

**Air Quality Impact Evaluation
ISOFlex Packaging – Chicago, Illinois**

October, 2023

Prepared for:

**ISOFlex Packaging
1650 & 1800 E 95th Street, Chicago, Illinois**

Prepared by:

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1.0 INTRODUCTION

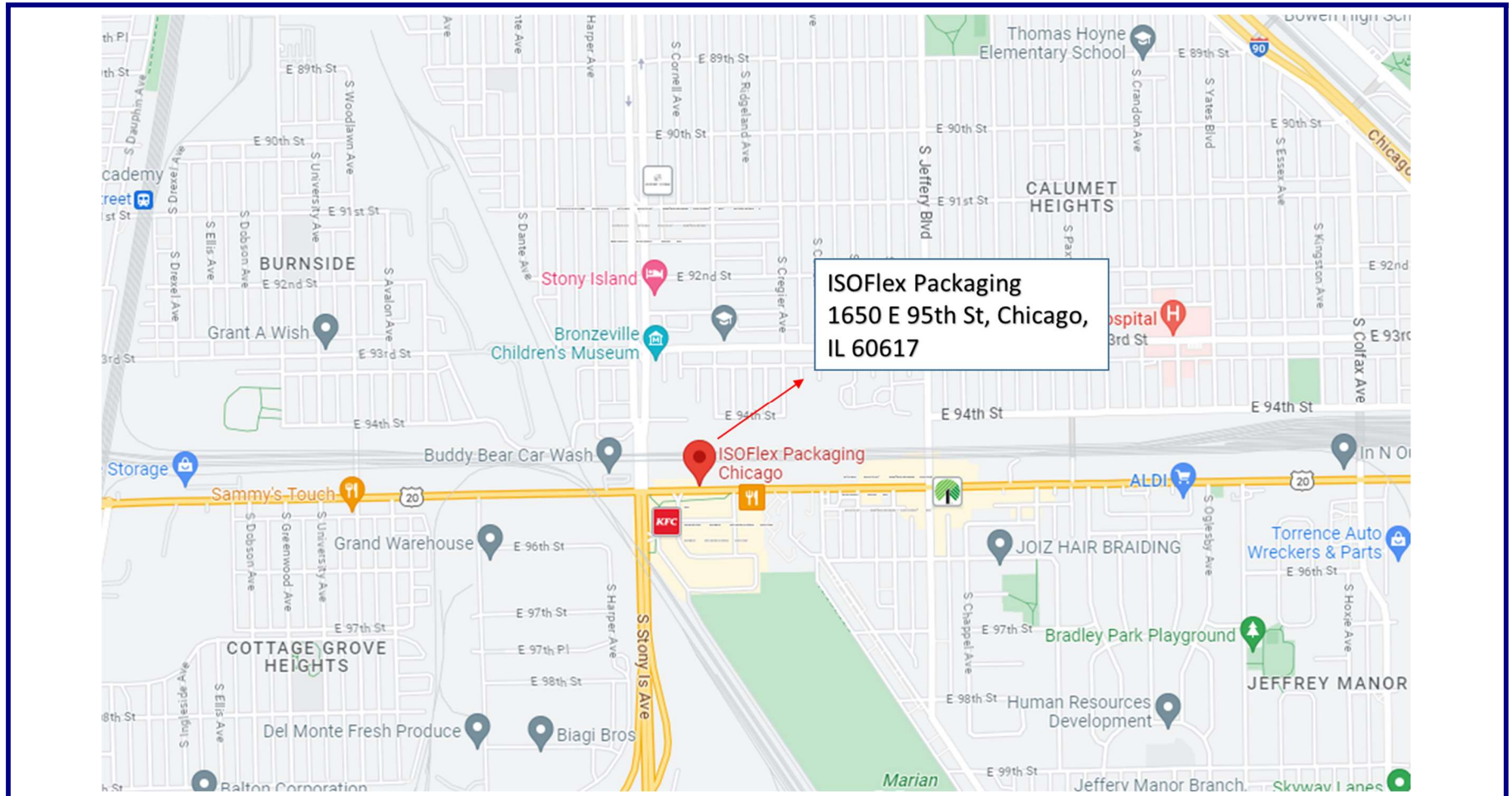
ISOFlex Packaging Warehouse Development (ISOFlex) located at 1650-1800 E. 95th Street in Chicago, Illinois, is proposing to develop a warehouse expansion to the existing ISOFlex building and a new warehouse building supported by 110-space parking lot. A Site Location Map and Facility Layout Map are presented in Figures 1-1 and 1-2.

The Chicago Air Quality Ordinance Municipal Code Section 17-9-0117-G (March 21) requires an Air Quality Impact Evaluation (AQIE) to be submitted as part of the site plan submittal for projects associated with warehousing. The AQIE requires an air dispersion modeling study to evaluate the impact of the project for PM10, PM2.5 and NOx. This AQIE has been prepared for the proposed development at ISOFlex to estimate the potential impacts from a proposed expansion and a new warehouse building to be located at 1800 E 95th street in Chicago, IL.

A Traffic Impact Study (traffic study) was independently prepared for the proposed warehouse/distribution building by Haeger Engineering LLC, Schaumburg, IL. According to the traffic study the horizon year for the project was 2028. Projected 2028 traffic volume was used to evaluate the impact of this project.

1.1 Facility Location and Contact Information

<u>Business Name:</u>	ISOFlex Packaging
<u>Source Location:</u>	1650 & 1800 E 95th Street in Chicago, Illinois
<u>RKA Contact for This Document</u>	Darina Demirev - Senior Engineer 2S631 Route 59, Suite B - Warrenville, Illinois 60555 630-393-9000 - ddemirev@rka-inc.com



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COMMENTS:

Air Quality Impact Evaluation

DRAWN BY:..

APPROVED BY:..

ZH

PROJECT NUMBER

DATE DRAWN:

10/2023

REVISED DATE

Site Location Map

ISOFlex Packaging
1650 & 1800 E 95th Street in Chicago, Illinois

FIGURE

1-1



ISOFlex Packaging
 1650 E 95th St, Chicago, IL 60617

<p>2S631 ROUTE 59, SUITE B WARRENVILLE, IL 60555 630-393-9000/630-393-9111</p>	<p>COMMENTS:</p> <p style="text-align: center;">Air Quality Impact Evaluation</p>	<p>Facility Map ISOFlex Packaging 1650 & 1800 E 95th Street in Chicago, Illinois</p>		<p>FIGURE 1-2</p>
	<p>DRAWN BY:</p>	<p>APPROVED BY: DD</p>	<p>PROJECT NUMBER</p>	<p>DATE DRAWN: 10-2023</p>

2.0 EMISSION SOURCES

2.1 Emissions Estimation

The proposed development will generate emissions from on-site and off-site activities. Off-site activities include truck and non-truck traffic on connecting roads which are identified in the traffic study, as well as acceleration, deceleration, and idling at stop signs and traffic lights.

On-site activities include on-site truck traffic from the proposed Access 3A to the loading docks, on-site employee, and other passenger vehicles traffic from Access 3A and Access 4 to the west and east parking lot, respectively. On-site forklifts are equipped with propane engines that generate negligible emissions and are not included in this analysis. On-site stationary sources include a number of natural gas fired heaters. Fugitive dust emissions from this Site are assumed transient as they will occur during construction operations. This air quality impact analysis is performed for post-construction activities.

Maximum hourly emissions are estimated for each activity to be input in the dispersion model. The following emissions are evaluated in this chapter:

- Off-site traffic from moving vehicles
- Off-site idling emissions
- On-site traffic from moving vehicles
- Onsite idling emissions
- On-site stationary sources

Emission factors from the Motor Vehicle Emission Simulator (MOVES) are used to estimate emissions from moving and idling vehicles. CDPH has created a look up table “CookCountyIL_MOVES_LookupTable_2021-2030_On-Road_CDB.xlsx” that includes default emissions factors for NOx, PM2.5, and PM10. The spreadsheet was downloaded from the CDPH website in 2023.

2.2 Off-site Traffic - Moving Vehicles

Projected 2028 traffic volume is used to estimate emissions from this project. Roadway sections and associated traffic volumes are determined based on information provided in Figure 5 in Haeger Engineering LLC traffic study. The off-site traffic that is impacted by the site development includes sections of E 95th Street, North Entrance Road of Stony Island Plaza, and South Stony Island Avenue.

RKA identified four (4) road segments, Segments A-D, on which traffic is assumed to move with the posted speed limit. RKA identified eight (8) acceleration/deceleration segments, Segments 1-8, where traffic is assumed to accelerate or decelerate approaching stop signs or traffic lights. Figure A-1 in Appendix A shows the selected segments.

Roadway segments lengths are determined based on information provided in the traffic study or estimated using Google Earth. Acceleration/Deceleration segments length is assumed 75 ft.

Maximum peak hourly traffic volumes, morning or afternoon, whichever is higher, are used to estimate emissions from off-site traffic. Vehicle speeds are determined based on road types, number of lanes, acceleration & deceleration lanes as follows:

- Traffic traveling on four lane roads (E 95th street, S Stony Ave) - approximately 30 miles per hour.
- Average vehicle speed at acceleration & deceleration segments is assumed to be 15 miles per hour.
- Vehicle speeds were chosen at the lower range of expected vehicle speed, which provides more conservative emissions.

Off-site traffic moving emissions including emissions from roadway segments and acceleration/ deceleration segments are shown in Tables A-1 through A-4 in Appendix A.

2.3 Off-site Traffic – Idling Emissions

Idling areas and the delay periods are identified using information from Table 6, Table 7, and Table 8 in the Haeger Engineering LLC traffic study. Twelve (12) off-site idling areas are identified, Idling 1-12. Idling areas are shown on Figure A-2. Emissions from each idling area from trucks and non-truck vehicles are shown in Table A-5 in Appendix A.

2.4 On-site Traffic – Moving Vehicles

The on-site traffic includes:

- Trucks entering or exiting from the proposed Access 3A travelling to the loading docks or E 95th street.
- Employee and commercial passenger vehicles entering or exiting from the Access 3A traveling to the parking lot or to E 95th Street.
- Employee and commercial passenger vehicles entering or exiting from Access 4 traveling to the parking lot or to E 95th Street.
- Idling emissions from trucks and non-truck vehicles.

Traffic traveling on-site was assumed to travel at approximately 5 miles per hour. The maximum traveling distance is assumed for each vehicle type – for trucks entering through Access 3A to the most distant loading dock and for non-truck vehicles entering Access 3A and Access 4 and reaching the most distant parking lot. Road Segments E, F for non -truck vehicles and G for trucks are shown on Figure A-1. This gives the most conservative approach to emission estimation. The length of each route is estimated using Google Earth.

Hourly emissions for on-site mobile traffic are calculated using maximum peak hourly traffic volumes. On-site traffic moving emissions are shown in Table A-6 in Appendix A.

2.5 On-site Traffic – Idling Emissions

Trucks will idle at access 3A, and non-truck vehicles will idle at Access 3A or Access 4. Idling times are determined from Table 8 in the Haeger Engineering LLC traffic study. It is conservatively assumed that trucks and non-truck vehicles will idle for 5 minutes at the docks or in the parking lot. This is a conservative approach to accounting emissions. On-site idling emissions are calculated using the maximum peak hourly traffic volumes.

On-site traffic idling emissions are shown in Table A-7 in Appendix A.

2.6 Natural Gas Fired Heaters

ISOFlex will install forty (40) natural gas fired heaters for comfort heating. Each heater will be with a maximum rated capacity of 0.15 MMBtu/hr. Sixteen (16) heaters will be installed in the Warehouse Expansion building and twenty-four (24) heaters will be installed in the New Warehouse building, installed in the new building.

Emissions from natural gas combustion from the space heaters are shown in Table A-8 in Appendix A.

3.0 DISPERSION MODELING

Dispersion modeling was performed to predict the maximum impact from the proposed ISOFlex warehouse expansion and new warehouse building. AERMOD dispersion model Version 22112 was used in this modeling analysis.

3.1 Meteorological Data

AERMET preprocessed surface and upper air meteorological data from the National Weather Service at the Midway Airport Station for the years 2016 through 2020 was obtained from the Chicago Department of Public Health web site, Resources for Applicants.

3.2 Terrain Data

Receptor elevations, source elevations, and building elevations were obtained by running AERMAP, using National Elevation Dataset (NED) files downloaded from USGS website.

3.3 Receptor Network

A Cartesian receptor grid is placed around the property lines up to 2 km from the property line as follows:

- 25 m apart along the property line
- 25 m apart extending from the fence line to 100 m
- 50 m apart extending from 100 m from the fence line to 250 m
- 100 m apart extending from 250 m from the fence line to 500 m
- 250 m apart from 500 m from the fence line to 2 km

This receptor grid is dense enough near the facility and catch the impact from off-site traffic and on-site traffic and stationary emission sources.

3.4 Building Downwash

The proposed warehouse building is included in the input files. However, all sources are fugitive and are modelled as area sources. Building downwash algorithms are not applicable for area sources.

3.5 Operating Schedule

The Site will be open 24 hours a day, 7 days a week. However, based on the traffic study no vehicles are expected to enter the facility between the hours of 10 pm and 6 am. However, are very conservative

approach is taken and the facility is assumed to operate continuously. Stationary on-site sources are also conservatively assumed to operate continuously.

On-site and off-site traffic emissions and vehicle idle emissions are modeled with peak hourly emission rates. This approach is conservative because pick hours activity is projected to occur for only one hour in the morning 7:30 am to 8:30 am and for one hour in the afternoon from 4:45 pm to 5:45 pm.

3.6 Model Inputs and Parameters

This section describes the modeling parameters selected for each source.

3.6.1 Off-Site Moving Vehicles

Each roadway segment identified in Section 2.2 is modeled as an area source. Following the CDPH Air Quality Evaluation Interim Guidance, each area source is centered on the centerline of the road, the length of the area source is equal to the length of the roadway segment, and the adjusted road width is equal to the road width plus 6 meters, as all roads are two or more lane roads. The remaining input parameters are calculated as follows:

- Top of Plume Height = 1.7 x (vehicle height)
- Release Height = 0.5 x (top of plume height)
- Initial Vertical Dimension = (top of plume height)/2.15

Modeled parameters for trucks and non-truck vehicles are shown in Table 1 below.

Table 1. Vehicle Release Parameters for Roadway Segments

Vehicle Type	Height		Top of Plume Height	Released Height	Initial Vertical Dimension σ_z
	(inches)	(m)	(m)	(m)	(m)
Non-Truck Vehicles	75	1.91	3.24	1.62	1.51
Trucks	162	4.11	7.00	3.50	3.25

Road area sources include only emissions from moving vehicles. Acceleration/deceleration emissions are included with off-site idling vehicle emission discussed in Section 3.6.2.

3.6.2 Off-Site Acceleration/Deceleration and Idling

Off-site idling emissions and acceleration/deceleration emissions occur at or near road intersections. Emissions from idling and acceleration/deceleration are combined at each intersection and modeled as a single area source. The segments included in each intersection area source as well as the emission rates are shown in Table B1 in Appendix B.

Area source release parameters are based on weighted average of trucks and non-truck vehicles. Based on the traffic study, the worst hourly ratio is 7.5% trucks and 92.5% non-truck vehicles. Release parameters used for area sources I-1 through I-5 in AERMOD are shown in Table 2.

Table 2. Vehicle Release Parameters for Intersections

Intersections Vehicle Ratio	Weighted Average Height		Top of Plume Height	Released Height	Initial Vertical Dimension σ_z
	(inches)	(m)	(m)	(m)	(m)
Trucks 7.5%	81.53	2.07	3.52	1.76	1.64
Non-truck 92.5%					

3.6.3 On-Site Activities

On-site activities include: truck activities, vehicle parking, and stationary sources. Truck activities include truck movement within the Site, docking, parking, and idling. Vehicle parking includes movement of non-truck vehicles within the Site, parking, and idling. Stationary sources include the natural gas fired space heaters for the warehouse.

Emissions from truck activities and vehicle parking are modeled as area sources covering the proposed parking lots.

The location of stationary sources exhausts is unknown at this time. Emissions of all stationary sources are modeled as an area source on the rooftop of the warehouse expansion building and on the proposed new warehouse building. Release parameters for the stationary area sources are shown in Table 3. Hourly emission for each area source is shown in Table B2 in Appendix B.

Table 3. Release Parameters for On-site Sources

On-Site Area Sources	Height		Top of Plume Height	Released Height	Initial Vertical Dimension σ_z
	(inches)	(m)	(m)	(m)	(m)
Warehouse Expansion Building	264	6.71	11.40	5.70	5.30
New Warehouse Building	264	6.71	11.40	5.70	5.30

4.0 MODELING RESULTS

AERMOD modeling was performed to identify off site impacts for comparison to the National Ambient Air Quality Standard (NAAQS) for PM₁₀, 24-hour, for PM_{2.5} 24-hour and annual, and for NO₂, 1-hour.

Pollutant	Averaging Time	NAAQS	Description
PM ₁₀	24 hours	150 µg/m ³	Not to be exceeded more than once per year on average over 3 years
PM _{2.5}	24 hours	35 µg/m ³	98th percentile, averaged over 3 years
	Annual	12 µg/m ³	annual mean, averaged over 3 years
NO ₂	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years

4.1 Background Concentrations

The Illinois Environmental Protection Agency (IEPA) operates a network of ambient air monitoring stations throughout Illinois to measure ambient concentrations of criteria pollutants. The measurements are posted each year in the Illinois Annual Air Quality Report.

The CDPH has posted preferred ambient background concentrations for four quadrants covering City of Chicago. The file Ambient_Background_Data.zip was downloaded from the CDPH website. The ISOFlex site is located within the Southeast quadrant. Design values posted for the Southeast quadrant are used as background concentrations. Hourly seasonal NO₂ background concentration are provided in a separate spreadsheet named 1HourNO2-AmbientBackground-SeasonalHourly.xlsx. The maximum hourly concentration is used as a design value for the 1-hour NO₂ limit.

Background concentrations are included in Table 4.

4.2 Modeling Results

The method to model PM₁₀ consists of calculating the highest 6th-high 24-hour average concentration for the five year period of 2016 through 2020. The method for calculating PM_{2.5} consists of calculating the highest 8th-high 24-hour average concentration for five year period and the highest 1st-high over 5 years of data. The NO₂ method consists of calculating the highest 8th-high for 1-year average over 5 years of data.

The AERMOD predicted concentrations and the background concentrations are shown in Table 4 below.

Table 4. Summary of PM₁₀, PM_{2.5}, and NO₂ Predicted Impacts

Pollutant	Meteorological Data	Averaging Period	Rank	AERMOD Predicted Concentration (µg/m ³)	East (X) (m)	North (Y) (m)	Background Concentration (µg/m ³)	Monitoring Station and Year	Predicted Impact to Compare to NAAQS (µg/m ³)	NAAQS (µg/m ³)	Predicted Impact Meets Standard (Yes/No)
PM ₁₀	2012-2016	24-HR	6TH	0.76	451357.00	4619130.00	61	Washington HS (2018-2020)	61.76	150	Yes
PM _{2.5}	2012-2016	24-HR	8TH	0.53	451357.00	4619130.00	25	Washington HS (2018-2020)	25.53	35	Yes
	2012-2016	Annual	1TH	0.24	451350.00	4619125.00	9	Washington HS (2018-2020)	9.24	12	Yes
NO ₂	2012-2016	1-HR	8TH	27.75	451357.00	4619130.00	76.89	18-089-022 (2018-2020)	104.64	188	Yes

Note: NO₂ reported design value of 52 ppb was converted into µg/m³, 1 ppm of NO₂ is equal to 1.88 µg/m³.

The results of this air quality impact evaluation demonstrate that the predicted off-site ambient impact for PM₁₀, PM_{2.5} and NO₂ is below the National Ambient Air Quality Standard (NAAQS) for all three pollutants.

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October 2023

**Appendix A
Emission Estimates**

Figure A1 - Roadway Sections, Acceleration & Deceleration Areas for Site Generated Traffic
 ISOFlex - Chicago, Illinois

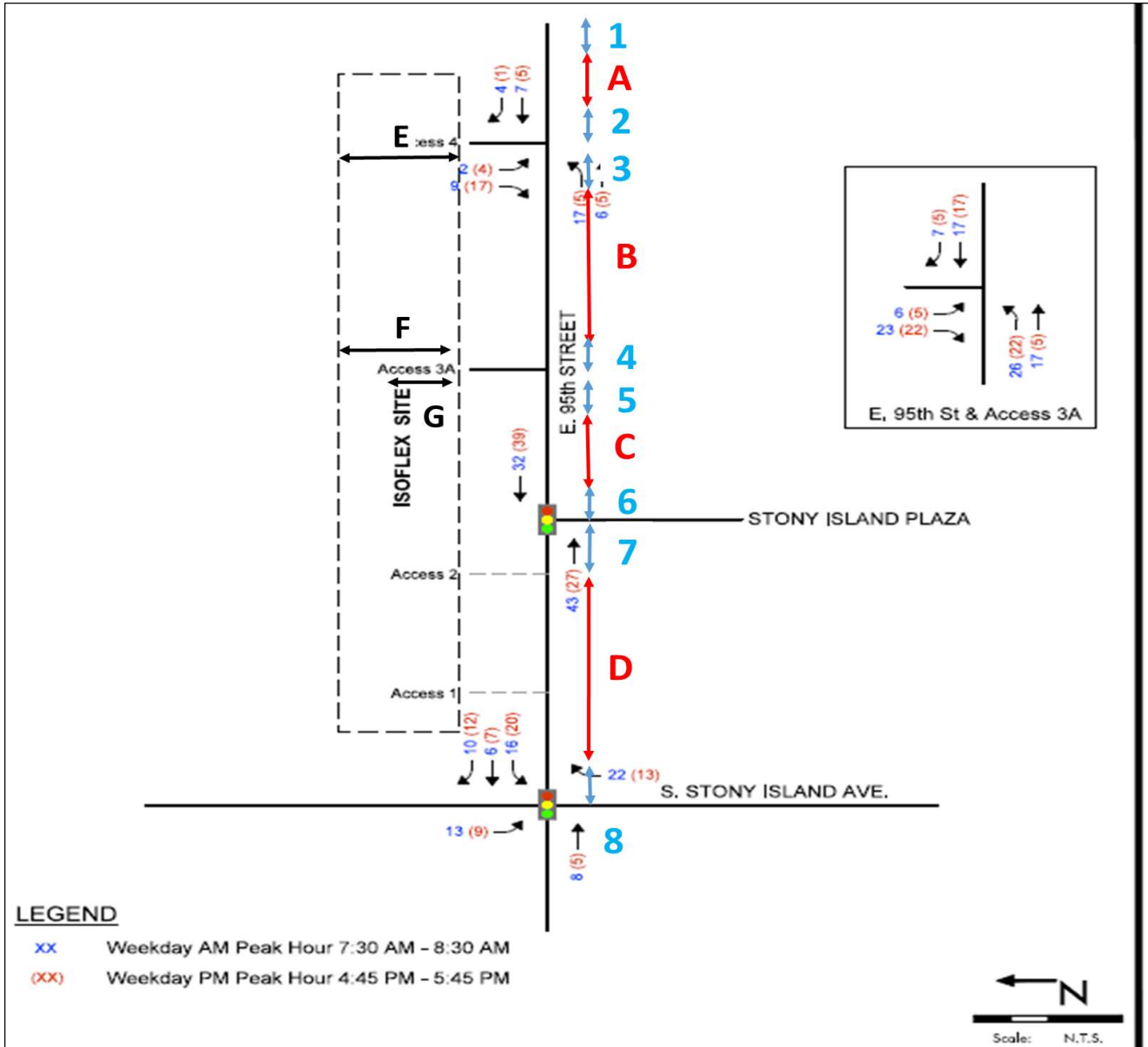


Figure A2 - Idling Areas for Site Generated Traffic
ISOFlex - Chicago, Illinois

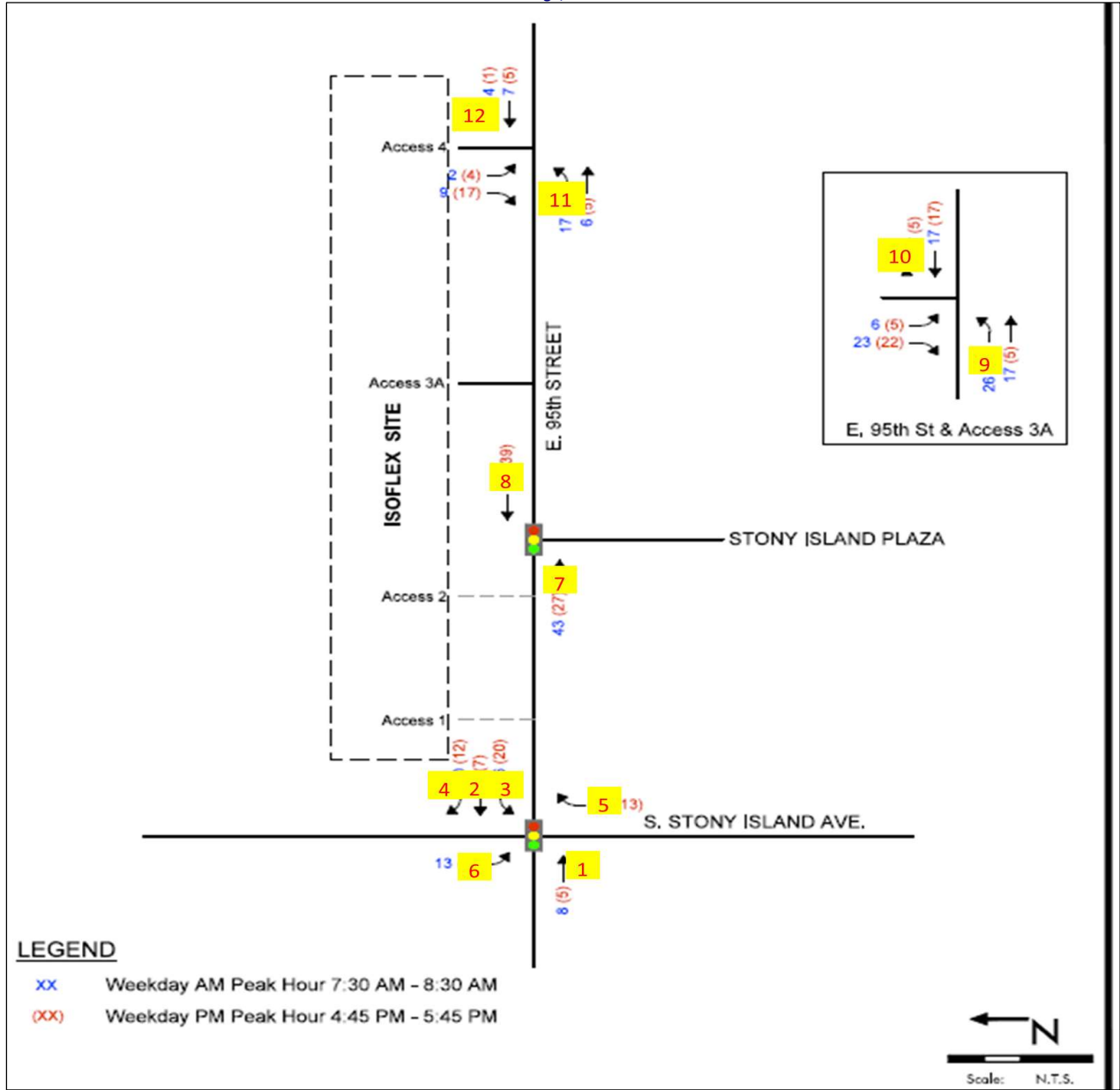


Table A1 - Projected Site Generated Off-Site Non-Truck Vehicles Moving Emissions from Roadway Segments
ISOFlex - Chicago, Illinois

Roadway Segment	Roadway Segment Description	Distance	Distance	AM Peak Hour Volume	PM Peak Hour Volume	Peak Hour Vehicle Volume	Miles in Peak Hours	Year	Fuel	Road Type	Speed Range	Nox EF	PM10 EF	PM2.5 EF	Hourly NOx Emission Rate	Hourly PM10 Emission Rate	Hourly PM2.5 Emission Rate
		ft	mile	# veh/hr	# veh/hr	# veh/hr	miles				mph	g/mile	g/mile	g/mile	lb/hr	lb/hr	lb/hr
A	Roadway - E 95 th Street Between Access 4 & S Jeffery Blvd	620	0.117	19	15	19	2.23	2028	Gasoline	Passenger car	27.5 <= speed < 32.5 mph	0.0532328	0.001560525	0.001380476	2.61E-04	7.66E-06	6.78E-06
B	Roadway - E 95th Street Between Access 4 & Access 3A	1070	0.203	47	32	47	9.52	2028	Gasoline	Passenger car	27.5 <= speed < 32.5 mph	0.0532328	0.001560525	0.001380476	1.12E-03	3.27E-05	2.89E-05
C	Roadway - E 95th Street Between Access 3A & Stony Island Plaza	315	0.060	75	66	75	4.47	2028	Gasoline	Passenger car	27.5 <= speed < 32.5 mph	0.0532328	0.001560525	0.001380476	5.24E-04	1.54E-05	1.36E-05
D	Roadway - E 95th Street Between Stony Island Plaza & S Stony Island Ave.	416	0.079	75	66	75	5.91	2028	Gasoline	Passenger car	27.5 <= speed < 32.5 mph	0.0532328	0.001560525	0.001380476	6.92E-04	2.03E-05	1.79E-05
Total															2.59E-03	7.60E-05	6.72E-05

Table A2 - Projected Site Generated Off-Site Trucks Moving Emissions from Roadway Segments
ISOFlex - Chicago, Illinois

Roadway Segment	Roadway Segment Description	Distance	Distance	AM Peak Hour Volume	PM Peak Hour Volume	Peak Hour Vehicle Volume	Miles in Peak Hours	Year	Fuel	Road Type	Speed Range	Nox EF	PM10 EF	PM2.5 EF	Hourly NOx Emission Rate	Hourly PM10 Emission Rate	Hourly PM2.5 Emission Rate
		ft	mile	# veh/hr	# veh/hr	# veh/hr	miles				mph	g/mile	g/mile	g/mile	lb/hr	lb/hr	lb/hr
A	Roadway - E 95 th Street Between Access 4 & S Jeffery Blvd	620	0.117	3	3	3	0.35	2028	Diesel Fuel	Single Unit Short-haul Truck	27.5 <= speed < 32.5 mph	5.41959	0.2811136	0.2586229	4.20E-03	2.18E-04	2.00E-04
B	Roadway - E 95th Street Between Access 4 & Access 3A	1070	0.203	3	3	3	0.61	2028	Diesel Fuel	Single Unit Short-haul Truck	27.5 <= speed < 32.5 mph	5.41959	0.2811136	0.2586229	7.25E-03	3.76E-04	3.46E-04
C	Roadway - E 95th Street Between Access 3A & Stony Island Plaza	315	0.060	0	0	0	0.00	2028	Diesel Fuel	Single Unit Short-haul Truck	27.5 <= speed < 32.5 mph	5.41959	0.2811136	0.2586229	0.00E+00	0.00E+00	0.00E+00
D	Roadway - E 95th Street Between Stony Island Plaza & S Stony Island Ave.	416	0.079	0	0	0	0.00	2028	Diesel Fuel	Single Unit Short-haul Truck	27.5 <= speed < 32.5 mph	5.41959	0.2811136	0.2586229	0.00E+00	0.00E+00	0.00E+00
Total															1.14E-02	5.94E-04	5.46E-04

Table A3 - Projected Site Generated Off-site Non-Truck Vehicles Moving Emissions from Acceleration/Deceleration Segments
ISOFlex - Chicago, Illinois

Acceleration/Deceleration Segments	Acceleration/Deceleration Segment Description	Distance	Distance	AM Peak Hour Volume	PM Peak Hour Volume	Peak Hour Vehicle Volume	Miles in Peak Hours	Year	Fuel	Road Type	Speed Range	Nox EF	PM10 EF	PM2.5 EF	Hourly NOx Emission Rate	Hourly PM10 Emission Rate	Hourly PM2.5 Emission Rate
		ft	mile	# veh/hr	# veh/hr	# veh/hr	miles				mph	g/mile	g/mile	g/mile	lb/hr	lb/hr	lb/hr
1	Roadway - E 95 th Street Between Access 4 & S Jeffery Blvd	75	0.014	19	15	19	0.27	2028	Gasoline	Passenger car	12.5 <= speed < 17.5 mph	0.0625631	0.00244308	0.002161202	3.71E-05	1.45E-06	1.28E-06
2	Roadway - E 95 th Street Between Access 4 & S Jeffery Blvd	75	0.014	19	15	19	0.27	2028	Gasoline	Passenger car	12.5 <= speed < 17.5 mph	0.0625631	0.00244308	0.002161202	3.71E-05	1.45E-06	1.28E-06
3	Roadway - E 95th Street Between Access 4 & Access 3A	75	0.014	47	32	47	0.67	2028	Gasoline	Passenger car	12.5 <= speed < 17.5 mph	0.0625631	0.00244308	0.002161202	9.19E-05	3.59E-06	3.17E-06
4	Roadway - E 95th Street Between Access 4 & Access 3A	75	0.014	47	32	47	0.67	2028	Gasoline	Passenger car	12.5 <= speed < 17.5 mph	0.0625631	0.00244308	0.002161202	9.19E-05	3.59E-06	3.17E-06
5	Roadway - E 95th Street Between Access 3A & Stony Island Plaza	75	0.014	75	66	75	1.07	2028	Gasoline	Passenger car	12.5 <= speed < 17.5 mph	0.0625631	0.00244308	0.002161202	1.47E-04	5.73E-06	5.07E-06
6	Roadway - E 95th Street Between Access 3A & Stony Island Plaza	75	0.014	75	66	75	1.07	2028	Gasoline	Passenger car	12.5 <= speed < 17.5 mph	0.0625631	0.00244308	0.002161202	1.47E-04	5.73E-06	5.07E-06
7	Roadway - E 95th Street Between Stony Island Plaza & S Stony Island Ave.	75	0.014	75	66	75	1.07	2028	Gasoline	Passenger car	12.5 <= speed < 17.5 mph	0.0625631	0.00244308	0.002161202	1.47E-04	5.73E-06	5.07E-06
8	Roadway - E 95th Street Between Stony Island Plaza & S Stony Island Ave.	75	0.014	75	66	75	1.07	2028	Gasoline	Passenger car	12.5 <= speed < 17.5 mph	0.0625631	0.00244308	0.002161202	1.47E-04	5.73E-06	5.07E-06
Total															8.45E-04	3.30E-05	2.92E-05

Table A4 - Projected Site Generated Off-site Trucks Moving Emissions from Acceleration/Deceleration Segments
ISOFlex - Chicago, Illinois

Acceleration/Deceleration Segments	Acceleration/Deceleration Segment Description	Distance	Distance	AM Peak Hour Volume	PM Peak Hour Volume	Peak Hour Vehicle Volume	Miles in Peak Hours	Year	Fuel	Road Type	Speed Range	Nox EF	PM10 EF	PM2.5 EF	Hourly NOx Emission Rate	Hourly PM10 Emission Rate	Hourly PM2.5 Emission Rate
		ft	mile	# veh/hr	# veh/hr	# veh/hr	miles				mph	g/mile	g/mile	g/mile	lb/hr	lb/hr	lb/hr
1	Roadway - Fulton St Between Sacramento Blvd & Washenaw Ave.	150	0.028	3	3	3	0.09	2028	Diesel Fuel	Single Unit Short-haul Truck	12.5 <= speed < 17.5 mph	7.9732	0.428118	0.3938675	1.49E-03	8.03E-05	7.39E-05
2	Roadway - Fulton St Between Sacramento Blvd & Washenaw Ave.	150	0.028	3	3	3	0.09	2028	Diesel Fuel	Single Unit Short-haul Truck	12.5 <= speed < 17.5 mph	7.9732	0.428118	0.3938675	1.49E-03	8.03E-05	7.39E-05
3	Roadway - Fulton St Between Talman Ave. & Washenaw Ave.	150	0.028	3	3	3	0.09	2028	Diesel Fuel	Single Unit Short-haul Truck	12.5 <= speed < 17.5 mph	7.9732	0.428118	0.3938675	1.49E-03	8.03E-05	7.39E-05
4	Roadway - Fulton St Between Talman Ave. & Washenaw Ave.	150	0.028	3	3	3	0.09	2028	Diesel Fuel	Single Unit Short-haul Truck	12.5 <= speed < 17.5 mph	7.9732	0.428118	0.3938675	1.49E-03	8.03E-05	7.39E-05
5	Roadway - Fulton St Between Talman Ave. & Western Ave.	150	0.028	0	0	0	0.00	2028	Diesel Fuel	Single Unit Short-haul Truck	12.5 <= speed < 17.5 mph	7.9732	0.428118	0.3938675	0.00E+00	0.00E+00	0.00E+00
6	Roadway - Fulton St Between Talman Ave. & Western Ave.	150	0.028	0	0	0	0.00	2028	Diesel Fuel	Single Unit Short-haul Truck	12.5 <= speed < 17.5 mph	7.9732	0.428118	0.3938675	0.00E+00	0.00E+00	0.00E+00
7	Roadway - Washenaw Ave. Between Fulton St. & South Access Road	150	0.028	0	0	0	0.00	2028	Diesel Fuel	Single Unit Short-haul Truck	12.5 <= speed < 17.5 mph	7.9732	0.428118	0.3938675	0.00E+00	0.00E+00	0.00E+00
8	Roadway - Washenaw Ave. Between Fulton St. & South Access Road	150	0.028	0	0	0	0.00	2028	Diesel Fuel	Single Unit Short-haul Truck	12.5 <= speed < 17.5 mph	7.9732	0.428118	0.3938675	0.00E+00	0.00E+00	0.00E+00
Total															5.98E-03	3.21E-04	2.95E-04

Table A5 - Projected Site Generated Off-site Traffic Idling Emissions
IsoFlex - Chicago, Illinois

Source ID	Road Section Description	Peak hours Delay Time (seconds)		AM Peak Hour Volume		PM Peak Hour Volume		Peak Hour Volume		Delay in Peak hours		Trucks			Non-truck vehicles			Trucks			Non-truck vehicles			Total		
		Morning Peak Hour	Afternoon Peak Hour	Trucks # veh/hr	Non-truck vehicles # veh/hr	Trucks # veh/hr	Non-truck vehicles # veh/hr	Trucks # veh/hr	Non-truck vehicles # veh/hr	Trucks Seconds	Non-truck vehicles Seconds	Nox EF g/hr	PM10 EF g/hr	PM2.5 EF g/hr	Nox EF g/hr	PM10 EF g/hr	PM2.5 EF g/hr	Hourly NOx Emission Rate lb/hr	Hourly PM10 Emission Rate lb/hr	Hourly PM2.5 Emission Rate lb/hr	Hourly NOx Emission Rate lb/hr	Hourly PM10 Emission Rate lb/hr	Hourly PM2.5 Emission Rate lb/hr	Hourly NOx Emission Rate lb/hr	Hourly PM10 Emission Rate lb/hr	Hourly PM2.5 Emission Rate lb/hr
Idling 1	Traffic Signal - E 95th Street & S Stony Island Ave Eastbound	72.3	125.9	2	8	2	5	2	8	396	1208	45.317	3.721	3.424	0.193	0.018	0.016	1.10E-02	9.01E-04	8.29E-04	1.43E-04	1.33E-05	1.18E-05	1.11E-02	9.15E-04	8.41E-04
Idling 2	Traffic Signal - E 95th Street & S Stony Island Ave Westbound Straight	69.9	85.7	0	6	0	7	0	7	0	1019	45.317	3.721	3.424	0.193	0.018	0.016	0.00E+00	0.00E+00	0.00E+00	1.20E-04	1.12E-05	9.93E-06	1.20E-04	1.12E-05	9.93E-06
Idling 3	Traffic Signal - E 95th Street & S Stony Island Ave Westbound Left Turn	91.7	252.3	1	16	1	20	1	20	344	6513	45.317	3.721	3.424	0.193	0.018	0.016	9.53E-03	7.82E-04	7.20E-04	7.69E-04	7.17E-05	6.35E-05	1.03E-02	8.54E-04	7.83E-04
Idling 4	Traffic Signal - E 95th Street & S Stony Island Ave Westbound Right Turn	72.0	92.7	0	10	0	12	0	12	0	1832	45.317	3.721	3.424	0.193	0.018	0.016	0.00E+00	0.00E+00	0.00E+00	2.16E-04	2.02E-05	1.79E-05	2.16E-04	2.02E-05	1.79E-05
Idling 5	Traffic Signal - E 95th Street & S Stony Island Ave Northbound Right Turn	35.5	33.5	0	22	0	13	0	22	0	1217	45.317	3.721	3.424	0.193	0.018	0.016	0.00E+00	0.00E+00	0.00E+00	1.44E-04	1.34E-05	1.19E-05	1.44E-04	1.34E-05	1.19E-05
Idling 6	Traffic Signal - E 95th Street & S Stony Island Ave Southbound Left Turn	71.6	20.7	0	13	0	9	0	13	0	1117	45.317	3.721	3.424	0.193	0.018	0.016	0.00E+00	0.00E+00	0.00E+00	1.32E-04	1.23E-05	1.09E-05	1.32E-04	1.23E-05	1.09E-05
Idling 7	Traffic Signal - E 95th Street & Stony Island Plaza Exit Eastbound	37.3	37.4	2	43	2	27	2	43	149	2614	45.317	3.721	3.424	0.193	0.018	0.016	4.14E-03	3.40E-04	3.13E-04	3.09E-04	2.88E-05	2.55E-05	4.45E-03	3.69E-04	3.38E-04
Idling 8	Traffic Signal - E 95th Street & Stony Island Plaza Exit Westbound	28.6	32.5	1	32	1	39	1	39	61	2183	45.317	3.721	3.424	0.193	0.018	0.016	1.69E-03	1.39E-04	1.28E-04	2.58E-04	2.40E-05	2.13E-05	1.95E-03	1.63E-04	1.49E-04
Idling 9	Traffic Signal - E 95th Street & Access 3A Eastbound Left Turn	33.8	46.0	2	26	2	22	2	26	160	1891	45.317	3.721	3.424	0.193	0.018	0.016	4.42E-03	3.63E-04	3.34E-04	2.23E-04	2.08E-05	1.84E-05	4.64E-03	3.84E-04	3.52E-04
Idling 10	Traffic Signal - E 95th Street & Access 3A Westbound right Turn	22.9	33.2	0	7	0	5	0	7	0	326	45.317	3.721	3.424	0.193	0.018	0.016	0.00E+00	0.00E+00	0.00E+00	3.85E-05	3.59E-06	3.18E-06	3.85E-05	3.59E-06	3.18E-06
Idling 11	Traffic Signal - E 95th Street & Access 4 Eastbound Left Turn	28.2	41.5	0	17	0	5	0	17	0	687	45.317	3.721	3.424	0.193	0.018	0.016	0.00E+00	0.00E+00	0.00E+00	8.11E-05	7.57E-06	6.69E-06	8.11E-05	7.57E-06	6.69E-06
Idling 12	Traffic Signal - E 95th Street & Access 4 Eastbound Right Turn	18.0	29.3	0	4	0	1	0	4	0	101	45.317	3.721	3.424	0.193	0.018	0.016	0.00E+00	0.00E+00	0.00E+00	1.20E-05	1.12E-06	9.87E-07	1.20E-05	1.12E-06	9.87E-07
Total																		3.08E-02	2.53E-03	2.32E-03	2.45E-03	2.28E-04	2.02E-04	3.32E-02	2.75E-03	2.53E-03

Table A6 - Projected Peak Hour On-Site Generated Moving Emissions.
IsoFlex - Chicago, Illinois

Source ID	Road Section Description	Distance	Distance	AM Peak Hour Volume	PM Peak Hour Volume	Peak Hour Vehicle Volume	Miles in Peak Hours	Year	Fuel	Road Type	Speed Range	Nox EF	PM10 EF	PM2.5 EF	Hourly NOx Emission Rate	Hourly PM10 Emission Rate	Hourly PM2.5 Emission Rate
		ft	mile	# veh/hr	# veh/hr	# veh/hr	miles				mph	g/mile	g/mile	g/mile	lb/hr	lb/hr	lb/hr
Road J	Roadway - Truck Traveling From facility Access 3A to dock	250	0.047	3	3	3	0.14	2028	Diesel fuel	Truck	2.5 <= speed < 7.5 mph	16.331	0.952612	0.8764	5.10E-03	2.98E-04	2.74E-04
Road k	Roadway - Non truck traveling From facility south access 3A to parking	500	0.095	32	27	32	3.030	2028	Gasoline	Passenger car	2.5 <= speed < 7.5 mph	0.0741	0.0044	0.0039	4.94E-04	2.95E-05	2.61E-05
Road k	Roadway - Non truck traveling From facility south access 4 to parking	500	0.095	62	54	62	5.871	2028	Gasoline	Passenger car	2.5 <= speed < 7.5 mph	0.0642	0.0029	0.0026	8.29E-04	3.80E-05	3.36E-05
Total															5.60E-03	3.27E-04	3.00E-04

Table A7 - Projected Peak Hour On-Site Generated idling Emissions.
ISOFlex - Chicago, Illinois

Source ID	Road Section Description	Idling Time	AM Peak Hour Volume	PM Peak Hour Volume	Peak Hour Vehicle Volume	Peak Hour Idling period	Year	Fuel	Road Type	Nox EF	PM10 EF	PM2.5 EF	Hourly NOx Emission Rate	Hourly PM10 Emission Rate	Hourly PM2.5 Emission Rate
		seconds	# veh/hr	# veh/hr	# veh/hr	seconds				g/hr	g/hr	g/hr	lb/hr	lb/hr	lb/hr
Idling 34	Trucks idling at dock	300	3	3	3	900	2028	Diesel fuel	Truck	45.3169	3.72143	3.42371	2.49E-02	2.05E-03	1.88E-03
Idling 34	Trucks idling at access 3A	33.2	3	3	3	100	2028	Diesel fuel	Truck	45.3169	3.72143	3.42371	2.76E-03	2.27E-04	2.08E-04
Idling 34	Non-truck vehicles idling at parking lot	60	94	81	94	5640	2028	Gasoline	Passenger car	0.193208	0.018024956	0.01594525	6.66E-04	6.21E-05	5.50E-05
Idling 34	Non-truck vehicles idling at access 3A	33.2	32	27	32	1062	2028	Gasoline	Passenger car	0.193208	0.018024956	0.01594525	1.25E-04	1.17E-05	1.04E-05
Idling 34	Non-truck vehicles idling at access 4	29.3	62	54	62	1817	2028	Gasoline	Passenger car	0.193208	0.018024956	0.01594525	2.14E-04	2.00E-05	1.77E-05
Total													2.87E-02	2.37E-03	2.17E-03

**Table A8 - Projected Emission of On-site Heaters for Warehouse and Office Building
ISOFlex - Chicago, Illinois**

Equipment	Number of Equipment	Single Unit Natural Gas Consumption Rate (Btu/hr)	AP-42 Emission Factor			Emission Rate		
			NOx (lb/10 ⁶ cu ft)	PM (lb/10 ⁶ cu ft)	PM10 (lb/10 ⁶ cu ft)	NOx (lb/hr)	PM (lb/hr)	PM10 (lb/hr)
Expansion	16	150,000	100	7.6	7.6	2.40E-04	1.82E-05	1.82E-05
New Building	24	150,000	100	7.6	7.6	3.60E-04	2.74E-05	2.74E-05

**Air Quality Impact Evaluation
ISOFlex Packaging – Chicago, Illinois**

October 2023

**Appendix B
Modeled Emissions**

Table B1 - Modeled Emissions at Road Intersections
Isoflex - Chicago, Illinois

Intersection Description	Area Source ID	Acceleration/ Deceleration Segments	Idling Segments	A & D Emissions			Idling Emissions			Total Emissions		
				NOx (lbs/hr)	PM10 (lbs/hr)	PM2.5 (lbs/hr)	NOx (lbs/hr)	PM10 (lbs/hr)	PM2.5 (lbs/hr)	NOx (lbs/hr)	PM10 (lbs/hr)	PM2.5 (lbs/hr)
E. 95th Street & S. Stony Island Ave.	I-1	8	1, 2, 3, 4, 5, 6	1.47E-04	5.73E-06	5.07E-06	2.20E-02	1.83E-03	1.67E-03	2.22E-02	1.83E-03	1.68E-03
E. 95th Street & S. Stony Island Plaza	I-2	6, 7	7, 8	2.93E-04	1.15E-05	1.01E-05	6.40E-03	5.32E-04	4.87E-04	6.69E-03	5.43E-04	4.97E-04
E. 95th Street & Access 3A	I-3	4, 5	9, 10	1.73E-03	8.96E-05	8.21E-05	4.68E-03	3.87E-04	3.56E-04	6.42E-03	4.77E-04	4.38E-04
E. 95th Street & Access 4	I-4	2, 3	11, 12	3.12E-03	1.66E-04	1.52E-04	9.31E-05	8.68E-06	7.68E-06	3.21E-03	1.74E-04	1.60E-04
E. 95th Street & S. Jeffrey Blvd	I-5	1		1.53E-03	8.17E-05	7.51E-05				1.53E-03	8.17E-05	7.51E-05
			Total	6.82E-03	3.54E-04	3.25E-04	3.32E-02	2.75E-03	2.53E-03	4.00E-02	3.11E-03	2.85E-03

Table B2 - Modeled Emissions for On-site Sources
Isoflex - Chicago, Illinois

On-site Source	Source	NOx (lbs/hr)	PM10 (lbs/hr)	PM2.5 (lbs/hr)	Description
Parking Lot at Access 3A	Trucks	3.05E-02	2.44E-03	2.24E-03	Trucks movement on-site, docking, parking, and idling
	Non-Trucks	1.05E-03	8.92E-05	7.89E-05	Non-truck vehicles movement on-site, parking, and idling.
Parking Lot at Access 4	Non-Trucks	4.96E-04	3.29E-05	2.91E-05	Non-truck vehicles movement on-site, parking, and idling.
Stationary Sources - NG Heaters	Expansion	2.40E-04	1.82E-05	1.82E-05	Natural Gas fired space heaters; 16 heaters 0.15 MMBtu/hr ea.
	New Warehouse	3.60E-04	2.74E-05	2.74E-05	Natural Gas fired space heaters; 24 heaters 0.15 MMBtu/hr ea.