at 43rd Street and Racine Avenue.
- Idling area at Racine Avenue and Exchange Avenue.
- Idling area at Exchange Avenue and Morgan Street.
- Idling area at Morgan Street and 43rd Street.

3.3 Source-Specific Emission Factors

Table 3-1 shows the emission factors that were used to calculate emissions from on-site and off-site vehicular traffic due to the project. These emission factors were provided by the Chicago Department of Public Health.

Table 3-1 Emission Factors – On-Site and Off-Site Vehicles

Vehicle Type / Speed Bin	NO_x EF (g/mi)	$PM_{2.5}$ EF (g/mi)	PM_{10} EF (g/mi)
Passenger Car 2.5 <= speed < 7.5 mph	0.09	0.004	0.005
Passenger Car 12.5 <= speed < 17.5 mph	0.08	0.002	0.003
Passenger Car 22.5 <= speed < 27.5 mph	0.07	0.002	0.002
Truck 2.5 <= speed < 7.5 mph	26.0	0.54	0.59
Truck 12.5 <= speed < 17.5 mph	12.6	0.31	0.34
Truck 22.5 <= speed < 27.5 mph	9.40	0.26	0.28
Vehicle Type - Idling	(g/hr)	(g/hr)	(g/hr)
Passenger Car Idling	0.24	0.02	0.02
Truck Idling	59.4	1.74	1.89

In addition to emissions from on- and off-site traffic, emissions due to on-site comfort heating and water heaters in the building were calculated using emission factors from AP-42 Section 1.4 Natural Gas Combustion, Table 1.4-1 (NO_X) and Table 1.4-2 (PM – Total) (USEPA 1998). The calculated emissions were spread over the entire area of the building footprint and were calculated with the assumption that all heaters add up to 10 MMBtu/hr in rating. The emission factors used are shown in Table 3-2.

Table 3-2 Emission Factors – On-Site Comfort Heating and Water Heaters

Pollutant	Emission Factor (lb/MMscf)
NO_X	100
$PM_{2.5}$	7.6
PM_{10}	7.6

Emissions Calculations tables are included in Attachment A.

4 Model Inputs and Parameters

4.1 Mobile Emission Source Inputs

Estimating Top of Plume Height

- Passenger Vehicles = 1.53 x 1.7 = 2.6 m
- Trucks = 4.0 x 1.7 = 6.8 m
- Weighted = (0.9 x 2.6) + (0.1 x 6.8) = 3.02 m

Estimating Release Height

- Passenger Vehicles = 2.6 x 0.5 = 1.3 m
- Trucks = 6.8 x 0.5 = 3.4 m
- Weighted = 3.02 x 0.5 = 1.51 m

Estimating Initial Vertical Dimensions (σ_{zo})

- Passenger Vehicles = 2.6 / 2.15 = 1.2 m
- Trucks = 6.8 / 2.15 = 3.2 m
- Weighted = 3.02 / 2.15 = 1.4 m

4.2 Heater Emission Source Inputs

One area source was used to represent comfort heating and water heating emissions. The building height is projected to be 32 ft, so a release height of half of the building height (16 ft) was assumed. An initial vertical dimension of 14.9 ft (building height divided by 2.15 for a surface-based source) was assumed. Heater emissions were spread out evenly across the total area of the area source.

Source Input parameters for NOX, PM2.5, and PM10 model runs are listed in Table 4-1 below.

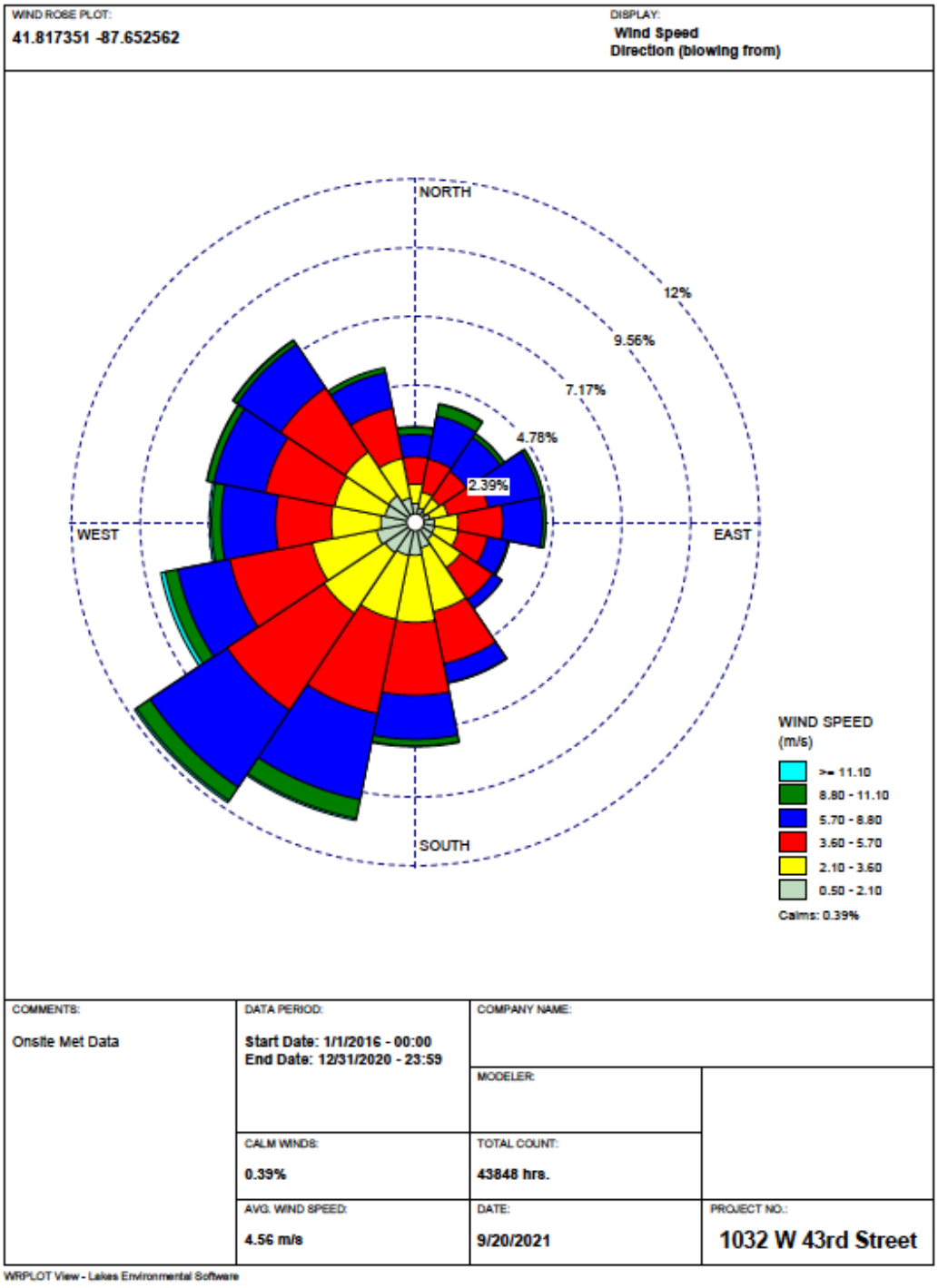
Table 4-1 43rd Street Project AERMOD Model Parameters

Source ID	Description	Type	Release Height (m)	σ_z (m)	Plume Width (m)	σ_y (m)	Area (m^2)	Max Hourly Emission Rate		
								NO_x (g/s)	PM_{10} (g/s)	$PM_{2.5}$ (g/s)
EX	Exchange Avenue	LINE_VOLUME	1.51	1.41	13.83	6.43	--	1.34E-03	3.64E-05	3.34E-05
43	W 43rd Street	LINE_VOLUME	1.51	1.41	13.83	6.43	--	2.64E-03	7.20E-05	6.61E-05
EXIN	Exchange Avenue Inbound, extended 1/4 mile east from site boundary	LINE_VOLUME	1.51	1.41	13.83	6.43	--	1.38E-03	4.07E-05	3.74E-05
43IN	W 43rd Street Inbound, extended 1/4 mile west from site boundary	LINE_VOLUME	1.51	1.41	13.83	6.43	--	1.43E-03	4.20E-05	3.85E-05
RACN	S Racine Avenue Inbound, extended 1/4 mile north from site boundary	LINE_VOLUME	1.51	1.41	13.83	6.43	--	2.47E-05	6.23E-07	5.51E-07
RACS	S Racine Inbound, extended 1/4 mile south from site boundary	LINE_VOLUME	1.51	1.41	13.83	6.43	--	1.41E-03	4.15E-05	3.80E-05
MORN	S Morgan Street Inbound, extended 1/4 mile north from site boundary	LINE_VOLUME	1.51	1.41	13.83	6.43	--	6.92E-04	2.04E-05	1.87E-05
MORS	S Morgan Street Inbound, extended 1/4 mile south from site boundary	LINE_VOLUME	1.51	1.41	13.83	6.43	--	6.92E-04	2.04E-05	1.87E-05
DOCKTRAV	On-site travel by trucks	LINE_VOLUME	3.40	3.16	9.0	4.19	--	1.18E-02	2.67E-04	2.46E-04
PASSPARK	On-site travel by cars	LINE_VOLUME	1.30	1.21	9.0	4.19	--	3.70E-04	1.89E-05	1.67E-05
Source ID	Description	Type	Release Height (m)	σ_z (m)	Plume Width (m)	σ_y (m)	Area (m^2)	($g/s-m^2$)	($g/s-m^2$)	($g/s-m^2$)
DOCKIDLE	Truck idling docks	AREA_POLY	3.40	3.16	--	--	3463.1	3.57E-06	1.14E-07	1.04E-07
SWIDLE	Traffic idling at Racine Ave x 43rd St	AREA_POLY	1.51	1.41	--	--	642.4	6.36E-06	2.02E-07	1.86E-07
SEIDLE	Traffic idling at Morgan St x 43rd St	AREA_POLY	1.51	1.41	--	--	479.6	6.32E-09	4.91E-10	4.34E-10
NEIDLE	Traffic idling at Exchange Ave x Morgan St	AREA_POLY	1.51	1.41	--	--	560.3	3.65E-06	1.16E-07	1.07E-07
NWIDLE	Traffic idling at Racine Ave x Exchange Ave	AREA_POLY	1.51	1.41	--	--	447.7	1.03E-06	3.28E-08	3.02E-08
HTRS	Comfort Heating Units	AREA	9.75	4.54	--	--	11910.3	1.04E-05	7.88E-07	7.88E-07

4.3 Meteorological Data Set Used

Meteorological data was generated from Weather Research and Forecasting Model (WRF) Model data and processed into AERMOD-ready format using. The WRF data were obtained from the National Center for Atmospheric Research utilizing the Nested Regional Climate Model (NRCM). Five years of hourly on-site and upper air data from January 01, 2016 through December 31, 2020, were obtained and processed to generate surface and profile data ready for input into AERMOD. See Figure 2 for the five-year Meteorological data wind rose.

Figure 2 43rd Street On-Site Wind Rose (2016-2020)



4.4 Terrain

Flat terrain was assumed for the AERMOD modeling analysis. This is because the terrain elevations for several kilometers around the Facility are at nearly the same elevation as the Facility. The base elevation of the project site is 181.5 meters above mean sea level (MSL).

4.5 Modeling Receptors

Grid receptors surrounding the roadway line-volume sources were placed at a spacing of 10 meters, out to approximately 50 meters from the center of the roadways. Some on-site grid receptors were placed in the visitor's parking lot area to the south of the building at a spacing of 10 meters. The rest of the grid receptors were placed in off-site areas approximately 1,000 m from the center of the Project site at a spacing of 50 meters. Fence line receptors were spaced at 20 meters.

4.6 Operating Schedule

All of the sources, except for the building heater source, were modeled to operate for 12 hours each day (including weekends), 6 AM to 6 PM. Although a 5 day/week work schedule is the assumed operations schedule for this Project, all 7 days of the week were included in the modeling in order to capture each day's meteorological conditions in the five years of meteorological data. Because maximum hourly operations were used for all averaging periods, sources were turned on or off using 1 (on) or 0 (off) for HROFDY variable emissions scenarios.

4.7 Building Downwash

There is no building downwash considered in this model as there are only line-volume and area sources considered and no point sources.

5 Results

5.1 National Ambient Air Quality Standards (NAAQS)

The National Ambient Air Quality Standards (NAAQS) are set by USEPA to help protect the public health and the environment from the impacts of criteria air pollutants. Table 5-1 below shows the NAAQS thresholds (or design values) and the design value basis for NO_2, $PM_{2.5}$, and PM_{10}.

Table 5-1 NAAQS Threshold Limits and Design Values

Pollutant	Averaging Time	Threshold	Design Value Basis
NO_2[1]	1-hour	188 µg/m^3	98th Percentile (H8H) Max. Daily Values Avg. over 5 years[2]
	Annual	100 µg/m^3	Highest Annual over 5 years
$PM_{2.5}$	1-hour	35 µg/m^3	98th Percentile (H8H) Avg. over 5 years[2]
	24-hour	12.0 µg/m^3	Annual Avg. over 5 years[2]
PM_{10}	24-hour	150 µg/m^3	High-4th-High over 5 years[2]

- 1. USEPA presents the NO_2 limits in units of ppb. These values have been converted to units of µg/m^3 using USEPA's conversion factor of 1 ppm volume = 1,880 µg/m^3.
- 2. Design values set by USEPA are based on 3-year periods. However, because five years of meteorological data are modeled for the AQIA, the design values for these results are obtained over 5 years.

5.2 Results

The AERMOD runs estimated impacts from NO_2, $PM_{2.5}$, and PM_{10} emissions from Project-generated passenger vehicle and truck emissions both on- and off-site. The modeled concentration impacts were added to the background values discussed in Section 2.4, then compared to the NAAQS threshold limits discussed in Section 5.1. Table 6 shows the modeled impacts for on- and off-site emission sources, and then added to the background values, for comparison to the NAAQS. Attachment B shows the modeled concentration isopleths for each pollutant / averaging time. Attachment C includes the electronic AERMOD modeling files.

Table 5-2 43rd Street Project Modeled Impacts + Background

Pollutant	Averaging Period	Modeled Impact Conc.[1] (µg/m³)	Ambient Background (µg/m³)	Total Conc. (µg/m³)	NAAQS (µg/m³)	Exceed NAAQS?
Impacts from On-Site Sources						
NO_2[4]	1-hour[2]	76.1	104	180	188	No
	Annual[2]	7.61	33.7	41.3	100	No
$PM_{2.5}$	24-hour[3]	1.61	19.1	20.7	35	No
	Annual	0.59	8.6	9.2	12	No
PM_{10}	24-hour	2.35	101	103	150	No
Impacts from Off-Site Sources						
NO_2[4]	1-hour[2]	21.1	104	125	188	No
	Annual[2]	1.33	33.7	35.0	100	No
$PM_{2.5}$	24-hour[3]	0.14	19.1	19.2	35	No
	Annual	0.04	8.6	8.6	12	No
PM_{10}	24-hour	0.23	101	101	150	No
Impacts from All Sources						
NO_2[4]	1-hour[2]	76.3	104	180	188	No
	Annual[2]	7.65	33.7	41.4	100	No
$PM_{2.5}$	24-hour[3]	1.62	19.1	20.7	35	No
	Annual	0.59	8.6	9.2	12	No
PM_{10}	24-hour	2.35	101	103	150	No

- [1] Unless otherwise noted, all values reported are the 1st Highest High.
- [2] Annual NO2 concentration is reported as the highest annual concentration among the 5 years of modeled Met data. 1-hour NO2 concentration is reported as the 8th Highest High (i.e., the 98th percentile, five-year average) for the NAAQS analysis.
- [3] The 24-hour PM2.5 concentration is reported as the 8th Highest High (i.e., the 98th percentile, five-year average).
- [4] The 1-hour and annual NO2 concentrations were determined using the Tier 2 ARM2 method.

The highest modeled concentrations of 1-hr NO_2 were seen on the northern fence line of the Project site, just south of W. Exchange Avenue. The highest modeled concentrations of annual NO_2 were seen on the eastern fence line of the Project site, near the employee parking lot.

The highest modeled concentrations of 24-hr $PM_{2.5}$ were seen on the northern fence line of the Project site, just south of W. Exchange Avenue. The highest modeled concentrations of annual $PM_{2.5}$ were seen on the eastern fence line of the Project site, near the employee parking lot.

The highest modeled concentrations of 24-hr PM_{10} were seen on the northern fence line of the Project site, just south of W. Exchange Avenue.

6 Conclusions

The AQIA reviewed the modeled concentration impacts of NO_2, $PM_{2.5}$, and PM_{10} due to emissions from Project-generated passenger vehicle and truck emissions both on- and off-site, as well as on-site stationary sources. Modeled concentrations from Project-related sources were added to background concentrations in the Project site vicinity. When compared to the applicable NAAQS standards, total concentrations are below the NAAQS thresholds. Therefore, the West 43rd Avenue Project is not expected to cause or contribute to an exceedance of the NAAQS.

7 References

Chicago DPH 2021. *Procedure for Calculating Emissions Using the MOVES Lookup Tables (DRAFT)* and accompanying Excel Tables, Chicago Department of Public Health, August 2021.

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ATTACHMENT A

EMISSIONS CALCULATIONS TABLES

1032 W. 43rd Street, Chicago, IL
Roadway Emissions by Link
September 23, 2021

Mobile Emissions

Type/Size	Weekday Morning Peak Hour		
	In	Out	Total
General Light Industrial	80	11	91
Passenger Vehicles (90%)	72	10	82
Trucks (10%)	8	1	9
Type/Size	**Weekday Evening Peak Hour**		
	In	**Out**	**Total**
General Light Industrial	11	71	82
Passenger Vehicles (90%)	10	64	74
Trucks (10%)	1	7	8
Type/Size	**Daily Two-Way Trips**		
	In	**Out**	**Total**
General Light Industrial	324	324	648
Passenger Vehicles (90%)	292	292	584
Trucks (10%)	32	32	64

Information from Table 1 of KLOA traffic report

Peak Vehicles (am or pm)	Hourly	Daily
Total	91	648
Passenger Vehicles (90%)	82	584
Trucks (10%)	9	64

1032 W. 43rd Street, Chicago, IL

Roadway Emissions by Link

September 23, 2021

Offsite Travel

Passenger Cars

Link	Distance (ft)	Volume peak hour	Miles per peak hour	Year	Vehicle Type	Fuel	Speed Bin	NO_x EF (g/mi)	PM_{10} EF (g/mi)	$PM_{2.5}$ EF (g/mi)	Hourly NO_x rate (g/hr)	Hourly PM_{10} rate (g/hr)	Hourly $PM_{2.5}$ rate (g/hr)	Hourly NO_x rate (g/s)	Hourly PM_{10} rate (g/s)	Hourly $PM_{2.5}$ rate (g/s)
EX-620	620	5	0.59	2022	Passenger Car	Gasoline	12.5 <= speed < 17.5 mph	0.076	0.003	0.002	0.044	0.002	0.001	1.23E-05	4.21E-07	3.72E-07
EX-310	310	5	0.29	2022	Passenger Car	Gasoline	12.5 <= speed < 17.5 mph	0.076	0.003	0.002	0.022	0.001	0.001	6.16E-06	2.11E-07	1.86E-07
EX-340	340	23	1.48	2022	Passenger Car	Gasoline	12.5 <= speed < 17.5 mph	0.076	0.003	0.002	0.112	0.004	0.003	3.11E-05	1.06E-06	9.40E-07
EX-IN	1320	15	3.75	2022	Passenger Car	Gasoline	22.5 <= speed < 27.5 mph	0.071	0.002	0.002	0.267	0.007	0.006	7.41E-05	1.87E-06	1.65E-06
43-IN	1320	25	6.25	2022	Passenger Car	Gasoline	22.5 <= speed < 27.5 mph	0.071	0.002	0.002	0.444	0.011	0.010	1.23E-04	3.11E-06	2.76E-06
43-620	620	46	5.40	2022	Passenger Car	Gasoline	12.5 <= speed < 17.5 mph	0.076	0.003	0.002	0.408	0.014	0.012	1.13E-04	3.87E-06	3.43E-06
43-310	310	27	1.59	2022	Passenger Car	Gasoline	12.5 <= speed < 17.5 mph	0.076	0.003	0.002	0.120	0.004	0.004	3.33E-05	1.14E-06	1.01E-06
43-340	340	8	0.52	2022	Passenger Car	Gasoline	12.5 <= speed < 17.5 mph	0.076	0.003	0.002	0.039	0.001	0.001	1.08E-05	3.69E-07	3.27E-07
RAC-N	1320	5	1.25	2022	Passenger Car	Gasoline	22.5 <= speed < 27.5 mph	0.071	0.002	0.002	0.089	0.002	0.002	2.47E-05	6.23E-07	5.51E-07
RAC-N-S	956	0	0	2022	Passenger Car	Gasoline	12.5 <= speed < 17.5 mph	0.076	0.003	0.002	0	0	0	0	0	0
RAC-S	1320	21	5.25	2022	Passenger Car	Gasoline	22.5 <= speed < 27.5 mph	0.071	0.002	0.002	0.373	0.009	0.008	1.04E-04	2.62E-06	2.31E-06
MOR-N	1320	8	2.00	2022	Passenger Car	Gasoline	22.5 <= speed < 27.5 mph	0.071	0.002	0.002	0.142	0.004	0.003	3.95E-05	9.97E-07	8.82E-07
MOR-N-S	956	0	0	2022	Passenger Car	Gasoline	12.5 <= speed < 17.5 mph	0.076	0.003	0.002	0	0	0	0	0	0
MOR-S	1320	8	2.00	2022	Passenger Car	Gasoline	22.5 <= speed < 27.5 mph	0.071	0.002	0.002	0.142	0.004	0.003	3.95E-05	9.97E-07	8.82E-07

Information from Figure 8 of KLOA traffic report

Trucks

Link	Distance (ft)	Volume peak hour	Miles per peak hour	Year	Vehicle Type	Fuel	Speed Bin	NO_x EF (g/mi)	PM_{10} EF (g/mi)	$PM_{2.5}$ EF (g/mi)	Hourly NO_x rate (g/hr)	Hourly PM_{10} rate (g/hr)	Hourly $PM_{2.5}$ rate (g/hr)	Hourly NO_x rate (g/s)	Hourly PM_{10} rate (g/s)	Hourly $PM_{2.5}$ rate (g/s)
EX-620	620	0	0	2022	Combination Short-haul Truck	Diesel Fuel	12.5 <= speed < 17.5 mph	12.6	0.34	0.31	0	0	0	0	0	0
EX-310	310	3	0.18	2022	Combination Short-haul Truck	Diesel Fuel	12.5 <= speed < 17.5 mph	12.6	0.34	0.31	2.2172	0.0595	0.0548	6.16E-04	1.65E-05	1.52E-05
EX-340	340	3	0.19	2022	Combination Short-haul Truck	Diesel Fuel	12.5 <= speed < 17.5 mph	12.6	0.34	0.31	2.4318	0.0653	0.0601	6.75E-04	1.81E-05	1.67E-05
EX-IN	1320	2	0.50	2022	Combination Short-haul Truck	Diesel Fuel	22.5 <= speed < 27.5 mph	9.40	0.28	0.26	4.7003	0.1398	0.1286	1.31E-03	3.88E-05	3.57E-05
43-IN	1320	2	0.50	2022	Combination Short-haul Truck	Diesel Fuel	22.5 <= speed < 27.5 mph	9.40	0.28	0.26	4.7003	0.1398	0.1286	1.31E-03	3.88E-05	3.57E-05
43-620	620	5	0.59	2022	Combination Short-haul Truck	Diesel Fuel	12.5 <= speed < 17.5 mph	12.6	0.34	0.31	7.3907	0.1984	0.1825	2.05E-03	5.51E-05	5.07E-05
43-310	310	1	0.06	2022	Combination Short-haul Truck	Diesel Fuel	12.5 <= speed < 17.5 mph	12.6	0.34	0.31	0.7391	0.0198	0.0183	2.05E-04	5.51E-06	5.07E-06
43-340	340	1	0.06	2022	Combination Short-haul Truck	Diesel Fuel	12.5 <= speed < 17.5 mph	12.6	0.34	0.31	0.8106	0.0218	0.0200	2.25E-04	6.04E-06	5.56E-06
RAC-N	1320	0	0	2022	Combination Short-haul Truck	Diesel Fuel	22.5 <= speed < 27.5 mph	9.40	0.28	0.26	0.0000	0.0000	0.0000	0	0	0
RAC-N-S	956	0	0	2022	Combination Short-haul Truck	Diesel Fuel	12.5 <= speed < 17.5 mph	12.6	0.34	0.31	0.0000	0.0000	0.0000	0	0	0
RAC-S	1320	2	0.50	2022	Combination Short-haul Truck	Diesel Fuel	22.5 <= speed < 27.5 mph	9.40	0.28	0.26	4.7003	0.1398	0.1286	1.31E-03	3.88E-05	3.57E-05
MOR-N	1320	1	0.25	2022	Combination Short-haul Truck	Diesel Fuel	22.5 <= speed < 27.5 mph	9.40	0.28	0.26	2.3501	0.0699	0.0643	6.53E-04	1.94E-05	1.79E-05
MOR-N-S	956	0	0	2022	Combination Short-haul Truck	Diesel Fuel	12.5 <= speed < 17.5 mph	12.6	0.34	0.31	0.0000	0.0000	0.0000	0	0	0
MOR-S	1320	1	0.25	2022	Combination Short-haul Truck	Diesel Fuel	22.5 <= speed < 27.5 mph	9.40	0.28	0.26	2.3501	0.0699	0.0643	6.53E-04	1.94E-05	1.79E-05

Information from Figure 9 of KLOA traffic report

Onsite Travel

All Vehicles

Link	Distance (ft)	Volume peak hour	Miles per peak hour	Year	Vehicle Type	Fuel	Speed Bin	NO_x EF (g/hr)	PM_{10} EF (g/hr)	$PM_{2.5}$ EF (g/hr)	Hourly NO_x rate (g/hr)	Hourly PM_{10} rate (g/hr)	Hourly $PM_{2.5}$ rate (g/hr)	Hourly NO_x rate (g/s)	Hourly PM_{10} rate (g/s)	Hourly $PM_{2.5}$ rate (g/s)
PASS-PARK	956	82	14.8	2022	Passenger Car	Gasoline	2.5 <= speed < 7.5 mph	0.090	0.005	0.004	1.33	0.07	0.06	3.70E-04	1.89E-05	1.67E-05
DOCK-TRAV	956	9	1.63	2022	Combination Short-haul Truck	Diesel Fuel	2.5 <= speed < 7.5 mph	26.0	0.59	0.54	42.4	0.96	0.89	1.18E-02	2.67E-04	2.46E-04

Note: Assume no idling for this portion - idling covered below

1032 W. 43rd Street, Chicago, IL

Roadway Emissions by Link

September 23, 2021

Idling times - use LOS delay

Racine/43rd (SW)

AM EB	11.3
PM EB	7
AM WB	11.9
PM WB	14
AM NB	9.6
PM NB	13.5
AM SB	5.1
PM SB	3.9
Average	**9.54**

Racine/Exchange (NW)

AM EB	
PM EB	
AM WB	9.5
PM WB	14.1
AM NB	9.5
PM NB	5.2
AM SB	10.6
PM SB	10.9
Average	**10.0**

43rd/Morgan (SE)

AM EB	9.9
PM EB	9.7
AM WB	
PM WB	
AM NB	9.2
PM NB	9.3
AM SB	8.6
PM SB	8.9
Average	**9.27**

Note: no projected conditions given for this intersection - using base conditions

Exchange/Morgan (NE)

AM EB	8.4
PM EB	8.7
AM WB	9.7
PM WB	12.4
AM NB	9.1
PM NB	9.6
AM SB	10.1
PM SB	9.5
Average	**9.69**

Note: no projected conditions given for this intersection - using base conditions

Idling

Link	Volume peak hour	Idle minutes/ hr/veh	Idle minutes/ hr	Year	Vehicle Type	Fuel	Speed Bin	NO_x EF (g/hr)	PM_{10} EF (g/hr)	$PM_{2.5}$ EF (g/hr)	Hourly NO_x rate (g/hr)	Hourly PM_{10} rate (g/hr)	Hourly $PM_{2.5}$ rate (g/hr)	Hourly NO_x rate (g/s)	Hourly PM_{10} rate (g/s)	Hourly $PM_{2.5}$ rate (g/s)
DOCK-IDLE	9	5.00	45.00	2022	Combination Short-haul Truck	Diesel Fuel	speed =0 (idle) (g/hr)	59.4	1.89	1.74	44.6	1.42	1.30	1.24E-02	3.93E-04	3.62E-04
NW-IDLE-PASS	10	0.166	1.661	2022	Combination Short-haul Truck	Diesel Fuel	speed =0 (idle) (g/hr)	59.4	1.89	1.74	1.65	0.05	0.05	4.57E-04	1.45E-05	1.34E-05
SW-IDLE-PASS	92	0.159	14.624	2022	Combination Short-haul Truck	Diesel Fuel	speed =0 (idle) (g/hr)	59.4	1.89	1.74	14.5	0.46	0.42	4.02E-03	1.28E-04	1.18E-04
NE-IDLE-PASS	46	0.161	7.427	2022	Combination Short-haul Truck	Diesel Fuel	speed =0 (idle) (g/hr)	59.4	1.89	1.74	7.36	0.23	0.21	2.04E-03	6.49E-05	5.97E-05
SE-IDLE-PASS	16	0.154	2.471	2022	Passenger Car	Gasoline	speed =0 (idle) (g/hr)	0.24	0.02	0.02	0.010	0.0008	0.0007	2.69E-06	2.09E-07	1.85E-07
NW-IDLE-TRK	0	0.166	0	2022	Passenger Car	Gasoline	speed =0 (idle) (g/hr)	0.24	0.02	0.02	0	0	0	0	0	0
SW-IDLE-TRK	9	0.159	1.431	2022	Passenger Car	Gasoline	speed =0 (idle) (g/hr)	0.24	0.02	0.02	0.006	0.0004	0.0004	1.56E-06	1.21E-07	1.07E-07
NE-IDLE-TRK	6	0.161	0.969	2022	Passenger Car	Gasoline	speed =0 (idle) (g/hr)	0.24	0.02	0.02	0.004	0.0003	0.0003	1.06E-06	8.21E-08	7.26E-08
SE-IDLE-TRK	2	0.154	0.309	2022	Passenger Car	Gasoline	speed =0 (idle) (g/hr)	0.24	0.02	0.02	0.001	0.0001	0.0001	3.37E-07	2.62E-08	2.31E-08

1032 W. 43rd Street, Chicago, IL

Roadway Emissions Links Combined
September 23, 2021

Combined Links for Ease of Modeling

Source Name	Type	Hourly NO_x rate (g/s)	Hourly PM_{10} rate (g/s)	Hourly $PM_{2.5}$ rate (g/s)
EX-PASS	Line Volume	4.96E-05	1.69E-06	1.50E-06
EX-IN-PASS	Line Volume	7.41E-05	1.87E-06	1.65E-06
43-IN-PASS	Line Volume	1.23E-04	3.11E-06	2.76E-06
43-PASS	Line Volume	1.57E-04	5.38E-06	4.76E-06
RAC-N-PASS	Line Volume	2.47E-05	6.23E-07	5.51E-07
RAC-S-PASS	Line Volume	1.04E-04	2.62E-06	2.31E-06
MOR-N-PASS	Line Volume	3.95E-05	9.97E-07	8.82E-07
MOR-S-PASS	Line Volume	3.95E-05	9.97E-07	8.82E-07
EX-TRK	Line Volume	1.29E-03	3.47E-05	3.19E-05
EX-IN-TRK	Line Volume	1.31E-03	3.88E-05	3.57E-05
43-IN-TRK	Line Volume	1.31E-03	3.88E-05	3.57E-05
43-TRK	Line Volume	2.48E-03	6.67E-05	6.13E-05
RAC-N-TRK	Line Volume	0.00E+00	0.00E+00	0.00E+00
RAC-S-TRK	Line Volume	1.31E-03	3.88E-05	3.57E-05
MOR-N-TRK	Line Volume	6.53E-04	1.94E-05	1.79E-05
MOR-S-TRK	Line Volume	6.53E-04	1.94E-05	1.79E-05
DOCK-TRAV	Line Volume	1.18E-02	2.67E-04	2.46E-04
DOCK-IDLE	Area	1.24E-02	3.93E-04	3.62E-04
PASS-PARK	Line Volume	3.70E-04	1.89E-05	1.67E-05
NW-IDLE-PASS	Area	4.57E-04	1.45E-05	1.34E-05
SW-IDLE-PASS	Area	4.02E-03	1.28E-04	1.18E-04
NE-IDLE-PASS	Area	2.04E-03	6.49E-05	5.97E-05
SE-IDLE-PASS	Area	2.69E-06	2.09E-07	1.85E-07
NW-IDLE-TRK	Area	0.00E+00	0.00E+00	0.00E+00
SW-IDLE-TRK	Area	1.56E-06	1.21E-07	1.07E-07
NE-IDLE-TRK	Area	1.06E-06	8.21E-08	7.26E-08
SE-IDLE-TRK	Area	3.37E-07	2.62E-08	2.31E-08

1032 W. 43rd Street, Chicago, IL

Roadway Emissions Links Combined
September 23, 2021

Combined Car and Truck Emissions

Source Name	Type	Hourly NO_x rate (g/s)	Hourly PM_{10} rate (g/s)	Hourly $PM_{2.5}$ rate (g/s)
EX	Line Volume	1.34E-03	3.64E-05	3.34E-05
EXIN	Line Volume	1.38E-03	4.07E-05	3.74E-05
43IN	Line Volume	1.43E-03	4.20E-05	3.85E-05
43	Line Volume	2.64E-03	7.20E-05	6.61E-05
RACN	Line Volume	2.47E-05	6.23E-07	5.51E-07
RACS	Line Volume	1.41E-03	4.15E-05	3.80E-05
MORN	Line Volume	6.92E-04	2.04E-05	1.87E-05
MORS	Line Volume	6.92E-04	2.04E-05	1.87E-05
DOCKTRAV	Line Volume	1.18E-02	2.67E-04	2.46E-04
DOCKIDLE	Area	1.24E-02	3.93E-04	3.62E-04
PASSPARK	Line Volume	3.70E-04	1.89E-05	1.67E-05
NWIDLE	Area	4.57E-04	1.45E-05	1.34E-05
SWIDLE	Area	4.02E-03	1.28E-04	1.18E-04
NEIDLE	Area	2.04E-03	6.50E-05	5.98E-05
SEIDLE	Area	3.03E-06	2.35E-07	2.08E-07

Note: vehicle release parameters to be weighted by 90% passenger vehicles and 10% trucks, as in traffic report. See below for parameters

Hours/day operation	12
Hours/day	24

Vehicle Release Parameters

Parameter / Percentage	Passenger 90%	Truck 10%	Combined
Vehicle Ht. (m)	1.53	4.00	1.78
Plume Ht. (m)	2.60	6.800	3.02
Release Ht. (m)	1.30	3.40	1.51
Initial Vertical Dimension	1.21	3.16	1.41

1032 W. 43rd Street, Chicago, IL

Variable Emissions Scenario
September 23, 2021

Hour Ending	Factor
1	0
2	0
3	0
4	0
5	0
6	0
7	1
8	1
9	1
10	1
11	1
12	1
13	1
14	1
15	1
16	1
17	1
18	1
19	0
20	0
21	0
22	0
23	0
24	0

1032 W. 43rd Street, Chicago, IL

Emissions from Comfort Heaters and Water Heaters – Natural Gas Fueled
September 23, 2021

Comfort Heating/ Hot Water Usage:

Parameter	Value	Units
Heating Requirement for Building	50	BTU/ft2
Square footage of entire building	130,354	ft2
Heating requirement for space	6,517,700	BTU/hr
Conservative Heating Estimate	10,000,000	BTU/hr
NG usage	0.010	MMscf/hr
NG usage	240,000,000	BTU/day
NG usage	0.24	MMscf/day

Notes:

- Assume Climate zone 5. https://basc.pnnl.gov/images/iecc-climate-zone-map, https://www.energy.gov/sites/default/files/2015/10/f27/ba_climate_region_guide_7.3.pdf
- Square Footage from 1032 W 43rd st Brochure
- Heating requirement for space calculated based on BTU calculator at https://learnmetrics.com/heating-btu-calculator/

Combustor type determination	10.0	MMBTU/hr

Based on Combustor type, assume Small Boilers from AP-42 EF
https://www3.epa.gov/ttn/chief/ap42/ch01/final/c01s04.pdf

Emission Type	NO_x	PM_{10}	$PM_{2.5}$
EF, Uncontrolled, lb/MMscf	100	7.6	7.6
EF, Uncontrolled, lb/hr	0.9804	0.0745	0.0745
EF, Uncontrolled, g/s	0.12	0.01	0.01

Conversions:

1,020 BTU/scf

Source Parameters

AERMOD ID	HTRS
Source Type	Area
Source Description	Comfort Heaters/ Hot water
# of sources	1
plume height (ft)	32.0
plume height (m)	9.75
top of roof (ft)	32.0
top of roof (m)	9.75
building edge height (ft)	32.0
building edge height (m)	9.75
release height (ft)	16.0
release height (m)	4.88
szinit (ft)	14.9
szinit (m)	4.54

ATTACHMENT B

NO2, PM2.5, AND PM10 MODELED CONCENTRATION ISOPLETHS

Annual Maximum Daily 1 Hour NO_2 Averaged Over 5 Years

Highest Annual Average NO_2 Concentration Over 5 Years

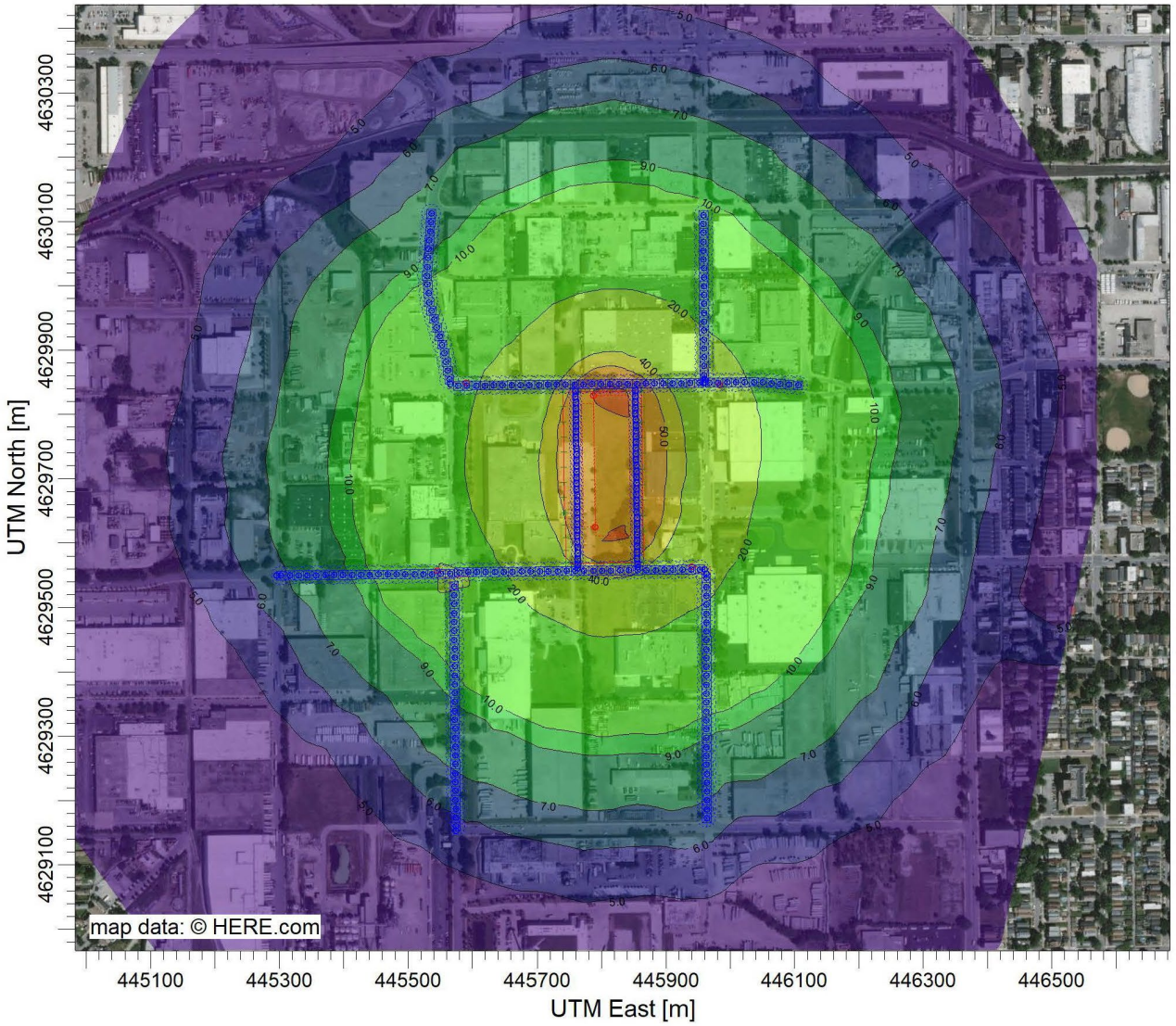
Maximum 24 Hour $PM_{2.5}$ Concentrations Averaged Over 5 Years

Average Annual $PM_{2.5}$ Concentrations Over 5 Years

Maximum 24 Hour PM_{10} Concentrations Over 5 Years

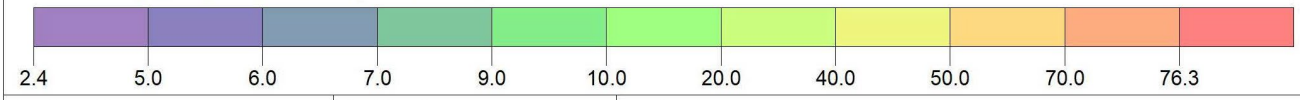
PROJECT TITLE:

1032 W. 43rd Street AQIA
H8H Annual Max. Daily 1-hr NO2 Averaged Over 5 Years



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

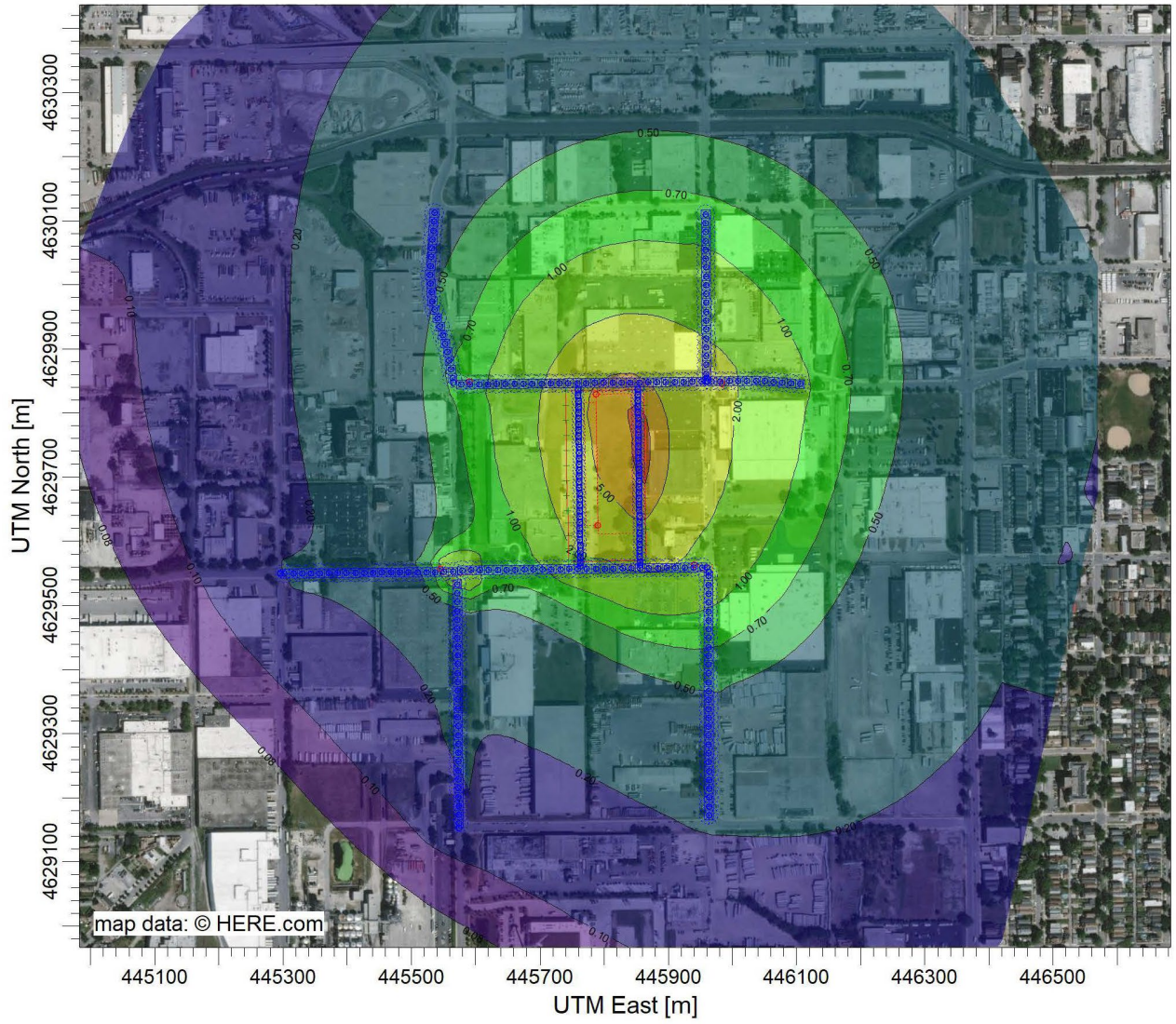
Max: 76.3 [ug/m^3] at (445813.37, 4629835.51)



COMMENTS:	SOURCES:	COMPANY NAME:	
	16	**BlueScape Environmental**	
	RECEPTORS:	MODELER:	
	3458		
	OUTPUT TYPE:	SCALE: 1:10,691	
	Concentration	0 — 0.4 km	
	MAX:	DATE:	PROJECT NO.:
	76.3 ug/m^3	**9/23/2021**	

PROJECT TITLE:

1032 W. 43rd Street AQIA
Highest Annual Avg. NO2 Concentrations Over 5 Years (2016)



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

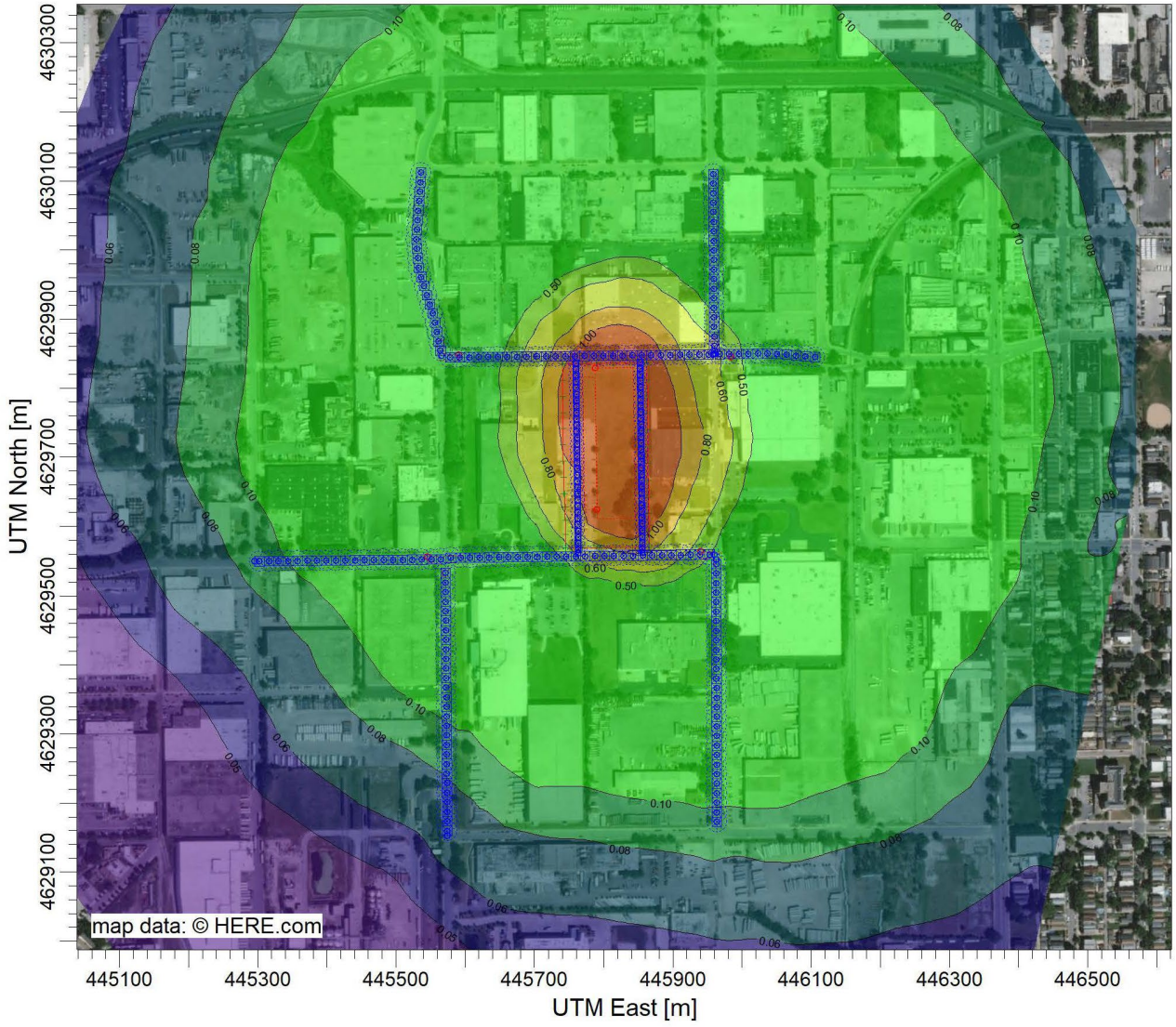
Max: 7.65 [ug/m^3] at (445863.37, 4629739.20)

0.08 | 0.10 | 0.20 | 0.50 | 0.70 | 1.00 | 2.00 | 5.00 | 7.00 | 7.65

COMMENTS:	SOURCES: **16**	COMPANY NAME: **BlueScape Environmental**	
	RECEPTORS: **3458**	MODELER:	
	OUTPUT TYPE: **Concentration**	SCALE: 1:10,691 — 0 — 0.4 km	
	MAX: **7.65 ug/m^3**	DATE: **9/23/2021**	PROJECT NO.:

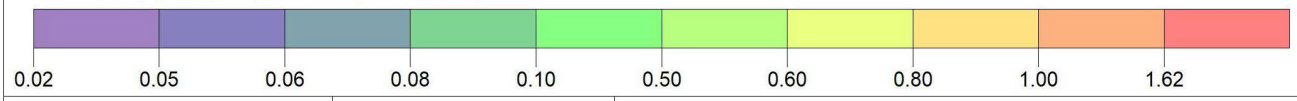
PROJECT TITLE:

1032 W. 43rd Street AQIA
Annual H8H 24-hr Avg. PM2.5 Concentrations Averaged Over 5 Years



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

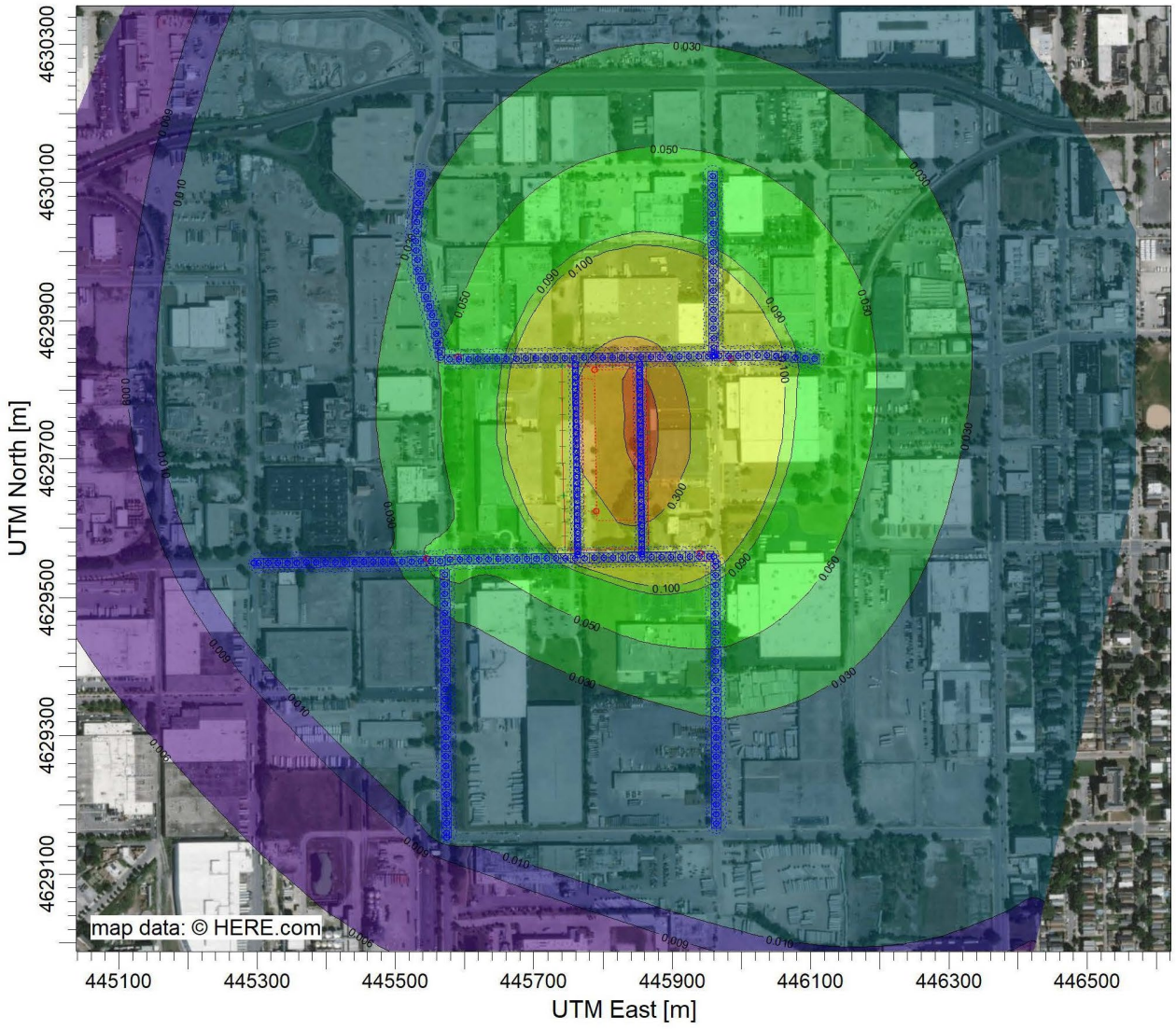
Max: 1.62 [ug/m^3] at (445813.37, 4629835.51)



COMMENTS:	SOURCES: **16**	COMPANY NAME: **BlueScape Environmental**	
	RECEPTORS: **3458**	MODELER:	
	OUTPUT TYPE: **Concentration**	SCALE: 1:9,951 0 0.3 km	
	MAX: **1.62 ug/m^3**	DATE: **9/23/2021**	PROJECT NO.:

PROJECT TITLE:

1032 W. 43rd Street AQIA
Average Annual PM2.5 Concentrations Over 5 Years



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

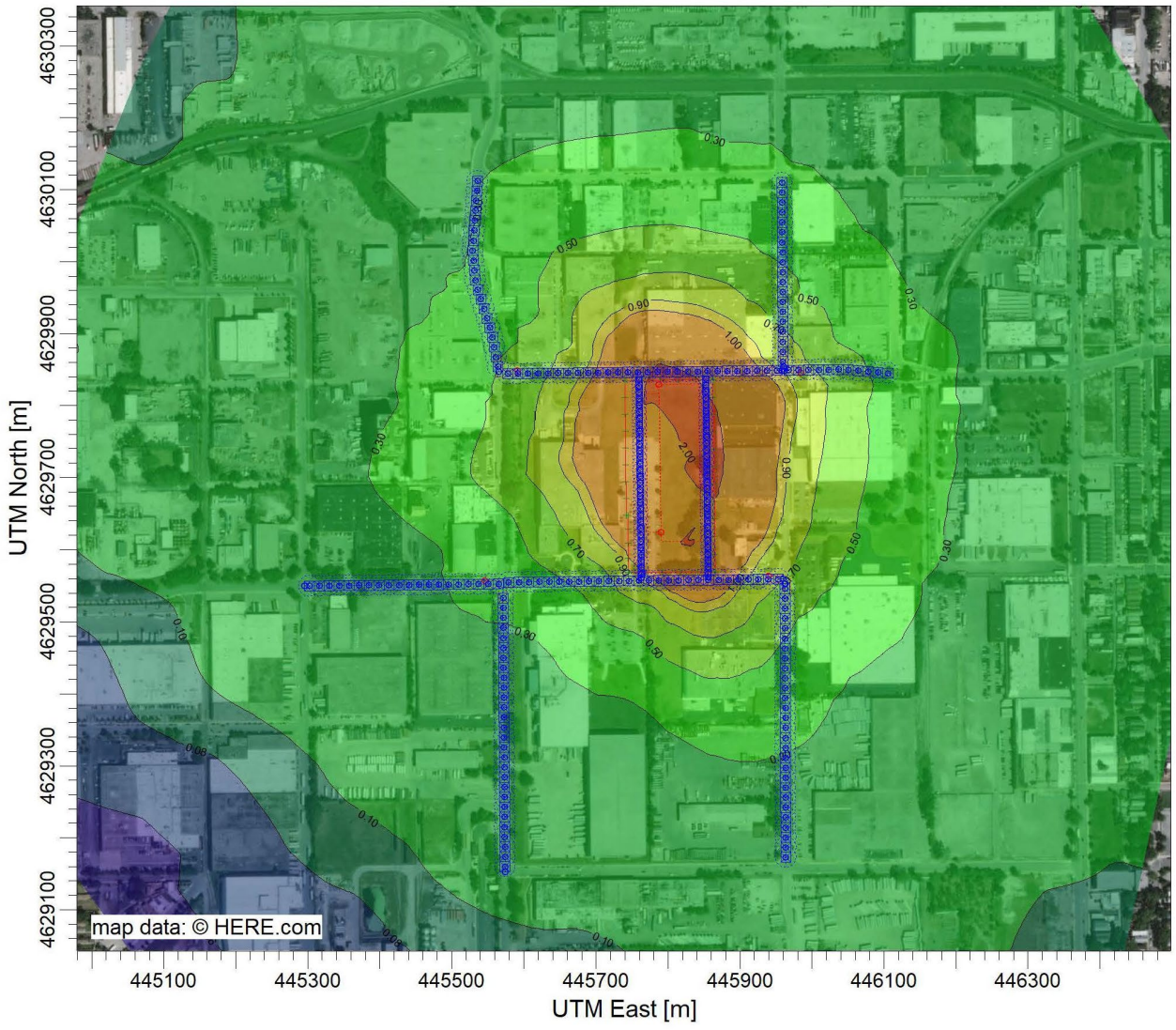
Max: 0.595 [ug/m^3] at (445863.37, 4629739.20)

0.006 0.009 0.010 0.030 0.050 0.090 0.100 0.300 0.500 0.595

COMMENTS:	SOURCES: **16**	COMPANY NAME: **BlueScape Environmental**	
	RECEPTORS: **3458**	MODELER:	
	OUTPUT TYPE: **Concentration**	SCALE: 1:9,950 0 0.3 km	
	MAX: **0.595 ug/m^3**	DATE: **9/23/2021**	PROJECT NO.:

PROJECT TITLE:

1032 W. 43rd Street AQIA
Maximum H4H 24-hr Avg. PM10 Concentrations Over 5 Years



PLOT FILE OF HIGH 4TH HIGH 24-HR VALUES FOR SOURCE GROUP: ALL ug/m^3

Max: 2.35 [ug/m^3] at (445788.93, 4629835.29)

0.04 0.05 0.06 0.08 0.10 0.30 0.50 0.70 0.90 1.00 2.00 2.35

COMMENTS:	SOURCES: **16**	COMPANY NAME: **BlueScape Environmental**	
	RECEPTORS: **3458**	MODELER:	
	OUTPUT TYPE: **Concentration**	SCALE: 1:9,550 (0 — 0.3 km)	
	MAX: **2.35 ug/m^3**	DATE: **9/23/2021**	PROJECT NO.:

ATTACHMENT C

AERMOD MODELING FILES (ELECTRONIC FORMAT)

Please Respect the Environment

About Cardno

Cardno is an ASX-200 professional infrastructure and environmental services company, with expertise in the development and improvement of physical and social infrastructure for communities around the world. Cardno's team includes leading professionals who plan, design, manage, and deliver sustainable projects and community programs. Cardno is an international company listed on the Australian Securities Exchange [ASX:CDD].

Cardno Zero Harm

Cardno ZERO HARM EVERY JOB. EVERY DAY.

At Cardno, our primary concern is to develop and maintain safe and healthy conditions for anyone involved at our project worksites. We require full compliance with our Health and Safety Policy Manual and established work procedures and expect the same protocol from our subcontractors. We are committed to achieving our Zero Harm goal by continually improving our safety systems, education, and vigilance at the workplace and in the field. Safety is a Cardno core value and through strong leadership and active employee participation, we seek to implement and reinforce these leading actions on every job, every day.

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