

**Air Quality Impact Evaluation  
Lakeshore Recycling Systems, LLC – Chicago, Illinois**

**September, 2022**

**R22469-1.0**

***Prepared for:***  
**Lakeshore Recycling Systems, LLC**  
**3152 South California Avenue**  
**Chicago, Illinois**

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## 1.0 INTRODUCTION

This Air Quality Impact Evaluation (AQIE) has been prepared to estimate potential impacts from the proposed project at the Lakeshore Recycling Systems, LLC (LRS) facility located at 3152 South California Avenue, Chicago, Illinois. The LRS site is a municipal solid waste (MSW) transfer station and construction and demolition (C&D) recycling facility. The facility receives waste materials for either transfer or recycling depending upon content and market. A Site Location Map and Facility Layout Map are presented in Figures 1-1 and 1-2.

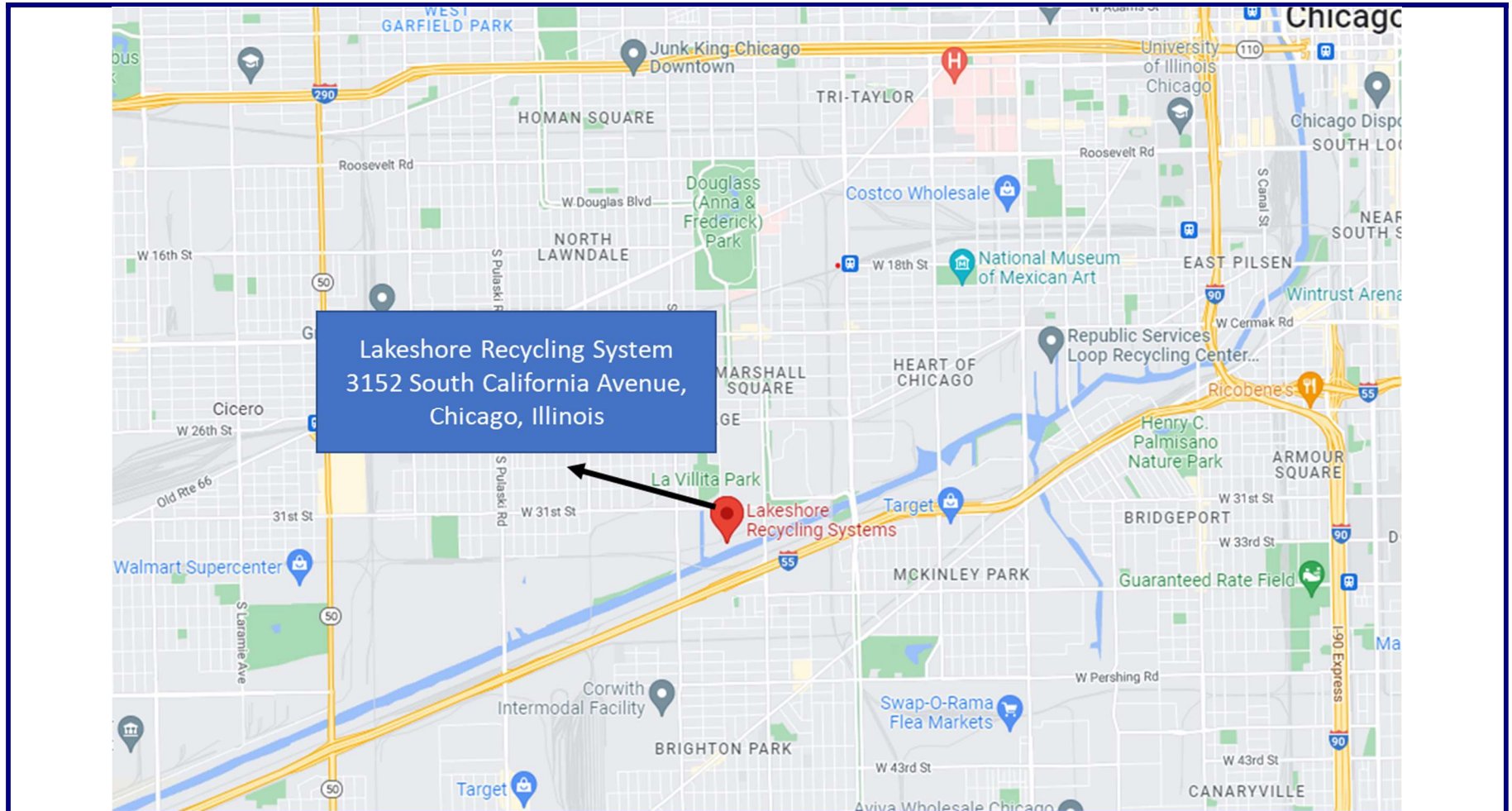
LRS will receive C&D waste with recyclable material and MSW waste without recyclable materials. C&D waste will be unloaded in Building 1 – C&D Building, and recyclable materials will be separated from non-recyclable materials by screening and sorting the waste into clean, generic material types (i.e. wood, metals, concrete, bricks ect.). Once separated, these materials are accumulated in inventory until volumes are adequate to be shipped. The non-recyclable portion of the waste is transported to Building 2 – MSW Building, via conveyor.

MSW and waste without recyclable materials are unloaded directly into MSW Building where the waste is compacted and baled. Bales are loaded into a barge and shipped for landfill disposal.

LRS submitted a permit application for Waste Transfer and Recycling Facility to City of Chicago Department of Public Health (CDPH). The Chicago Air Quality Ordinance Municipal Code Section 17-9-0117-G (March 21) requires Air Quality Impact Evaluation to be submitted as part of the application process. The AQIE requires an air dispersion modeling study to evaluate the impact of the project for PM<sub>10</sub>, PM<sub>2.5</sub> and NO<sub>x</sub>.

### 1.1 Facility Location and Contact Information

|                                      |  |
|--------------------------------------|--|
| <u>Business Name:</u>                | Lakeshore Recycling Systems LLC  |
| <u>Source Location:</u>              | 3152 South California Avenue – Chicago, Illinois 60608   |
| <u>RKA Contact for This Document</u> | Darina Demirev - Senior Engineer<br>2S631 Route 59, Suite B - Warrenville, Illinois 60555<br>630-393-9000 - <a href="mailto:ddemirev@rka-inc.com">ddemirev@rka-inc.com</a> |

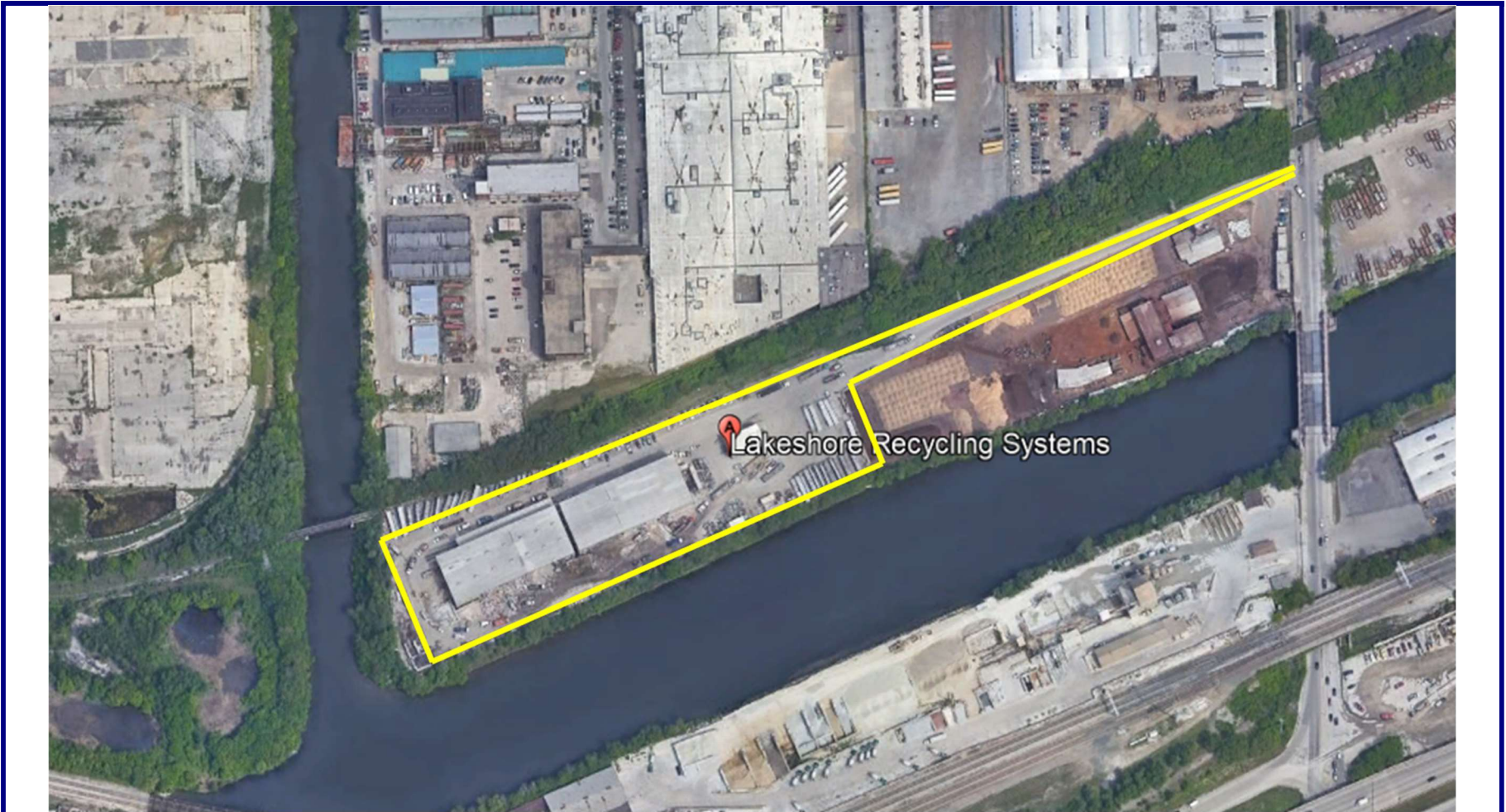


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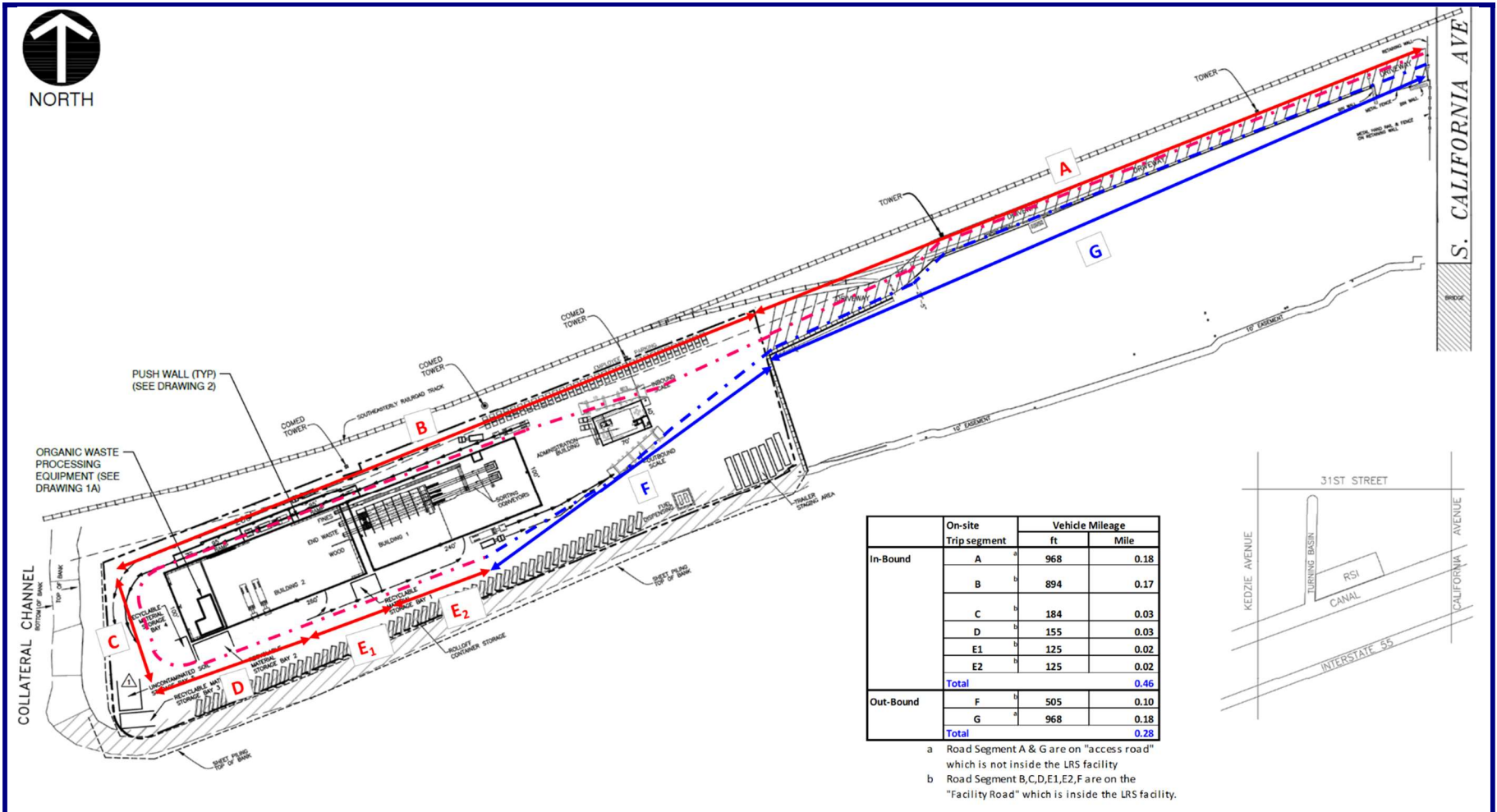
& ASSOCIATES, INC.

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|           |              |                                      |             |  |  |        |  |
|-----------|--------------|--------------------------------------|-------------|--|--|--------|--|
| COMMENTS: |              | <b>Air Quality Impact Evaluation</b> |             | <b>Site Location Map</b>   |  | FIGURE |  |
|           |              |                                      |             | Lakeshore Recycling<br>3152 South California Avenue, Chicago, Illinois |  | 1-1    |  |
| DRAWN BY: | APPROVED BY: | PROJECT NUMBER                       | DATE DRAWN: | REVISED DATE   |  |        |  |
|           | DD           | R22469-1.00                          | 08-2022     |  |  |        |  |



|  |  |   |  |   |  |
|--|--|---|--|---|--|
| <p>2S631 ROUTE 59, SUITE B<br/>WARRENVILLE, IL 60555<br/>630-393-9000/630-393-9111</p> | <p>COMMENTS:</p> <p style="text-align: center;"><b>Air Quality Impact Evaluation</b></p> |   | <p style="text-align: center;"><b>Facility Map</b><br/>Lakeshore Recycling<br/>3152 South California Avenue, Chicago, Illinois</p> |   | <p>FIGURE</p> <p style="font-size: 2em; text-align: center;">1-2</p> |
|  | <p>DRAWN BY:</p>   | <p>APPROVED BY:</p> <p style="text-align: center;">DD</p> | <p>PROJECT NUMBER</p> <p style="text-align: center;">R22469-1.00</p>   | <p>DATE DRAWN:</p> <p style="text-align: center;">08-2022</p> | <p>REVISED DATE</p>  |



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COMMENTS:  
**Air Quality Impact Evaluation**  
 DRAWN BY: APPROVED BY: DD  
 PROJECT NUMBER: R22469-1.00  
 DATE DRAWN: 08-2022

**Site Paved Road segment identification**  
 Lakeshore Recycling  
 3152 South California Avenue, Chicago, Illinois

FIGURE  
**1-3**  
 REVISED DATE



## 2.0 EMISSION SOURCES

### 2.1 Emissions Estimation

Emission estimates used for modeling are expressed as Potential-to-Emit (PTE) and are based on the maximum capacity and listed operating hours for each emission point or activity.

Stationary sources at the LRS Facility include: C&D Processing Building; MSW Processing Building; fugitive emissions from vehicles travel on paved roads; fugitive emission from Storage Bays.

Mobile source at the LRS Facility include: on-road vehicles (dump & load vehicles) moving emissions; on-road vehicles idling emissions; non-road vehicles (on-site diesel engine) emissions; employee vehicles emissions.

### 2.2 C&D Building Emissions

Basic information & assumptions for estimating C&D building PM10, PM2.5 & NOx emissions from building processing includes the following.

- The current permitted building operating capacity is 1,000 tons/day.
- C&D processing is performed 24 hr/day. 365 days/yr. C&D building accepts waste delivered by all types of dump and load vehicles from Monday 4 am to Saturday 3 pm (weekly peak hours). From Saturday at 3 pm through Monday at 4 am (weekly non-peak hours), there are no vehicles associated with C&D waste.
- Average C&D wastes percentages are shown in Table 2-1

Table 2-1: Percentage of C&D Building Incoming Wastes Categories  
 Lakeshore Recycling Services – California Avenue Facility – Chicago, Illinois

| C&D Waste description  | Process rate (ton/day) | Percentage (%) |
|------------------------|------------------------|----------------|
| Fines                  | 258                    | 26%            |
| End waste              | 480                    | 48%            |
| Wood chipper           | 35                     | 4%             |
| Brick Recovered        | 70                     | 7%             |
| crete recovered        | 30                     | 3%             |
| Metal recovered        | 23                     | 2%             |
| Misc. Debris recovered | 105                    | 11%            |
| <b>Total</b>           | <b>1000</b>            | <b>100%</b>    |

- Building equipment includes 2 vibrating conveyors (C-1B, C-1A), 2 vibrating screens (E-1B, E-1A), 4 fines transfer conveyors (C-3C, C-4C, C-5C, C-6C), 4 C&D end waste transfer

conveyors (C-3A, C-3B, C-4A, C-4B), 2 Woodchipper conveyor (WC-1, WC-2), 1 woodchipper, 1 excavator. Modeled pollutant include PM<sub>10</sub>, PM<sub>2.5</sub> and NO<sub>x</sub>.

- C&D end wastes and fines are transferred to MSW building through conveyors. The recyclable materials (woodchips, recovered brick, recovered concrete, recovered metal, and recovered misc. debris) are picked up manually from transfer conveyor. Wood chips are sent to the woodchipper through the woodchipper conveyor. Other recovered materials are transferred to storage bay 1 through bay 5 by end loader. End loader emissions are included in the storage bay emissions.
- PM<sub>10</sub> and P<sub>2.5</sub> emission factors for the material handling and processing (material loading, screening, transferring point, wood chipping) performed in the C&D Building are based on AP 42; Table 11.19.2-2 Crushed Stone Processing.
- PM emission factors for the material drop points in vehicle dumping and recovered materials manually picked up is based on the Material Drop PM equation in AP-42, Section 13.2.4.3.
- Wood chipping PM emission factor is from AP 42; Table 10.1.4-4 Wood products manufacturing (8/1994), PM 10 & PM 2.5 is estimated as 50% and 25% of PM Emission factor based on EPA Region 10 Particulate Matter Potential to Emit Emission Factors for Activities at Sawmills (05/2014). The woodchipper is electric and no additional emissions are generated by this equipment.
- Dust control mitigating procedures applied in the C&D building and building enclosure are assumed to provide 80% control.
- PM and NO<sub>x</sub> emission factors for the excavator diesel engine operation are based on 2022 EPA MOVES emission factor for non-road vehicles.

The C&D Building Emission summary is shown in Appendix A2-1

### **2.3 MSW building Emissions**

Basic information & assumptions for estimating MSW building PM<sub>10</sub>, PM<sub>2.5</sub> & NO<sub>x</sub> emission from building processing includes the following.

- MSW building current permitted operating capacity is 1680 tons/day,
- MSW processing is performed 24 hrs/day, 365 days/yr. MSW building accepts MSW waste from Monday at 4 am to Saturday at 3 pm. From Saturday 3 pm through Monday at 4 am, MSW building only accepts LRS trucks.
- MSW building also accepts the fines and C&D end wastes from C&D building through C&D building transfer conveyor (C-4A, C-4B and C-6C).

- A baler will bale the final compacted waste.
- MSW handling, and processing (dumping and loading) does not generate PM emissions. The PM emission factor for fines and C&D end waste transferring from C&D building are based on AP-42, Table 11.19.2-2 Crushed Stone Processing. PM emission factor for material drop performed in vehicle dumping is based on the Material Drop PM equation in AP-42, Section 13.2.4.3. MSW building Loader PM and NOx emission factor are based on MOVES 2021 non-road vehicle emission factor list.

The MSW Building Emission summary is shown in Appendix A2-2

**2.4 Fugitive Emissions**

The fugitive PM emissions are generated form vehicles travel on paved roads and from material loading to stockpiles in Storage Bays 1 through 5.

**2.4.1 Paved Road Emissions**

The facility roadways are 100% paved. Facility paved roads are subdivided into 1) Access Road from California Ave to facility gates and 2) Facility Road which is the path of inbound & outbound traffic inside the facility. Paved Road PM emissions are generated by inbound/outbound dump & load vehicles, facility non-road vehicles, and employee vehicles. Emission factors from paved roads are estimated using equations and procedures identified in based on AP-42 Section 13.2.

**2.4.1.1 Inbound/Outbound Dumping & Loading Vehicle Traffic generated Paved Road Emissions**

Basic information & assumptions for estimating PM emission from vehicle travel over paved roads includes the following.

- Inbound vehicles (dump & load vehicles) are subdivided into MSW building vehicles and C&D building vehicles based on the two buildings permitted capacity ratio shown in the table 2-2.

Table 2-2: Ratio of C&D building and MSW building permitted capacity. Lakeshore Recycling Services – California Avenue Facility – Chicago, Illinois

| Stationary Emission Point | Stationary Emission Point Operating Capacity (tons/day) |         | Inbound vehicle percentage for C&D and MSW |
|---------------------------|---|---------|--|
|                           | Tons/day  | Tons/yr | %  |
| C&D Building              | 1,000   | 364,000 | 37.3%                                      |
| MSW Building              | 1,680   | 611,520 | 62.7%                                      |

- C&D building traffic daily peak hours are from 9:30 am to 3:30 pm, 80% of C&D building daily receipts come through traffic during peak hours. MSW traffic peak hours are from 8 am to 2pm, an anticipated 75% of MSW daily receipts come through the traffic during this period.
- Vehicle weights are calculated as the average of loaded and unloaded vehicle weights.
- The Potential number of vehicles travelled are prorated based on the permitted capacity of C&D and MSW building, calculated through the weighted average vehicle amount. (Permitted capacity x vehicle type weighted average amount ratio / single vehicle loaded waste weight)
- Traffic travel path is subdivided into Access Road and Facility Road. Access Road is the access road from California Avenue to LRS facility gates. Facility Road is the travel path inside the facility. The Facility Road is further divided into several segments to facilitate the emission calculations for MSW and C&D vehicles. See Figure 1-3. The total vehicle round trip distances is shown in Table 3.3. Detailed segment of the vehicle mileage in the facility are identified in Appendix Figure A2-1.

**Table 2-3: Mileage of C&D and MSW building Vehicles on-site  
 Lakeshore Recycling Services – California Avenue Facility – Chicago, Illinois**

|                                 | Vehicle Mileage |             |                 |             |
|---------------------------------|-----------------|-------------|-----------------|-------------|
|                                 | Inbound (mile)  |             | Outbound (mile) |             |
|                                 | Facility Road   | Access Road | Facility Road   | Access Road |
| <b>C&amp;D Building Vehicle</b> | 0.28            | 0.18        | 0.10            | 0.18        |
| <b>MSW building Vehicle</b>     | 0.23            | 0.18        | 0.14            | 0.18        |

Estimated PM10, and PM2.5 emissions from C&D and MSW vehicles travel over paved roads are summarized in Appendix A2-3a, A2-3b, respectively.

**2.4.1.2 Non- Road Vehicles Paved Road emissions**

Basic information & assumptions for emission estimates:

- On-site non-road vehicle emissions are generated by Loaders, Skid Steer, Forklift and Sweeper. Non-road vehicles operate 20 hrs/day, 365 days/yr.

- There are three Facility Road segments related to the Paved Road emissions: Storage Bay loading by the loader, MSW building waste pushing by the loader, and bales being transferred to barge by forklifts
- Storage bay loading amount is assumed to be 15 loads per day, calculated based on the ratio of recovered materials and the building permitted capacity identified in the C&D building process. The distance of the loading round trip is 0.02 mile from the C&D building to the storage bay.
- MSW building loader is assumed to be 8 loads/hr, 160 loads/day. The distance of the waste pushing in MSW is 0.02 mile
- The round-trip distance for the forklift to transfer bales to barge harbor is 0.02 mile, the operating rate is 755 loads/day.
- Assumed Skid Steer and Sweeper travel 5 miles/day inside the facility.

The Non- Road traffic generated Paved Road emission summary is shown in Appendix A2-4

#### **2.4.1.3 Employee Vehicles Paved Road Emissions**

Basic information & assumptions for emission estimates:

- Employee vehicles only use the Access Road
- Daily number of employee vehicles is 100 vehicles/day
- Employee vehicle type is assumed to be passenger car, average weight is 4000lbs.

Estimated PM10, and PM2.5 emissions from employee vehicles travel over paved roads are summarized in Appendix A2-5

#### **2.4.2 Storage Bay Fugitive Emissions**

There are five storage bays in the facility (Bay 1 to Bay 5) which are used to store the recovered materials from C&D building. The daily maximum capacity of each storage bay is shown in following.

- Storage bay 1: 57 tons/day
- Storage bay 2: 200 tons/day
- Storage bay 3: 150 tons/day

- Storage bay 4: 140 tons/day
- Storage bay 5: 550 tons/day

The operating capacity for the storage operation is 29% of total daily capacity of the 5 bays, 318 tons/day. PM10 & PM2.5 emission factors for the storage bay operation (loading & unloading recovered materials), fugitive emissions from wind erosion are based on Texas Commission on Environmental Quality Crushed Stone Emission Calculation. PM 2.5 emission factor is estimated from PM10 emission factor based on AP-42, 13.2.45.

The Estimated fugitive PM10, PM2.5 emissions and loading & unloading emissions from storage bays are summarized in Appendix A2-6.

## **2.5 Mobile Source Emissions (MOVEs Emission)**

Mobile source emission factors are based on the 2022 MOVEs emission factor table for on-road & non-road vehicles.

### **2.5.1 On-Road Vehicle Moving Emissions**

Basic information & assumptions for emission estimates:

- Average vehicle speed is limited to 10 mph on the Access Road and on the Facility Road.
- Moving vehicles are divided into C&D building vehicles and MSW building vehicles based on the permitted capacity ratio of the two buildings the same method as the estimation for Paved Road fugitive emission.
- NO<sub>x</sub>, PM10 and PM 2.5 Emission factors for each type of on-site dump & load vehicles are identified in 2022 Cook County Vehicle Emission Factor Database shown in the Table 2-4.
- The potential vehicle mileage for each type of vehicle is estimated based on the potential vehicle amount which is prorated by MSW building or C&D building permitted capacity and identified on-site vehicle travel segment for MSW building vehicles and C&D building vehicles. (Potential vehicle amount x vehicle travel distance).
- Vehicle weekly and daily peak hours are identified in Paved Road Emission Estimation.

Inbound & Outbound dump and load vehicles moving emissions are summarized in Appendix table A2-7a and A2-7b for C&D building vehicles and MSW building vehicles, respectively.

Table 2-4: MOVES table Emission Factor for each type of On-site Dump & Load Vehicles  
Lakeshore Recycling Services – California Avenue Facility – Chicago, Illinois

| year | On-site Vehicle Type | MOVES source Type Name       | Fuel Type   | Road Type          | Avg Speed               | NOx EF (g/mi) | PM10 EF (g/mi) | PM2.5 EF (g/mi) |
|------|----------------------|------------------------------|-------------|--------------------|-------------------------|---------------|----------------|-----------------|
| 2022 | Box Truck            | Light Commercial Truck       | Diesel Fuel | Urban Unrestricted | 7.5 <= speed < 12.5 mph | 2.964         | 0.111          | 0.102           |
| 2022 | FLAT BED             | Passenger Truck              | Gasoline    | Urban Unrestricted | 7.5 <= speed < 12.5 mph | 0.109         | 0.004          | 0.003           |
| 2022 | DUMP TRUCK           | Single Unit Short-haul Truck | Diesel Fuel | Urban Unrestricted | 7.5 <= speed < 12.5 mph | 10.662        | 0.624          | 0.574           |
| 2022 | PACKER               | Light Commercial Truck       | Diesel Fuel | Urban Unrestricted | 7.5 <= speed < 12.5 mph | 2.964         | 0.111          | 0.102           |
| 2022 | Rolloff              | Single Unit Short-haul Truck | Diesel Fuel | Urban Unrestricted | 7.5 <= speed < 12.5 mph | 10.662        | 0.624          | 0.574           |
| 2022 | Semi                 | Single Unit Long-haul Truck  | Diesel Fuel | Urban Unrestricted | 7.5 <= speed < 12.5 mph | 5.482         | 0.113          | 0.104           |
| 2022 | SUV                  | Passenger Truck              | Gasoline    | Urban Unrestricted | 7.5 <= speed < 12.5 mph | 0.109         | 0.004          | 0.003           |
| 2022 | Semi Dump            | Single Unit Short-haul Truck | Diesel Fuel | Urban Unrestricted | 7.5 <= speed < 12.5 mph | 10.662        | 0.624          | 0.574           |
| 2022 | VAC TRUCK            | Single Unit Short-haul Truck | Diesel Fuel | Urban Unrestricted | 7.5 <= speed < 12.5 mph | 10.662        | 0.624          | 0.574           |
| 2022 | VAN                  | Passenger Truck              | Gasoline    | Urban Unrestricted | 7.5 <= speed < 12.5 mph | 0.109         | 0.004          | 0.003           |
| 2022 | PICK UP W. TLR       | Passenger Truck              | Gasoline    | Urban Unrestricted | 7.5 <= speed < 12.5 mph | 0.109         | 0.004          | 0.003           |
| 2022 | PICK UP              | Passenger Truck              | Gasoline    | Urban Unrestricted | 7.5 <= speed < 12.5 mph | 0.109         | 0.004          | 0.003           |

### 2.5.2 On-Road Vehicle Idling Emissions

Basic information & assumptions for emission estimates:

- NOx, PM10 and PM 2.5 Emission factors for each type of on-site dump & load vehicles are identified in 2022 Cook County vehicle emission factor database which are shown in the following table 2-5
- Vehicle weekly and daily peak hours are identified in Paved Road Emission Estimation.

Vehicle idling emissions are summarized in Appendix table A2-8a and A2-8b for C&D building vehicles and MSW building vehicles, respectively.

Table 2-5: MOVES table emission factor for vehicle idling  
Lakeshore Recycling Services – California Avenue Facility – Chicago, Illinois

| year | On-site Vehicle Type | MOVES source Type Name       | Fuel Type   | Road Type               | Avg Speed               | NOx EF (g/hr) | PM10 EF (g/hr) | PM2.5 EF (g/hr) |
|------|----------------------|------------------------------|-------------|-------------------------|-------------------------|---------------|----------------|-----------------|
| 2022 | Box Truck            | Light Commercial Truck       | Diesel Fuel | Off-Network Idle (g/hr) | speed = 0 (idle) (g/hr) | 50.096        | 1.286          | 1.184           |
| 2022 | FLAT BED             | Passenger Truck              | Gasoline    | Off-Network Idle (g/hr) | speed = 0 (idle) (g/hr) | 0.366         | 0.011          | 0.009           |
| 2022 | DUMP TRUCK           | Single Unit Short-haul Truck | Diesel Fuel | Off-Network Idle (g/hr) | speed = 0 (idle) (g/hr) | 48.339        | 3.893          | 3.582           |
| 2022 | PACKER               | Light Commercial Truck       | Diesel Fuel | Off-Network Idle (g/hr) | speed = 0 (idle) (g/hr) | 50.096        | 1.286          | 1.184           |
| 2022 | Rolloff              | Single Unit Short-haul Truck | Diesel Fuel | Off-Network Idle (g/hr) | speed = 0 (idle) (g/hr) | 48.339        | 3.893          | 3.582           |
| 2022 | Semi                 | Single Unit Long-haul Truck  | Diesel Fuel | Off-Network Idle (g/hr) | speed = 0 (idle) (g/hr) | 24.376        | 0.620          | 0.571           |
| 2022 | SUV                  | Passenger Truck              | Gasoline    | Off-Network Idle (g/hr) | speed = 0 (idle) (g/hr) | 0.366         | 0.011          | 0.009           |
| 2022 | Semi Dump            | Single Unit Short-haul Truck | Diesel Fuel | Off-Network Idle (g/hr) | speed = 0 (idle) (g/hr) | 48.339        | 3.893          | 3.582           |
| 2022 | VAC TRUCK            | Single Unit Short-haul Truck | Diesel Fuel | Off-Network Idle (g/hr) | speed = 0 (idle) (g/hr) | 48.339        | 3.893          | 3.582           |
| 2022 | VAN                  | Passenger Truck              | Gasoline    | Urban Unrestricted      | speed = 0 (idle) (g/hr) | 0.366         | 0.011          | 0.009           |
| 2022 | PICK UP W. TLR       | Passenger Truck              | Gasoline    | Off-Network Idle (g/hr) | speed = 0 (idle) (g/hr) | 0.366         | 0.011          | 0.009           |
| 2022 | PICK UP              | Passenger Truck              | Gasoline    | Off-Network Idle (g/hr) | speed = 0 (idle) (g/hr) | 0.366         | 0.011          | 0.009           |

### 2.5.3 Non- Road Vehicles Emissions

Basic information & assumptions for emission estimates:

- On-site non-road vehicles operate 20 hrs/day, 365 days/yr.
- NOx, PM10 and PM 2.5 Emission factors for non-road vehicles are based on vehicle horsepower and 2021 MOVES emission factor database for non-road vehicles shown in Table 2-6.
- Estimated NOx, PM10 and PM2.5 emissions from on-site non-road vehicles are summarized in Appendix A2-9.



Table 2-6: On-site non-road vehicles Emission Factors  
 Lakeshore Recycling Services – California Avenue Facility – Chicago, Illinois

| Project Year | Equipment Description | Fuel Type | Equipment Horsepower | Equipment Engine Tier | Exhaust NOx EF (g/hp-hr) | Exhaust PM10 EF (g/hp-hr) | Exhaust PM2.5 EF (g/hp-hr) |
|--------------|-----------------------|-----------|----------------------|-----------------------|--------------------------|---------------------------|----------------------------|
| 2022         | Excavator             | Diesel    | 100 < hp <= 175      | 4                     | 0.057                    | 0.000                     | 0.000                      |
| 2022         | Rubber Tire Loaders   | Diesel    | 100 < hp <= 175      | 4                     | 0.057                    | 0.000                     | 0.000                      |
| 2022         | Skid Steer            | Diesel    | 75 < hp <= 100       | 4                     | 0.019                    | 0.000                     | 0.000                      |
| 2022         | Forklift              | Diesel    | 50 < hp <= 75        | 4                     | 0.054                    | 0.000                     | 0.000                      |
| 2022         | Material Handler      | Diesel    | 175 < hp <= 300      | 4                     | 0.017                    | 0.000                     | 0.000                      |
| 2022         | Sweeper               | Diesel    | 75 < hp <= 100       | 4                     | 0.039                    | 0.000                     | 0.000                      |

#### 2.5.4 Employee Vehicle Moving Emissions

Basic information & assumptions for emission estimates:

- Employee vehicle travels inbound and outbound of facility continuously for 24 hours. There is no idling time estimated for employee vehicles.
- Employee vehicle NOx, PM10 and PM2.5 emission factor is based on 2022 MOVES emission factor database for gasoline passenger car.

The estimated NOx, PM10 and PM2.5 emissions from on-site non-road vehicles are summarized in Appendix A2-10.

### **3.0 DISPERSION MODELING**

Dispersion modeling was performed to predict the maximum impact from LRS sources. AERMOD dispersion model Version 22112 was used in this modeling analysis.

#### **3.1 Meteorological Data**

Surface meteorological data used in the modeling was obtained from the National Weather Service at the Midway Airport Station for the years 2012 through 2016. Wind data was downloaded as 1-minute average ASOS data and processed using AERMINUTE. Upper air data for the same period was obtained from the coincident upper air sounding station at Davenport, Iowa. Surface and upper air data were preprocessed with AERMET using surface parameters from AIRSURFACE. This dataset was selected as complete five-year dataset. Due to incomplete and missing data in 2017, this is the most current complete 5-year data set.

#### **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 Ambient Air Boundaries**

There is 12-foot retaining wall securing the eastern boundary of the property and a 15-foot seawall on the southern boundary of LSR property. The Collateral Channel is on the west side of the property. The access road from South California Avenue to the LSR gate is a private road and it is part of this facility property. As such the road is included within LSR boundaries. Public access to the road will be restricted by placing a street sign.

#### **3.4 Receptor Network**

A Cartesian receptor grid is placed around the property lines up to 5 km from the property line as follows:

- 25 m apart along the property line
- 50 m extending from the fence line to 0.5 km
- 100 m extending from the fence line to 1.5 km
- 250 m extending from the fence line to 3 km
- 500 m apart from 3 m to 5 km

### 3.5 Building Downwash

Existing buildings and structures were included in the input files. However, all sources in the facility are fugitive sources and therefore are modeled as volume sources. Building downwash algorithms are not applicable for volume and area sources.

### 3.6 Operating Schedule

The facility is permitted to operate 24 hours a day, 7 days a week. However, the facility receives the waste in peak volumes as follows: Building 1 C&D waste receiving peak hours are from 9:30 am to 3:30 pm, and Building 2 MSW waste receiving peak volumes are from 8:00 am to 2:00 pm, Monday through Saturday. Waste processing rates do not change in peak hours. Processing rates remain relatively the same during the day.

Traffic emissions and vehicle idle emissions are modeled with peak hourly rates during the peak hours and off-peak hourly rates for off-peak hours. Emission rates are described in Section 2. Starting on Saturday at 3:00 pm through Monday at 4:00 am the facility gates are closed. Some LSR waste trucks are accepted during these weekend hours. Weekend emission rates are estimated to represent this low traffic flow.

AERMOD allows “Hour per Day of Week Emission Rate Factors”. These factors are in 1-hour intervals. Therefore, the peak hours for the C&D waste were modeled from 10:00 am to 4:00 pm. The matrix of emission rates is shown below:

| Traffic Pattern | 8 am - 10 am | 10 am - 2 pm | 2 pm - 4 pm | 4 pm - 8 am | Sat 4 pm - Mon 4 am |
|-----------------|--------------|--------------|-------------|-------------|---------------------|
| MSW Traffic     | Peak         | Peak         | Off-Peak    | Off-Peak    | Weekend             |
| C&D Traffic     | Off-Peak     | Peak         | Peak        | Off-Peak    | Weekend             |

Idle emissions are also modeled using this matrix.

Employee vehicle emissions are expected mostly during the shift changes at 4 am and 4 pm each day. Employee emissions are estimated and modeled for these two hours of the day. No employee vehicle emissions are modeled during the remaining part of the day.

### 3.7 Model Inputs and Parameters

This section describes the modeling parameters selected for each source.

**3.7.1 Processing Buildings: C&D Building and MSW Building**

Waste processing buildings have two open walls each and are modeled as volume sources. The aspect ratio for each building is higher than 1 and therefore each building is represented by two volume sources.

| Volume Source | Bldg Height (ft) | Bldg Length (ft) | Bld Width (ft) | # Volume Sources | Release Height (ft) | Initial Lateral Dimension (ft) | Initial Vertical Dimension (ft) | PM10 (lbs/hr) ea. | PM2.5 (lbs/hr) ea. | NOx (lbs/hr) ea. |
|---------------|------------------|------------------|----------------|------------------|---------------------|--------------------------------|---------------------------------|-------------------|--------------------|------------------|
| MSW Building  | 48               | 260              | 100            | 2                | 24                  | 30.2                           | 22.3                            | 0.009             | 0.002              | 0.008            |
| C&D Building  | 48               | 260              | 100            | 2                | 24                  | 30.2                           | 22.3                            | 0.067             | 0.029              | 0.010            |

**3.7.2 Mobile Sources – Road Traffic**

Road traffic was separated into segments to capture the different emission rates and peak hours for vehicles serving the MSW process building and the C&D process building. Segments used for the emission calculations in shown in Table 1-3 were grouped for modeling purposes as follows:

| Modeling Segment | Description   | Emissions Segment (Figure 1-3) |
|------------------|---|--------------------------------|
| A                | Access Road   | A & G                          |
| B                | From LSR gate to Building 2 (MSW Building)          | B, C & D                       |
| C                | From Building 2 (MSW Bldg) to Building 1 (C&D Bldg) | E1 & E2                        |
| D                | From Building 1 (C&D Bldg) to LSR gate              | F                              |
| E                | From Building 2 (MSW Bldg) to barge                 | NA                             |
| F                | From Building 1 (C&D Bldg) to storage bay           | NA                             |

Emissions from moving vehicles are modeled as line of volume sources placed along the road segments. Vehicles traveling on the facility roads vary from pick up trucks to semi-trailers. Volume source parameters for each vehicle type are selected based on the AQIE guidance and weighted averages are then calculated to be used in the model. Volume source parameters for modeled road segments A-D are estimated as follows:

| Vehicle Type     | Height   |      | Width    |      | Vehicle # (veh/yr) | Vehicle Type (%) | Top of Plume Height (m) | Released Height (m) | Plume Width (m) | Initial Lateral Dimension (m) | Initial Vertical Dimension (m) |
|------------------|----------|------|----------|------|--------------------|------------------|-------------------------|---------------------|-----------------|-------------------------------|--------------------------------|
|                  | (inches) | (m)  | (inches) | (m)  |                    |                  |                         |                     |                 |                               |                                |
| Pick up Trucks   | 75       | 1.91 | 80       | 2.03 | 14,839.00          | 23%              | 3.24                    | 1.62                | 8.03            | 3.74                          | 1.51                           |
| Semi             | 162      | 4.11 | 102      | 2.59 | 48,744.00          | 77%              | 7.00                    | 3.50                | 8.59            | 4.00                          | 3.25                           |
| Weighted Average |          |      |          |      |                    |                  | 6.12                    | 3.06                | 8.46            | 3.94                          | 2.85                           |

Emissions for modeled segments E and F are generated from forklift traffic loading MSW waste bales to the barge and wheel loaders moving recycled material from C&D building to the storage bays, correspondingly. Volume source parameters are shown below:

| Vehicle Type | Height   |      | Width    |      | Top of Plume Height | Released Height | Plume Width | Initial Lateral Dimension | Initial Vertical Dimension |
|--------------|----------|------|----------|------|---------------------|-----------------|-------------|---------------------------|----------------------------|
|              | (inches) | (m)  | (inches) | (m)  | (m)                 | (m)             | (m)         | (m)                       | (m)                        |
| Forklift     | 96       | 2.44 | 72       | 1.83 | 4.15                | 2.07            | 7.83        | 3.64                      | 1.93                       |
| Wheel Loader | 135.6    | 3.44 | 98.4     | 2.50 | 5.86                | 2.93            | 8.50        | 3.95                      | 2.72                       |

Volume source parameters for employee vehicles are as follows:

| Vehicle Type               | Height   |     | Width    |      | Top of Plume Height | Released Height | Plume Width | Initial Lateral Dimension | Initial Vertical Dimension |
|----------------------------|----------|-----|----------|------|---------------------|-----------------|-------------|---------------------------|----------------------------|
|                            | (inches) | (m) | (inches) | (m)  | (m)                 | (m)             | (m)         | (m)                       | (m)                        |
| Employee Passenger Vehicle | 1.53     | 75  | 1.91     | 2.60 | 1.30                | 7.91            | 3.68        | 1.21                      |                            |

### 3.7.3 Other Emission Sources

Other sources included in the model include the storage bay area, emissions from idling vehicles, and emissions from material handling non-road vehicles.

Storage bay area includes five storage bays. Each bay is represented by one volume source. Volume source parameters are as follows:

| Storage Bay | Height |      | Width    |       | Top of Plume Height | Released Height | Plume Width | Initial Lateral Dimension | Initial Vertical Dimension |
|-------------|--------|------|----------|-------|---------------------|-----------------|-------------|---------------------------|----------------------------|
|             | ft     | (m)  | (inches) | (m)   | (m)                 | (m)             | (m)         | (m)                       | (m)                        |
|             | 10     | 3.05 | 36       | 10.97 | 5.18                | 2.59            | 16.97       | 7.89                      | 2.41                       |

Vehicle idling occur at the weighing station and at MSW and C&D building when waste is being unloaded. Idling vehicle emissions were modeled as three volume sources: one placed near the weigh station, one in the MSW building and one in the C&D building. Volume source characteristics are same as vehicle traffic volume source parameters in Section 3.7.2

## 4.0 MODELING RESULTS

AERMOD modeling was performed to identify off site impacts for comparison to the National Ambient Air Quality Standard (NAAQS) for PM<sub>10</sub>, 24-hour, for PM<sub>2.5</sub> 24-hour and annual, and for NO<sub>2</sub>, 1-hour.

| Pollutant         | Averaging Time | NAAQS                 | Description   |
|-------------------|----------------|-----------------------|---|
| PM <sub>10</sub>  | 24 hours       | 150 µg/m <sup>3</sup> | Not to be exceeded more than once per year on average over 3 years            |
| PM <sub>2.5</sub> | 24 hours       | 35 µg/m <sup>3</sup>  | 98th percentile, averaged over 3 years  |
|                   | Annual         | 12 µg/m <sup>3</sup>  | annual mean, averaged over 3 years  |
| NO <sub>2</sub>   | 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 most recent report, the annual 2020 report, was reviewed to select the monitor most representative of background conditions at the facility.

The ComEd Maintenance Building (17-031-0076) monitoring station located at 7801 Lawndale, Chicago, approximately 5.6 miles South of the project site is selected as a background station for PM<sub>2.5</sub> and NO<sub>2</sub>. The IEPA published design values for the most recent 3-year of monitoring data will be used as a background concentration.

The Washington High School (17-031-0022) monitoring station located at 353 E 114<sup>th</sup> Street, approximately 13.2 miles Southeast from the project site is selected as a background station for PM<sub>10</sub>. IEPA does not publish design values for 24-hour averaged PM<sub>10</sub> concentrations. The recommended method to determine the background design concentration for the 24-hour PM<sub>10</sub> is based on the recently available 3 year average 24-hour highest fourth high concentrations or if one year of monitoring data, the second high could be used, which is a more conservative approach. The more conservative approach is used, and the second high measured concentration is taken as a background value, 93 µg/m<sup>3</sup>.

### 4.2 Modeling Results

The method to model PM<sub>10</sub> consists of calculating the highest 6<sup>th</sup>-high 24-hour average concentration for the five year period of 2012 through 2016. The method for calculating PM<sub>2.5</sub> consists of calculating the highest 8<sup>th</sup>-high 24-hour average concentration for five year period and the highest 1<sup>st</sup>-high over 5 years of data. The NO<sub>2</sub> method consists of calculating the highest 8<sup>th</sup>-high for 1-year average over 5 years of data.

The AERMOD predicted concentrations and the background concentrations are shown in Table 3-1 below.

**Table 3-1 – Summary of PM<sub>10</sub>, PM<sub>2.5</sub>, and NO<sub>2</sub> Predicted Impacts**

| Pollutant         | Meteorological Data | Averaging Period | Rank | AERMOD Predicted Concentration (µg/m <sup>3</sup> ) | East (X) (m) | North (Y) (m) | Background Concentration (µg/m <sup>3</sup> ) | Monitoring Station and Year | Predicted Impact to Compare to NAAQS (µg/m <sup>3</sup> ) | NAAQS (µg/m <sup>3</sup> ) | Predicted Impact Meets Standard (Yes/No) |
|-------------------|---------------------|------------------|------|---|--------------|---------------|---|-----------------------------|---|----------------------------|--|
| PM <sub>10</sub>  | 2012-2016           | 24-HR            | 6TH  | 26.01   | 442041.74    | 4631674.16    | 93  | Washington High School 2020 | 119.01  | 150                        | Yes                                      |
| PM <sub>2.5</sub> | 2012-2016           | 24-HR            | 8TH  | 5.67  | 442050.00    | 4631700.00    | 19.1  | ComEd Maintenance 2018-2020 | 24.77   | 35                         | Yes                                      |
|                   | 2012-2016           | Annual           | 1TH  | 2.68  | 442041.74    | 4631674.16    | 8.6   | ComEd Maintenance 2018-2020 | 11.28   | 12                         | Yes                                      |
| NO <sub>2</sub>   | 2012-2016           | 1-HR             | 8TH  | 53.04   | 441906.85    | 4631556.63    | 97.76   | ComEd Maintenance 2018-2020 | 150.80  | 188                        | Yes                                      |

Note: NO<sub>2</sub> reported design value of 52 ppb was converted into µg/m<sup>3</sup>, 1 ppm of NO<sub>2</sub> is equal to 1.88 µg/m<sup>3</sup>.

The results of this air quality impact evaluation demonstrate that the predicted off-site ambient impact for PM<sub>10</sub>, PM<sub>2.5</sub> and NO<sub>2</sub> is below the National Ambient Air Quality Standard (NAAQS) for all three pollutants.

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**Air Quality Impact Evaluation  
Lakeshore Recycling Systems, LLC – Chicago, Illinois**

**September 2022**

**Appendix A  
Emission Estimates**



**Table A2-1- Construction and Demolition Debris (C&D) Building Processing System - Particulate Emissions  
Lakeshore Recycling Services - California Avenue Facility - Chicago, Illinois**

| Equipment Generating Emissions |  | Material Conveyed      | Moisture > 1.5%<br>Y / N | Transfer Point Location (Inside / Outside) | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Control Eff. (%) | Material Throughput Rates |        |         | PM Emissions         |        |        |                     | PM10 Emissions        |        |        |                     | PM2.5 Emissions       |        |        |                     |
|--------------------------------|--|------------------------|--------------------------|--|---------------------------------|--------------------------------|-----------------------|---------------------------|--------|---------|----------------------|--------|--------|---------------------|-----------------------|--------|--------|---------------------|-----------------------|--------|--------|---------------------|
| ID #                           | Description                                |                        |                          |  |                                 |                                |                       | tph                       | tpm    | tpy     | lb/ton               | lb/hr  | ton/mo | tpy                 | lb/ton                | lb/hr  | ton/mo | tpy                 | lb/ton                | lb/hr  | ton/mo | tpy                 |
|                                | Waste unloading from Dump vehicles         | C&D Wastes             | Y <sup>a1</sup>          | Outside                                    | Y                               | Dust Boss                      | 80% <sup>g</sup>      | 42                        | 29,047 | 290,472 | 0.00761 <sup>b</sup> | 0.1349 | 0.0589 | 0.5891 <sup>g</sup> | 0.000296 <sup>b</sup> | 0.0052 | 0.0023 | 0.0229 <sup>g</sup> | 0.000112 <sup>b</sup> | 0.0020 | 0.0009 | 0.0086 <sup>g</sup> |
| C-1A                           | Waste loading to conveyor                  | C&D Wastes             | Y <sup>a1</sup>          | Outside                                    | Y                               | Dust Boss                      | 80% <sup>g</sup>      | 21                        | 14,524 | 145,236 | 0.00020 <sup>a</sup> | 0.0018 | 0.0008 | 0.0079 <sup>g</sup> | 0.000100 <sup>c</sup> | 0.0009 | 0.0004 | 0.0039 <sup>g</sup> | 0.000015 <sup>c</sup> | 0.0001 | 0.0001 | 0.0006 <sup>g</sup> |
| C-1B                           | Waste loading to conveyor                  | C&D Wastes             | Y <sup>a1</sup>          | Outside                                    | Y                               | Dust Boss                      | 80% <sup>g</sup>      | 21                        | 14,524 | 145,236 | 0.00020 <sup>e</sup> | 0.0043 | 0.0015 | 0.0149 <sup>g</sup> | 0.000100 <sup>e</sup> | 0.0021 | 0.0007 | 0.0073 <sup>g</sup> | 0.000015 <sup>e</sup> | 0.0003 | 0.0001 | 0.0011 <sup>g</sup> |
| C-1C                           | Vibrating conveyor transfer from C-1A      | C&D Wastes             | Y <sup>a1</sup>          | Outside                                    | N                               |                                |                       | 21                        | 14,524 | 145,236 | 0.00014 <sup>c</sup> | 0.0029 | 0.0010 | 0.0102              | 0.000046 <sup>c</sup> | 0.0010 | 0.0003 | 0.0033              | 0.000013 <sup>c</sup> | 0.0003 | 0.0001 | 0.0009              |
| C-2C                           | Vibrating conveyor transfer from C-1B      | C&D Wastes             | Y <sup>a1</sup>          | Outside                                    | N                               |                                |                       | 21                        | 14,524 | 145,236 | 0.00014 <sup>c</sup> | 0.0029 | 0.0010 | 0.0102              | 0.000046 <sup>c</sup> | 0.0010 | 0.0003 | 0.0033              | 0.000013 <sup>c</sup> | 0.0003 | 0.0001 | 0.0009              |
| E-1A                           | Vibrating screening                        | C&D Wastes             | Y <sup>a1</sup>          | Outside                                    | Y                               | Dust Boss                      | 80% <sup>g</sup>      | 21                        | 14,524 | 145,236 | 0.00220 <sup>d</sup> | 0.0195 | 0.0085 | 0.0852 <sup>g</sup> | 0.000740 <sup>d</sup> | 0.0066 | 0.0029 | 0.0286 <sup>g</sup> | 0.000050 <sup>d</sup> | 0.0004 | 0.0002 | 0.0019 <sup>g</sup> |
| E-1B                           | Vibrating screening                        | C&D Wastes             | Y <sup>a1</sup>          | Outside                                    | Y                               | Dust Boss                      | 80% <sup>g</sup>      | 21                        | 14,524 | 145,236 | 0.00220 <sup>d</sup> | 0.0195 | 0.0085 | 0.0852 <sup>g</sup> | 0.000740 <sup>d</sup> | 0.0066 | 0.0029 | 0.0286 <sup>g</sup> | 0.000050 <sup>d</sup> | 0.0004 | 0.0002 | 0.0019 <sup>g</sup> |
| C-3C                           | Fines Transfer Conveyor from E-1A & E-1B   | Fines                  | Y <sup>a1</sup>          | Outside                                    | N                               |                                |                       | 11                        | 7,480  | 74,797  | 0.00014 <sup>c</sup> | 0.0015 | 0.0005 | 0.0052              | 0.000046 <sup>c</sup> | 0.0005 | 0.0002 | 0.0017              | 0.000013 <sup>c</sup> | 0.0001 | 0.0000 | 0.0005              |
| C-3A                           | C&D waste Transfer Conveyor from E-1A      | C&D Wastes             | Y <sup>a1</sup>          | Outside                                    | N                               |                                |                       | 15                        | 10,784 | 107,838 | 0.00014 <sup>c</sup> | 0.0022 | 0.0008 | 0.0075              | 0.000046 <sup>c</sup> | 0.0007 | 0.0002 | 0.0025              | 0.000013 <sup>c</sup> | 0.0002 | 0.0001 | 0.0007              |
| C-3B                           | C&D waste Transfer Conveyor from E-1B      | C&D Wastes             | Y <sup>a1</sup>          | Outside                                    | N                               |                                |                       | 15                        | 10,784 | 107,838 | 0.00014 <sup>c</sup> | 0.0022 | 0.0008 | 0.0075              | 0.000046 <sup>c</sup> | 0.0007 | 0.0002 | 0.0025              | 0.000013 <sup>c</sup> | 0.0002 | 0.0001 | 0.0007              |
| C-4C                           | Fines Transfer Conveyor from C-3C          | Fines                  | Y <sup>a1</sup>          | Outside                                    | N                               |                                |                       | 11                        | 7,480  | 74,797  | 0.00014 <sup>c</sup> | 0.0015 | 0.0005 | 0.0052              | 0.000046 <sup>c</sup> | 0.0005 | 0.0002 | 0.0017              | 0.000013 <sup>c</sup> | 0.0001 | 0.0000 | 0.0005              |
| C-5C                           | Fines Transfer Conveyor from C-4C          | Fines                  | Y <sup>a1</sup>          | Outside                                    | N                               |                                |                       | 11                        | 7,480  | 74,797  | 0.00014 <sup>c</sup> | 0.0015 | 0.0005 | 0.0052              | 0.000046 <sup>c</sup> | 0.0005 | 0.0002 | 0.0017              | 0.000013 <sup>c</sup> | 0.0001 | 0.0000 | 0.0005              |
| C-6C                           | Fines Transfer Conveyor from C-5C          | Fines                  | Y <sup>a1</sup>          | Outside                                    | N                               |                                |                       | 11                        | 7,480  | 74,797  | 0.00014 <sup>c</sup> | 0.0015 | 0.0005 | 0.0052              | 0.000046 <sup>c</sup> | 0.0005 | 0.0002 | 0.0017              | 0.000013 <sup>c</sup> | 0.0001 | 0.0000 | 0.0005              |
| C-4A                           | C&D end waste Transfer Conveyor from C-3DA | End Wastes             | Y <sup>a1</sup>          | Outside                                    | N                               |                                |                       | 15                        | 10,784 | 107,838 | 0.00014 <sup>c</sup> | 0.0022 | 0.0008 | 0.0075              | 0.000046 <sup>c</sup> | 0.0007 | 0.0002 | 0.0025              | 0.000013 <sup>c</sup> | 0.0002 | 0.0001 | 0.0007              |
| C-4B                           | C&D end waste Transfer Conveyor from C-3B  | End Wastes             | Y <sup>a1</sup>          | Outside                                    | N                               |                                |                       | 15                        | 10,784 | 107,838 | 0.00014 <sup>c</sup> | 0.0022 | 0.0008 | 0.0075              | 0.000046 <sup>c</sup> | 0.0007 | 0.0002 | 0.0025              | 0.000013 <sup>c</sup> | 0.0002 | 0.0001 | 0.0007              |
| DP-4A                          | End Waste Transfer Conveyor                | End Wastes             | Y <sup>a1</sup>          | Outside                                    | N                               |                                |                       | 10                        | 6,971  | 69,713  | 0.00014 <sup>c</sup> | 0.0014 | 0.0005 | 0.0049              | 0.000046 <sup>c</sup> | 0.0005 | 0.0002 | 0.0016              | 0.000013 <sup>c</sup> | 0.0001 | 0.0000 | 0.0005              |
| DP-4B                          | End Waste Transfer Conveyor                | End Wastes             | Y <sup>a1</sup>          | Outside                                    | N                               |                                |                       | 10                        | 6,971  | 69,713  | 0.00014 <sup>c</sup> | 0.0014 | 0.0005 | 0.0049              | 0.000046 <sup>c</sup> | 0.0005 | 0.0002 | 0.0016              | 0.000013 <sup>c</sup> | 0.0001 | 0.0000 | 0.0005              |
| DP-R1                          | Material manually picked up and dump       | Wood Chips             | Y <sup>a1</sup>          | Outside                                    | Y                               | Dust Boss                      | 80% <sup>g</sup>      | 1                         | 1,017  | 10,167  | 0.00761 <sup>b</sup> | 0.0047 | 0.0021 | 0.0206 <sup>g</sup> | 0.000296 <sup>b</sup> | 0.0002 | 0.0001 | 0.0008 <sup>g</sup> | 0.000112 <sup>b</sup> | 0.0001 | 0.0000 | 0.0003 <sup>g</sup> |
| DP-R2                          | Material manually picked up and dump       | Brick Recovered        | Y <sup>a1</sup>          | Outside                                    | Y                               | Dust Boss                      | 80% <sup>g</sup>      | 3                         | 2,033  | 20,333  | 0.00761 <sup>b</sup> | 0.0094 | 0.0041 | 0.0412 <sup>g</sup> | 0.000296 <sup>b</sup> | 0.0004 | 0.0002 | 0.0016 <sup>g</sup> | 0.000112 <sup>b</sup> | 0.0001 | 0.0001 | 0.0006 <sup>g</sup> |
| DP-R3                          | Material manually picked up and dump       | Concrete recovered     | Y <sup>a1</sup>          | Outside                                    | Y                               | Dust Boss                      | 80% <sup>g</sup>      | 1                         | 871    | 8,714   | 0.00761 <sup>b</sup> | 0.0040 | 0.0018 | 0.0177 <sup>g</sup> | 0.000296 <sup>b</sup> | 0.0002 | 0.0001 | 0.0007 <sup>g</sup> | 0.000112 <sup>b</sup> | 0.0001 | 0.0000 | 0.0003 <sup>g</sup> |
| DP-R4                          | Material manually picked up and dump       | Metal recovered        | Y <sup>a1</sup>          | Outside                                    | Y                               | Dust Boss                      | 80% <sup>g</sup>      | 1                         | 654    | 6,536   | 0.00761 <sup>b</sup> | 0.0030 | 0.0013 | 0.0133 <sup>g</sup> | 0.000296 <sup>b</sup> | 0.0001 | 0.0001 | 0.0005 <sup>g</sup> | 0.000112 <sup>b</sup> | 0.0000 | 0.0000 | 0.0002 <sup>g</sup> |
| DP-R5                          | Material manually picked up and dump       | Misc. Debris recovered | Y <sup>a1</sup>          | Outside                                    | Y                               | Dust Boss                      | 80% <sup>g</sup>      | 4                         | 3,050  | 30,500  | 0.00761 <sup>b</sup> | 0.0142 | 0.0062 | 0.0619 <sup>g</sup> | 0.000296 <sup>b</sup> | 0.0005 | 0.0002 | 0.0024 <sup>g</sup> | 0.000112 <sup>b</sup> | 0.0002 | 0.0001 | 0.0009 <sup>g</sup> |

**Table A2-1- Construction and Demolition Debris (C&D) Building Processing System - Particulate Emissions  
Lakeshore Recycling Services - California Avenue Facility - Chicago, Illinois**

| Equipment Generating Emissions                         |                                     | Material Conveyed | Moisture > 1.5%<br>Y / N | Transfer Point Location (Inside / Outside) | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Control Eff. (%) | Material Throughput Rates |       |        | PM Emissions         |              |              |              | PM10 Emissions        |              |              |              | PM2.5 Emissions       |              |              |              |
|--|-------------------------------------|-------------------|--------------------------|--|---------------------------------|--------------------------------|-----------------------|---------------------------|-------|--------|----------------------|--------------|--------------|--------------|-----------------------|--------------|--------------|--------------|-----------------------|--------------|--------------|--------------|
| ID #   | Description                         |                   |                          |  |                                 |                                |                       | tph                       | tpm   | tpy    | lb/ton               | lb/hr        | ton/mo       | tpy          | lb/ton                | lb/hr        | ton/mo       | tpy          | lb/ton                | lb/hr        | ton/mo       | tpy          |
| DP-WC  | Wood Chipper                        | Wood Chips        | Y <sup>a1</sup>          | Outside                                    | N                               | Dust Boss                      | 80%                   | 1                         | 1,017 | 10,167 | 0.35000 <sup>f</sup> | 0.2172       | 0.0949       | 0.9489       | 0.175000 <sup>f</sup> | 0.1086       | 0.0474       | 0.4745       | 0.087500 <sup>f</sup> | 0.0543       | 0.0237       | 0.2372       |
| DP-WC 1  | Wood Chipping Conveyor from DP-WC   | Sawdust           | Y <sup>a1</sup>          | Outside                                    | N                               | Dust Boss                      | 80%                   | 1                         | 1,017 | 10,167 | 0.00014 <sup>c</sup> | 0.0001       | 0.0000       | 0.0004       | 0.000046 <sup>c</sup> | 0.0000       | 0.0000       | 0.0001       | 0.000013 <sup>c</sup> | 0.0000       | 0.0000       | 0.0001       |
| DP-WC 2  | Wood Chipping Conveyor from DP-WC 1 | Sawdust           | Y <sup>a1</sup>          | Outside                                    | N                               | Dust Boss                      | 80%                   | 1                         | 1,017 | 10,167 | 0.00014 <sup>c</sup> | 0.0001       | 0.0000       | 0.0004       | 0.000046 <sup>c</sup> | 0.0000       | 0.0000       | 0.0001       | 0.000013 <sup>c</sup> | 0.0000       | 0.0000       | 0.0001       |
| <b>Totals C &amp; D Material Handling PM Emissions</b> |                                     |                   |                          |  |                                 |                                |                       |                           |       |        |                      | <b>0.321</b> | <b>0.138</b> | <b>1.379</b> |                       | <b>0.134</b> | <b>0.057</b> | <b>0.576</b> |                       | <b>0.058</b> | <b>0.025</b> | <b>0.253</b> |

a1 Material moisture was assumed to be the mean of material moisture contents identified in AP42, Table 13.2.4-1.

b Uncontrolled emission factor calculated according to material drop equation in AP-42, Section 13.2.4.3.

c Uncontrolled particulate matter emission factors from AP-42, Table 11.19.2-2 for conveying. If moisture content is greater than 1.5% by weight, controlled emission factors are used.

d Uncontrolled particulate matter emission factors from AP-42, Table 11.19.2-2 for screening. If moisture content is greater than 1.5% by weight, controlled emission factors are used.

e Uncontrolled particulate matter emission factors from AP-42, Table 11.19.2-2 for truck loading of crushed stone. Use uncontrolled emission factor to be conservative.

f Uncontrolled particulate matter emission factors from Wood Chipping, AP 42; Table 10.1.4-4 Wood products manufacturing (8/1994). PM10 emission factor is 50% of PM emission factor, PM2.5 emission factor is 25 % of PM emission factor.

g 80% dust control for drop loading and screening from April through October due to use of a dust boss in the material screening area.

**Table A2-2 - Munciple Solid Waste (MSW) Building Process - Particulate Emissions  
Lakeshore Recycling Services - California Avenue Facility - Chicago, Illinois**

| Equipment Generating Emissions      |                                       | Material Transferred | Moisture > 1.5%<br>Y / N | Point Location (Inside / Outside) | Transfer Point Controlled (Y/N) | Type of Transfer Point Control | Dust Control Eff. (%) | Material Throughput Rates |        |        | PM Emissions          |        |        |                     | PM10 Emissions         |        |        |                     | PM2.5 Emissions        |        |        |                     |
|-------------------------------------|---------------------------------------|----------------------|--------------------------|-----------------------------------|---------------------------------|--------------------------------|-----------------------|---------------------------|--------|--------|-----------------------|--------|--------|---------------------|------------------------|--------|--------|---------------------|------------------------|--------|--------|---------------------|
|                                     |                                       |                      |                          |                                   |                                 |                                |                       | tph                       | ton/mo | tpy    | lb/ton                | lb/hr  | ton/mo | tpy                 | lb/ton                 | lb/hr  | ton/mo | tpy                 | lb/ton                 | lb/hr  | ton/mo | tpy                 |
| DP-6C                               | Fines from C&D building conveyor C-6C | Fines                | Y <sup>a1</sup>          | Outside                           | Y                               | Dust Boss                      | 80% <sup>b</sup>      | 10.73                     | 7,480  | 74,797 | 0.00014 <sup>a1</sup> | 0.0006 | 0.0003 | 0.0028 <sup>b</sup> | 0.000046 <sup>a1</sup> | 0.0002 | 0.0001 | 0.0009 <sup>b</sup> | 0.000013 <sup>a1</sup> | 0.0001 | 0.0000 | 0.0003 <sup>b</sup> |
| DP-4A                               | Fines from C&D building conveyor C-4A | End waste            | Y <sup>a1</sup>          | Outside                           | Y                               | Dust Boss                      | 80% <sup>b</sup>      | 10.00                     | 6,971  | 69,713 | 0.00014 <sup>a1</sup> | 0.0006 | 0.0003 | 0.0026 <sup>b</sup> | 0.000046 <sup>a1</sup> | 0.0002 | 0.0001 | 0.0009 <sup>b</sup> | 0.000013 <sup>a1</sup> | 0.0001 | 0.0000 | 0.0003 <sup>b</sup> |
| DP-4B                               | Fines from C&D building conveyor C-4B | End waste            | Y <sup>a1</sup>          | Outside                           | Y                               | Dust Boss                      | 80% <sup>b</sup>      | 10.00                     | 6,971  | 69,713 | 0.00014 <sup>a1</sup> | 0.0006 | 0.0003 | 0.0026 <sup>b</sup> | 0.000046 <sup>a1</sup> | 0.0002 | 0.0001 | 0.0009 <sup>b</sup> | 0.000013 <sup>a1</sup> | 0.0001 | 0.0000 | 0.0003 <sup>b</sup> |
| <b>Totals Material PM Emissions</b> |                                       |                      |                          |                                   |                                 |                                |                       |                           |        |        |                       | 0.002  | 0.001  | 0.008               |                        | 0.001  | 0.000  | 0.003               |                        | 0.000  | 0.000  | 0.001               |

a1 Material moisture was assumed to be the mean of material moisture contents identified in AP42, Table 13.2.4-1.

b 80% control is assumed for drop loading and screening from April through October due to use of a dust boss in the material screening area.

Table A2-3a - Fugitive PM Emissions - Paved Roads - C&D Building Vehicles  
Lakeshore Recycling Services - California Avenue Facility - Chicago, Illinois

| C&D Vehicles Inbound                            |                       |  |             |   |             |                              |           |        |                            | Weekly Peak hours (Monday 4 am to Saturday 3 pm)   |           |                                |           |        |                                |           |        |                                |           | Weekly Non-Peak hours (Saturday 3 pm to Monday 4 am) |                                |           |        |                                |           |        |                                |           |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
|---|-----------------------|--|-------------|---|-------------|------------------------------|-----------|--------|----------------------------|--|-----------|--------------------------------|-----------|--------|--------------------------------|-----------|--------|--------------------------------|-----------|--|--------------------------------|-----------|--------|--------------------------------|-----------|--------|--------------------------------|-----------|--------|-------------|-----------|--------|-------|-----------|--------|-------|-----------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Vehicle Type                                    | Vehicle Weight (tons) | Weekly Peak hours (Monday 4am to Saturday 3pm) |             | Weekly Non-Peak hours (Saturday 3pm to Monday 4 am) |             | Uncontrolled Emission Factor |           |        | Controlled Emission Factor |  |           | Facility Road                  |           |        |                                |           |        | Access Road                    |           |  |                                |           |        | Facility Road                  |           |        |                                |           |        | Access Road |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
|   |                       | Facility Road                                  | Access Road | Facility Road                                       | Access Road | PM                           | PM10      | PM2.5  | PM                         | PM10   | PM2.5     | Potential Controlled Emissions |           |        | Potential Controlled Emissions |           |        | Potential Controlled Emissions |           |  | Potential Controlled Emissions |           |        | Potential Controlled Emissions |           |        | Potential Controlled Emissions |           |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
|   |                       | lb/VMT   | ton/month   | lb/VMT  | ton/month   | lb/VMT                       | ton/month | lb/VMT | ton/month                  | lb/VMT   | ton/month | lb/yr                          | ton/month | ton/yr | lb/yr                          | ton/month | ton/yr | lb/yr                          | ton/month | ton/yr   | lb/yr                          | ton/month | ton/yr | lb/yr                          | ton/month | ton/yr | lb/yr                          | ton/month | ton/yr | lb/yr       | ton/month | ton/yr | lb/yr | ton/month | ton/yr | lb/yr | ton/month | ton/yr |       |       |       |       |       |       |       |       |       |
| <b>Inbound dump vehicles</b>                    |                       |  |             |   |             |                              |           |        |                            |  |           |                                |           |        |                                |           |        |                                |           |  |                                |           |        |                                |           |        |                                |           |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| Box Truck                                       | 9.55                  | 0.02   | 0.02        |   |             | 0.023                        | 0.125     | 0.031  | 0.125                      | 0.025  | 0.006     | 0.003                          | 0.001     | 0.010  | 0.000                          | 0.002     | 0.000  | 0.000                          | 0.001     | 0.002  | 0.001                          | 0.007     | 0.000  | 0.000                          | 0.001     | 0.000  | 0.000                          | 0.000     |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| FLAT BED  | 6.15                  | 0.00   | 0.00        |   |             | 0.398                        | 0.080     | 0.020  | 0.080                      | 0.016  | 0.004     | 0.000                          | 0.000     | 0.000  | 0.000                          | 0.000     | 0.000  | 0.000                          | 0.000     | 0.000  | 0.000                          | 0.000     | 0.000  | 0.000                          | 0.000     | 0.000  | 0.000                          |           |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| DUMP TRUCK                                      | 8.75                  | 0.41   | 0.27        | 0.24  | 0.16        | 0.570                        | 0.114     | 0.028  | 0.114                      | 0.023  | 0.006     | 0.047                          | 0.016     | 0.161  | 0.009                          | 0.003     | 0.032  | 0.002                          | 0.001     | 0.008  | 0.031                          | 0.010     | 0.105  | 0.006                          | 0.002     | 0.021  | 0.002                          | 0.001     | 0.005  | 0.028       | 0.139     | 1.391  | 0.006 | 0.001     | 0.005  | 0.001 | 0.000     | 0.001  | 0.018 | 0.002 | 0.018 | 0.004 | 0.000 | 0.004 | 0.001 | 0.000 | 0.001 |
| PACKER  | 21.24                 | 0.23   | 0.15        |   |             | 1.416                        | 0.283     | 0.070  | 0.283                      | 0.057  | 0.014     | 0.066                          | 0.022     | 0.224  | 0.013                          | 0.004     | 0.045  | 0.003                          | 0.001     | 0.021  | 0.043                          | 0.015     | 0.146  | 0.009                          | 0.003     | 0.029  | 0.002                          | 0.001     | 0.007  |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| RollOff   | 24.09                 | 0.44   | 0.29        |   |             | 1.602                        | 0.320     | 0.079  | 0.320                      | 0.064  | 0.016     | 0.141                          | 0.048     | 0.480  | 0.028                          | 0.010     | 0.096  | 0.007                          | 0.002     | 0.024  | 0.092                          | 0.031     | 0.313  | 0.018                          | 0.006     | 0.063  | 0.005                          | 0.002     | 0.015  |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| Semi  | 38.13                 | 0.28   | 0.19        |   |             | 2.559                        | 0.512     | 0.126  | 0.512                      | 0.102  | 0.025     | 0.146                          | 0.050     | 0.029  | 0.010                          | 0.009     | 0.002  | 0.002                          | 0.024     | 0.095  | 0.032                          | 0.324     | 0.018  | 0.006                          | 0.065     | 0.005  | 0.002                          | 0.016     |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| SUV   |                       |  |             |   |             |                              |           |        |                            |  |           |                                |           |        |                                |           |        |                                |           |  |                                |           |        |                                |           |        |                                |           |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| Semi Dump                                       | 30.45                 | 0.18   | 0.12        |   |             | 2.034                        | 0.407     | 0.100  | 0.407                      | 0.081  | 0.020     | 0.072                          | 0.025     | 0.246  | 0.014                          | 0.005     | 0.049  | 0.004                          | 0.001     | 0.012  | 0.047                          | 0.016     | 0.163  | 0.009                          | 0.003     | 0.032  | 0.002                          | 0.001     | 0.008  |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| VAC TRUCK                                       | 32.03                 | 0.00   | 0.00        |   |             | 2.142                        | 0.428     | 0.105  | 0.428                      | 0.086  | 0.021     | 0.001                          | 0.000     | 0.003  | 0.000                          | 0.001     | 0.000  | 0.001                          | 0.000     | 0.000  | 0.001                          | 0.002     | 0.000  | 0.000                          | 0.000     | 0.000  | 0.000                          | 0.000     |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| VAN   | 4.32                  | 0.02   | 0.01        |   |             | 0.278                        | 0.056     | 0.014  | 0.056                      | 0.011  | 0.003     | 0.001                          | 0.000     | 0.004  | 0.000                          | 0.000     | 0.001  | 0.000                          | 0.000     | 0.001  | 0.000                          | 0.003     | 0.000  | 0.000                          | 0.001     | 0.000  | 0.000                          | 0.000     |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| PICK UP W. TLR                                  | 8.35                  | 0.03   | 0.02        |   |             | 0.544                        | 0.109     | 0.027  | 0.109                      | 0.022  | 0.005     | 0.003                          | 0.001     | 0.010  | 0.001                          | 0.000     | 0.002  | 0.001                          | 0.007     | 0.000  | 0.000                          | 0.001     | 0.007  | 0.000                          | 0.000     | 0.001  | 0.000                          | 0.000     | 0.000  |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| PICK UP   | 3.75                  | 0.56   | 0.37        |   |             | 0.240                        | 0.048     | 0.012  | 0.048                      | 0.010  | 0.002     | 0.027                          | 0.009     | 0.092  | 0.005                          | 0.002     | 0.018  | 0.001                          | 0.000     | 0.005  | 0.018                          | 0.006     | 0.060  | 0.004                          | 0.001     | 0.012  | 0.001                          | 0.000     | 0.003  |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| <b>Inbound load vehicles</b>                    |                       |  |             |   |             |                              |           |        |                            |  |           |                                |           |        |                                |           |        |                                |           |  |                                |           |        |                                |           |        |                                |           |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| ROLLOFF   | 16.56                 | 0.01   | 0.01        |   |             | 1.093                        | 0.219     | 0.054  | 0.219                      | 0.044  | 0.011     | 0.003                          | 0.000     | 0.000  | 0.001                          | 0.000     | 0.000  | 0.000                          | 0.000     | 0.002  | 0.001                          | 0.006     | 0.000  | 0.001                          | 0.000     | 0.000  | 0.000                          | 0.000     |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| SEMI  | 15.00                 | 0.32   | 0.21        |   |             | 0.988                        | 0.198     | 0.049  | 0.198                      | 0.040  | 0.010     | 0.063                          | 0.001     | 0.009  | 0.013                          | 0.000     | 0.002  | 0.003                          | 0.000     | 0.041  | 0.014                          | 0.140     | 0.008  | 0.003                          | 0.028     | 0.002  | 0.001                          | 0.007     |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| SEMI DUMP                                       | 16.98                 | 0.04   | 0.02        |   |             | 1.121                        | 0.224     | 0.055  | 0.224                      | 0.045  | 0.011     | 0.008                          | 0.000     | 0.001  | 0.002                          | 0.000     | 0.000  | 0.000                          | 0.000     | 0.005  | 0.002                          | 0.018     | 0.001  | 0.000                          | 0.004     | 0.000  | 0.000                          | 0.001     |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| <b>Daily peak hours Paved Road Emission</b>     |                       |  |             |   |             |                              |           |        |                            | 1.857 0.158 1.58 0.372 0.032 0.32 0.091 0.008 0.08 1.232 0.103 1.03 0.243 0.021 0.21 0.040 0.005 0.05 0.089 0.008 0.08 0.018 0.002 0.02 0.004 0.000 0.00 0.058 0.005 0.05 0.012 0.001 0.01 0.003 0.000 0.00                  |           |                                |           |        |                                |           |        |                                |           |  |                                |           |        |                                |           |        |                                |           |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| <b>Daily Non-peak hours Paved Road Emission</b> |                       |  |             |   |             |                              |           |        |                            | 0.155 0.013 0.13 0.091 0.003 0.03 0.008 0.001 0.01 0.101 0.009 0.09 0.020 0.002 0.02 0.005 0.000 0.00 0.007 0.001 0.01 0.001 0.000 0.00 0.005 0.000 0.00 0.001 0.000 0.00 0.000 0.000 0.00 0.001 0.000 0.00 0.000 0.000 0.00 |           |                                |           |        |                                |           |        |                                |           |  |                                |           |        |                                |           |        |                                |           |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| <b>C&amp;D Vehicles Outbound</b>                |                       |  |             |   |             |                              |           |        |                            |  |           |                                |           |        |                                |           |        |                                |           |  |                                |           |        |                                |           |        |                                |           |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| Vehicle Type                                    | Vehicle Weight (tons) | Weekly Peak hours (Monday 4am to Saturday 3pm) |             | Weekly Non-Peak hours (Saturday 3pm to Monday 4 am) |             | Uncontrolled Emission Factor |           |        | Controlled Emission Factor |  |           | Facility Road                  |           |        |                                |           |        | Access Road                    |           |  |                                |           |        | Facility Road                  |           |        |                                |           |        | Access Road |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
|   |                       | Facility Road                                  | Access Road | Facility Road                                       | Access Road | PM                           | PM10      | PM2.5  | PM                         | PM10   | PM2.5     | Potential Controlled Emissions |           |        | Potential Controlled Emissions |           |        | Potential Controlled Emissions |           |  | Potential Controlled Emissions |           |        | Potential Controlled Emissions |           |        | Potential Controlled Emissions |           |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
|   |                       | lb/VMT   | ton/month   | lb/VMT  | ton/month   | lb/VMT                       | ton/month | lb/VMT | ton/month                  | lb/VMT   | ton/month | lb/yr                          | ton/month | ton/yr | lb/yr                          | ton/month | ton/yr | lb/yr                          | ton/month | ton/yr   | lb/yr                          | ton/month | ton/yr | lb/yr                          | ton/month | ton/yr | lb/yr                          | ton/month | ton/yr | lb/yr       | ton/month | ton/yr | lb/yr | ton/month | ton/yr | lb/yr | ton/month | ton/yr |       |       |       |       |       |       |       |       |       |
| <b>Outbound dump vehicles</b>                   |                       |  |             |   |             |                              |           |        |                            |  |           |                                |           |        |                                |           |        |                                |           |  |                                |           |        |                                |           |        |                                |           |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| Box Truck                                       | 5.46                  | 0.01   | 0.02        |   |             | 0.3504                       | 0.0705    | 0.0173 | 0.0705                     | 0.0141   | 0.0035    | 0.001                          | 0.000     | 0.00   | 0.000                          | 0.000     | 0.000  | 0.000                          | 0.001     | 0.000  | 0.000                          | 0.000     | 0.000  | 0.000                          | 0.000     | 0.000  | 0.000                          |           |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| FLAT BED  | 5.25                  | 0.00   | 0.00        |   |             | 0.3386                       | 0.0677    | 0.0166 | 0.0677                     | 0.0135   | 0.0033    | 0.000                          | 0.000     | 0.000  | 0.000                          | 0.000     | 0.000  | 0.000                          | 0.000     | 0.000  | 0.000                          | 0.000     | 0.000  | 0.000                          | 0.000     | 0.000  | 0.000                          |           |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| DUMP TRUCK                                      | 6.80                  | 0.14   | 0.27        | 0.08  | 0.16        | 0.4409                       | 0.0882    | 0.0216 | 0.0882                     | 0.0176   | 0.0043    | 0.012                          | 0.004     | 0.04   | 0.002                          | 0.001     | 0.01   | 0.001                          | 0.000     | 0.00   | 0.024                          | 0.008     | 0.08   | 0.005                          | 0.002     | 0.02   | 0.001                          | 0.000     | 0.00   | 0.007       | 0.130     | 1.30   | 0.001 | 0.001     | 0.01   | 0.000 | 0.000     | 0.00   | 0.014 | 0.005 | 0.05  | 0.003 | 0.001 | 0.01  | 0.001 | 0.000 | 0.00  |
| PACKER  | 18.48                 | 0.08   | 0.15        |   |             | 1.2223                       | 0.2445    | 0.0600 | 0.2445                     | 0.0489   | 0.0120    | 0.019                          | 0.007     | 0.07   | 0.004                          | 0.001     | 0.01   | 0.001                          | 0.000     | 0.00   | 0.037                          | 0.013     | 0.13   | 0.007                          | 0.003     | 0.03   | 0.002                          | 0.001     | 0.01   |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| RollOff   | 15.74                 | 0.15   | 0.29        |   |             | 1.0377                       | 0.2075    | 0.0509 | 0.2075                     | 0.0415   | 0.0102    | 0.031                          | 0.011     | 0.11   | 0.006                          | 0.002     | 0.02   | 0.002                          | 0.001     | 0.01   | 0.060                          | 0.020     | 0.20   | 0.012                          | 0.004     | 0.04   | 0.003                          | 0.001     | 0.01   |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| Semi  | 15.00                 | 0.10   | 0.19        |   |             | 0.9880                       | 0.1976    | 0.0485 | 0.1976                     | 0.0395   | 0.0097    | 0.019                          | 0.007     | 0.07   | 0.004                          | 0.001     | 0.01   | 0.001                          | 0.000     | 0.00   | 0.037                          | 0.013     | 0.13   | 0.007                          | 0.003     | 0.03   | 0.002                          | 0.001     | 0.01   |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| SUV   |                       |  |             |   |             |                              |           |        |                            |  |           |                                |           |        |                                |           |        |                                |           |  |                                |           |        |                                |           |        |                                |           |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| Semi Dump                                       | 16.98                 | 0.06   | 0.12        |   |             | 1.1212                       | 0.2242    | 0.0550 | 0.2242                     | 0.0448   | 0.0110    | 0.014                          | 0.005     | 0.05   | 0.003                          | 0.001     | 0.01   | 0.001                          | 0.000     | 0.00   | 0.026                          | 0.009     | 0.09   | 0.005                          | 0.002     | 0.02   | 0.001                          | 0.000     | 0.00   |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| VAC TRUCK                                       | 25.74                 | 0.00   | 0.00        |   |             | 1.7138                       | 0.3428    | 0.0841 | 0.3428                     | 0.0686   | 0.0168    | 0.000                          | 0.000     | 0.00   | 0.000                          | 0.000     | 0.000  | 0.000                          | 0.000     | 0.000  | 0.000                          | 0.000     | 0.000  | 0.000                          | 0.000     | 0.000  | 0.000                          |           |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| VAN   | 3.15                  | 0.01   | 0.01        |   |             | 0.2011                       | 0.0402    | 0.0099 | 0.0402                     | 0.0080   | 0.0020    | 0.000                          | 0.000     | 0.00   | 0.000                          | 0.000     | 0.000  | 0.000                          | 0.000     | 0.001  | 0.000                          | 0.000     | 0.000  | 0.000                          | 0.000     | 0.000  | 0.000                          | 0.000     |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| PICK UP W. TLR                                  | 5.13                  | 0.01   | 0.02        |   |             | 0.3307                       | 0.0661    | 0.0162 | 0.0661                     | 0.0132   | 0.0032    | 0.001                          | 0.000     | 0.00   | 0.000                          | 0.000     | 0.000  | 0.000                          | 0.000     | 0.001  | 0.000                          | 0.000     | 0.000  | 0.000                          | 0.000     | 0.000  | 0.000                          | 0.000     |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |
| PICK UP   | 2.80                  | 0.19   | 0.37        |   |             | 0.1783                       | 0.0357    | 0.0088 | 0.0357                     | 0.0071   | 0.0018    | 0.007                          | 0.002     | 0.02   | 0.001                          | 0.000     |        |                                |           |  |                                |           |        |                                |           |        |                                |           |        |             |           |        |       |           |        |       |           |        |       |       |       |       |       |       |       |       |       |



**Table A2-4 - Fugitive PM Emissions - Paved Roads - On-site Non-Road vehicles  
Lakeshore Recycling Services - California Avenue Facility - Chicago, Illinois**

| <b>Non-Road Vehicles</b>                        |                       |                         |  |        |        |                                |              |             |              |              |             |              |              |             |
|---|-----------------------|-------------------------|--|--------|--------|--------------------------------|--------------|-------------|--------------|--------------|-------------|--------------|--------------|-------------|
| Vehicle Type                                    | Vehicle Weight (tons) | Facility Road<br>VMT/hr | Controlled Emission Factor <sup>a7</sup> |        |        | Potential Controlled Emissions |              |             |              |              |             |              |              |             |
|   |                       |                         | PM                                       | PM10   | PM2.5  | PM                             |              |             | PM10         |              |             | PM2.5        |              |             |
|   |                       |                         | lb/VMT                                   | lb/VMT | lb/VMT | lb/hr                          | ton/month    | ton/yr      | lb/hr        | ton/month    | ton/yr      | lb/hr        | ton/month    | ton/yr      |
| Excavator <sup>a1</sup>                         | 21.14                 |                         | 0.2804                                   | 0.0561 | 0.0138 |                                |              |             |              |              |             |              |              |             |
| Loader for storage bay operating <sup>a2</sup>  | 41.93                 | 0.03                    | 0.5639                                   | 0.1128 | 0.0277 | 0.014                          | 0.005        | 0.05        | 0.003        | 0.001        | 0.01        | 0.001        | 0.000        | 0.00        |
| Loader for MSW buidling operation <sup>a2</sup> | 41.93                 | 0.15                    | 0.5639                                   | 0.1128 | 0.0277 | 0.085                          | 0.027        | 0.27        | 0.017        | 0.005        | 0.05        | 0.004        | 0.001        | 0.01        |
| Skid Steer <sup>a3</sup>                        | 5.00                  | 0.25                    | 0.0644                                   | 0.0129 | 0.0032 | 0.016                          | 0.005        | 0.05        | 0.003        | 0.001        | 0.01        | 0.001        | 0.000        | 0.00        |
| Forklift <sup>a4</sup>                          | 8.89                  | 0.86                    | 0.1158                                   | 0.0232 | 0.0057 | 0.099                          | 0.031        | 0.31        | 0.020        | 0.006        | 0.06        | 0.005        | 0.002        | 0.02        |
| Material Handler <sup>a5</sup>                  | 28.80                 |                         | 0.3844                                   | 0.0769 | 0.0189 |                                |              |             |              |              |             |              |              |             |
| Sweeper <sup>a6</sup>                           | 7.15                  | 0.25                    | 0.0928                                   | 0.0186 | 0.0046 | 0.023                          | 0.007        | 0.07        | 0.005        | 0.001        | 0.01        | 0.001        | 0.000        | 0.00        |
| <b>Total</b>                                    |                       |                         |  |        |        | <b>0.239</b>                   | <b>0.074</b> | <b>0.74</b> | <b>0.048</b> | <b>0.015</b> | <b>0.15</b> | <b>0.012</b> | <b>0.004</b> | <b>0.04</b> |

- a1 There Excavator, no moving, no paved emission
- a2 Loaders for C&D and storage bay transfer and loading operation (15 loads/day) . Loaders for MSW building operation (8 loads/day)
- a3 2 skid steers, assumed each one dayily moving distance is 5 mile
- a4 1 Forklift, operating for Barge loading, baler weight 3200 lbs, carried 2 balers once. based on MSW building maximum waste output (MSW, C&D fines, C&D End waste) 2417.5 tons/day.
- a5 1 Material handler, only opearing at barge loading, no moving, no paved emission
- a6 1 Sweeper, assumed dayily moving distance is 5 miles
- a7 80% dust controlled for Fugitive PM Emissions due to the on-site moist road.



**Table A2-5 - Fugitive PM Emissions - Paved Roads - Employee Vehicles  
Lakeshore Recycling Services - California Avenue Facility - Chicago, Illinois**

| Employee Vehicles |                       |                   | Access Road                              |        |        |                      |           |        |       |           |        |       |           |        |  |
|-------------------|-----------------------|-------------------|--|--------|--------|----------------------|-----------|--------|-------|-----------|--------|-------|-----------|--------|--|
| Vehicle Type      | Vehicle Weight (tons) | Mileage<br>VMT/hr | Controlled Emission Factor <sup>a2</sup> |        |        | Controlled emissions |           |        |       |           |        |       |           |        |  |
|                   |                       |                   | PM                                       | PM10   | PM2.5  | PM                   |           |        | PM10  |           |        | PM2.5 |           |        |  |
|                   |                       |                   | lb/VMT                                   | lb/VMT | lb/VMT | lb/hr                | ton/month | ton/yr | lb/hr | ton/month | ton/yr | lb/hr | ton/month | ton/yr |  |
| Employee vehicle  | <sup>a1</sup> 2.00    | 1.53              | 0.0253                                   | 0.0051 | 0.0012 | 0.039                | 0.017     | 0.17   | 0.008 | 0.003     | 0.03   | 0.002 | 0.001     | 0.01   |  |

a1 Employee vehicle includes sedan & SUV, round-trip only includes access road. Vehicle amount and weight is averaged value based on permit

a2 80% dust controlled for Fugitive PM Emissions due to the on-site moist road.

**Table A2-6 - Summary of Estimated Fugitive Particulate Emissions from Storage bay  
Lakeshore Recycling Services - California Avenue Facility - Chicago, Illinois**

| Plant         | Stock Pile   | Storage Bay Area Acres | Control Factor <sup>b</sup> | No of Active Days day/yr <sup>c</sup> | Bay fugitive Emission Factors | Total PM Emissions      |                           |                            |                       |                         |                          |
|---------------|--|------------------------|-----------------------------|---------------------------------------|-------------------------------|-------------------------|---------------------------|----------------------------|-----------------------|-------------------------|--------------------------|
|               |  |                        |                             |                                       | lb-PM/acre-day <sup>d</sup>   | PM lb/hr <sup>e,h</sup> | PM10 lb/hr <sup>e,h</sup> | PM2.5 lb/hr <sup>e,h</sup> | PM tpy <sup>e,h</sup> | PM10 tpy <sup>e,h</sup> | PM2.5 tpy <sup>e,h</sup> |
| Storage Bay   | Bay 1  | 0.0177                 | 0.33                        | 365                                   | 13.2000                       | 0.0032                  | 0.0016                    | 0.0003                     | 0.0141                | 0.0071                  | 0.0011                   |
|               | Bay 2  | 0.0253                 | 0.33                        | 365                                   | 13.2000                       | 0.0046                  | 0.0023                    | 0.0003                     | 0.0201                | 0.0101                  | 0.0015                   |
|               | Bay 3  | 0.0207                 | 0.33                        | 365                                   | 13.2000                       | 0.0037                  | 0.0019                    | 0.0003                     | 0.0164                | 0.0082                  | 0.0012                   |
|               | Bay 4  | 0.0132                 | 0.33                        | 365                                   | 13.2000                       | 0.0024                  | 0.0012                    | 0.0002                     | 0.0105                | 0.0053                  | 0.0008                   |
|               | Bay 5  | 0.0283                 | 0.33                        | 365                                   | 13.2000                       | 0.0051                  | 0.0026                    | 0.0004                     | 0.0225                | 0.0113                  | 0.0017                   |
|               | Storage Bay recovered material dumping (Drop) <sup>i</sup>           | 0.1051                 | 1                           | 365                                   | 13.2000                       | 0.0116                  | 0.0058                    | 0.0009                     | 0.0506                | 0.0253                  | 0.0038                   |
|               | Storage Bay Recovered material loading to load vehicles <sup>i</sup> | 0.1051                 | 1                           | 365                                   | 13.2000                       | 0.0116                  | 0.0058                    | 0.0009                     | 0.0506                | 0.0253                  | 0.0038                   |
| <b>Totals</b> |  |                        |                             |                                       |                               | <b>0.0422</b>           | <b>0.0211</b>             | <b>0.0032</b>              | <b>0.1849</b>         | <b>0.0926</b>           | <b>0.0139</b>            |

- a. Stockpile emissions calculation from TCEQ for crushed stone downloaded August 2019.  
<https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/emiss-calc-rock1.xlsx>
- b. Control Factor of 0.33 (67.5% control) for partial enclosure consisting of walls on three sides of bin. Control Factor of 1.0 for no control.
- c. Assume number of active days to be 7 days per week and 52 weeks per year and inactive days to be 1 day per week and 52 weeks per year.
- d. From TCEQ Guidance  
Stockpile emission calculation:  

$$\text{PM Emission Rate (tpy)} = [(\text{inactive day PM EF} \times \text{No. of inactive days}) \times \text{stockpile area}/2000 \times \text{control factor}] + [(\text{active day PM EF} \times \text{No. of active days}) \times (\text{stockpile area}/2000) \times \text{control factor}]$$

$$\text{Inactive Day PM Emission Factor} = 3.50 \text{ lb-PM/acre-day}$$

$$\text{Active Day PM Emission Factor} = 13.20 \text{ lb-PM/acre-day}$$
- e. PM10 emissions are half of PM emission per TCEQ Air Permits Division, Rock Crushing Emission Calculation spreadsheet.
- f. Where PM2.5 emission factors are not provided in AP-42, 11-19.2-2, a ratio of aerodynamic particle size multipliers from AP-42, 13.2.45 is used to estimate PM2.5 emission factors.  

$$\text{PM2.5 EF} = (\text{PM10 EF}/.035) \times .0053.$$
- g. Total particulate emissions is the sum of inactive day emissions plus active day emissions.
- h. Hourly emissions, if required, would be based on 8,760 hr/yr.
- i. 80% dust control for loading and unloading materials at storage bay





**Table A2-8a - Vehicle Idling Emissions - C&D Building Vehicles  
Lakeshore Recycling Services - California Avenue Facility - Chicago, Illinois**

| C&D Vehicles  | Potential Vehicle Veh/yr | Vehicle Idling Time hr | Weekly Peak hours (Monday 4 am to Saturday 3 pm) |            |             |                     |           |        |              |           |        |              |           |        | Weekly Non-Peak hours (Saturday 3 pm to Monday 4 am) |           |        |              |           |        |              |           |        |  |  |
|---|--------------------------|------------------------|--|------------|-------------|---------------------|-----------|--------|--------------|-----------|--------|--------------|-----------|--------|--|-----------|--------|--------------|-----------|--------|--------------|-----------|--------|--|--|
|   |                          |                        | Vehicle Idling Emission Factor                   |            |             | Potential Emissions |           |        |              |           |        |              |           |        | Potential Emissions                                  |           |        |              |           |        |              |           |        |  |  |
|   |                          |                        | Nox lb/hr  | PM10 lb/hr | PM2.5 lb/hr | Nox                 |           |        | PM10         |           |        | PM2.5        |           |        | Nox  |           |        | PM10         |           |        | PM2.5        |           |        |  |  |
|   |                          |                        | lb/hr  | ton/month  | ton/yr      | lb/hr               | ton/month | ton/yr | lb/hr        | ton/month | ton/yr | lb/hr        | ton/month | ton/yr | lb/hr  | ton/month | ton/yr | lb/hr        | ton/month | ton/yr | lb/hr        | ton/month | ton/yr |  |  |
| <b>Inbound dump vehicles</b> <sup>a1</sup>                    |                          |                        |  |            |             |                     |           |        |              |           |        |              |           |        |  |           |        |              |           |        |              |           |        |  |  |
| Box Truck   | 583.00                   | 0.33                   | 0.1104   | 0.0028     | 0.0026      | 0.003               | 0.001     | 0.011  | 0.000        | 0.000     | 0.000  | 0.000        | 0.000     | 0.000  |  |           |        |              |           |        |              |           |        |  |  |
| FLAT BED  | 7.00                     |                        | 0.0008   | 0.0000     | 0.0000      |                     |           |        |              |           |        |              |           |        |  |           |        |              |           |        |              |           |        |  |  |
| DUMP TRUCK  | 11,697.00                | 0.08                   | 0.1066   | 0.0086     | 0.0079      | 0.013               | 0.004     | 0.045  | 0.001        | 0.000     | 0.004  | 0.001        | 0.000     | 0.003  | 0.008  | 0.003     | 0.026  | 0.001        | 0.000     | 0.002  | 0.001        | 0.000     | 0.002  |  |  |
| PACKER  | 5,635.00                 | 0.08                   | 0.1104   | 0.0028     | 0.0026      | 0.008               | 0.003     | 0.026  | 0.000        | 0.000     | 0.001  | 0.000        | 0.000     | 0.001  |  |           |        |              |           |        |              |           |        |  |  |
| Rolloff   | 10,658.00                | 0.08                   | 0.1066   | 0.0086     | 0.0079      | 0.014               | 0.005     | 0.047  | 0.001        | 0.000     | 0.004  | 0.001        | 0.000     | 0.004  |  |           |        |              |           |        |              |           |        |  |  |
| Semi  | 6,903.00                 | 0.08                   | 0.0537   | 0.0014     | 0.0013      | 0.005               | 0.002     | 0.015  | 0.000        | 0.000     | 0.000  | 0.000        | 0.000     | 0.000  |  |           |        |              |           |        |              |           |        |  |  |
| SUV   |                          |                        | 0.0008   | 0.0000     | 0.0000      |                     |           |        |              |           |        |              |           |        |  |           |        |              |           |        |              |           |        |  |  |
| Semi Dump   | 4,308.00                 | 0.08                   | 0.1066   | 0.0086     | 0.0079      | 0.006               | 0.002     | 0.019  | 0.000        | 0.000     | 0.002  | 0.000        | 0.000     | 0.001  |  |           |        |              |           |        |              |           |        |  |  |
| VAC TRUCK   | 48.00                    | 0.25                   | 0.1066   | 0.0086     | 0.0079      | 0.000               | 0.000     | 0.001  | 0.000        | 0.000     | 0.000  | 0.000        | 0.000     | 0.000  |  |           |        |              |           |        |              |           |        |  |  |
| VAN   | 518.00                   | 0.17                   | 0.0008   | 0.0000     | 0.0000      | 0.000               | 0.000     | 0.000  | 0.000        | 0.000     | 0.000  | 0.000        | 0.000     | 0.000  |  |           |        |              |           |        |              |           |        |  |  |
| PICK UP W. TLR  | 656.00                   | 0.08                   | 0.0008   | 0.0000     | 0.0000      | 0.000               | 0.000     | 0.000  | 0.000        | 0.000     | 0.000  | 0.000        | 0.000     | 0.000  |  |           |        |              |           |        |              |           |        |  |  |
| PICK UP   | 13,665.00                | 0.08                   | 0.0008   | 0.0000     | 0.0000      | 0.000               | 0.000     | 0.000  | 0.000        | 0.000     | 0.000  | 0.000        | 0.000     | 0.000  |  |           |        |              |           |        |              |           |        |  |  |
| <b>Inbound load vehicles</b> <sup>a2</sup>                    |                          |                        |  |            |             |                     |           |        |              |           |        |              |           |        |  |           |        |              |           |        |              |           |        |  |  |
| ROLLOFF   | 300.00                   | 0.08                   | 0.1066   | 0.0086     | 0.0079      | 0.000               | 0.000     | 0.001  | 0.000        | 0.000     | 0.000  | 0.000        | 0.000     | 0.000  |  |           |        |              |           |        |              |           |        |  |  |
| SEMI  | 7,733.00                 | 0.08                   | 0.0537   | 0.0014     | 0.0013      | 0.005               | 0.002     | 0.017  | 0.000        | 0.000     | 0.000  | 0.000        | 0.000     | 0.000  |  |           |        |              |           |        |              |           |        |  |  |
| SEMI DUMP   | 872.00                   | 0.08                   | 0.1066   | 0.0086     | 0.0079      | 0.001               | 0.000     | 0.004  | 0.000        | 0.000     | 0.000  | 0.000        | 0.000     | 0.000  |  |           |        |              |           |        |              |           |        |  |  |
| <b>Daily peak hours Paved Road Emission</b> <sup>a5</sup>     |                          |                        |  |            |             | <b>0.175</b>        | 0.015     | 0.149  | <b>0.011</b> | 0.001     | 0.009  | <b>0.010</b> | 0.001     | 0.008  | <b>0.025</b>   | 0.002     | 0.021  | <b>0.002</b> | 0.000     | 0.002  | <b>0.002</b> | 0.000     | 0.002  |  |  |
| <b>Daily Non-peak hours Paved Road Emission</b> <sup>a5</sup> |                          |                        |  |            |             | <b>0.015</b>        | 0.004     | 0.037  | <b>0.001</b> | 0.000     | 0.002  | <b>0.001</b> | 0.000     | 0.002  | <b>0.002</b>   | 0.001     | 0.005  | <b>0.000</b> | 0.000     | 0.000  | <b>0.000</b> | 0.000     | 0.000  |  |  |

- a1 C&D building Inbound dump vehicles are loaded with C&D wastes.
- a2 Inbound load vehicles are empty and will be loaded with recovered materials only from C&D building
- a3 C&D building Outbound dump vehicles are empty, wastes are dumped to C&D building
- a4 Outbound load vehicles are loaded with recovered materials from C&D Building
- a5 Daily peak hours for C&D building traffic is between 9:30 am - 3:30 pm, anticipated capacity is 80% of total building processing daily capacity

**Table A2-8b- Vehicle Idling Emissions - MSW Building Vehicles**  
**Lakeshore Recycling Services - California Avenue Facility - Chicago, Illinois**

| MSW Vehicles  |            |             | Weekly Peak hours (Monday 4 am to Saturday 3 pm) |                        |                                |              |           |                     |              |           |        |              |           |        | Weekly Non-Peak hours (Saturday 3 pm to Monday 4 am) |           |                     |              |           |        |              |           |        |  |  |
|---|------------|-------------|--|------------------------|--------------------------------|--------------|-----------|---------------------|--------------|-----------|--------|--------------|-----------|--------|--|-----------|---------------------|--------------|-----------|--------|--------------|-----------|--------|--|--|
|   |            |             | Potential Vehicle Veh/yr                         | Vehicle Idling Time hr | Vehicle Idling Emission Factor |              |           | Potential Emissions |              |           |        |              |           |        |  |           | Potential Emissions |              |           |        |              |           |        |  |  |
| Nox lb/hr   | PM10 lb/hr | PM2.5 lb/hr |  |                        | Nox                            |              |           | PM10                |              |           | PM2.5  |              |           | Nox    |  |           | PM10                |              |           | PM2.5  |              |           |        |  |  |
| Vehicle Type  |            |             |  |                        |                                | lb/hr        | ton/month | ton/yr              | lb/hr        | ton/month | ton/yr | lb/hr        | ton/month | ton/yr | lb/hr  | ton/month | ton/yr              | lb/hr        | ton/month | ton/yr | lb/hr        | ton/month | ton/yr |  |  |
| <b>Inbound dump vehicles</b> <sup>a1</sup>                    |            |             |  |                        |                                |              |           |                     |              |           |        |              |           |        |  |           |                     |              |           |        |              |           |        |  |  |
| Box Truck   | 1,644.00   | 0.33        | 0.1104   | 0.0028                 | 0.0026                         | 0.009        | 0.003     | 0.030               | 0.000        | 0.000     | 0.001  | 0.000        | 0.000     | 0.001  |  |           |                     |              |           |        |              |           |        |  |  |
| FLAT BED  | 20.00      |             | 0.0008   | 0.0000                 | 0.0000                         |              |           |                     |              |           |        |              |           |        |  |           |                     |              |           |        |              |           |        |  |  |
| DUMP TRUCK  | 33,016.00  | 0.08        | 0.1066   | 0.0086                 | 0.0079                         | 0.037        | 0.013     | 0.126               | 0.003        | 0.001     | 0.010  | 0.003        | 0.001     | 0.009  | 0.022  | 0.007     | 0.074               | 0.002        | 0.001     | 0.006  | 0.002        | 0.001     | 0.005  |  |  |
| PACKER  | 15,905.00  | 0.08        | 0.1104   | 0.0028                 | 0.0026                         | 0.021        | 0.007     | 0.073               | 0.001        | 0.000     | 0.002  | 0.001        | 0.000     | 0.002  |  |           |                     |              |           |        |              |           |        |  |  |
| Rolloff   | 30,080.00  | 0.08        | 0.1066   | 0.0086                 | 0.0079                         | 0.039        | 0.013     | 0.134               | 0.003        | 0.001     | 0.011  | 0.003        | 0.001     | 0.010  |  |           |                     |              |           |        |              |           |        |  |  |
| Semi  | 19,483.00  | 0.08        | 0.0537   | 0.0014                 | 0.0013                         | 0.013        | 0.004     | 0.044               | 0.000        | 0.000     | 0.001  | 0.000        | 0.000     | 0.001  |  |           |                     |              |           |        |              |           |        |  |  |
| SUV   |            |             | 0.0008   | 0.0000                 | 0.0000                         |              |           |                     |              |           |        |              |           |        |  |           |                     |              |           |        |              |           |        |  |  |
| Semi Dump   | 12,160.00  | 0.08        | 0.1066   | 0.0086                 | 0.0079                         | 0.016        | 0.005     | 0.054               | 0.001        | 0.000     | 0.004  | 0.001        | 0.000     | 0.004  |  |           |                     |              |           |        |              |           |        |  |  |
| VAC TRUCK   | 135.00     | 0.25        | 0.1066   | 0.0086                 | 0.0079                         | 0.001        | 0.000     | 0.002               | 0.000        | 0.000     | 0.000  | 0.000        | 0.000     | 0.000  |  |           |                     |              |           |        |              |           |        |  |  |
| VAN   | 1,460.00   | 0.17        | 0.0008   | 0.0000                 | 0.0000                         | 0.000        | 0.000     | 0.000               | 0.000        | 0.000     | 0.000  | 0.000        | 0.000     | 0.000  |  |           |                     |              |           |        |              |           |        |  |  |
| PICK UP W. TLR  | 1,848.00   | 0.08        | 0.0008   | 0.0000                 | 0.0000                         | 0.000        | 0.000     | 0.000               | 0.000        | 0.000     | 0.000  | 0.000        | 0.000     | 0.000  |  |           |                     |              |           |        |              |           |        |  |  |
| PICK UP   | 38,569.00  | 0.08        | 0.0008   | 0.0000                 | 0.0000                         | 0.000        | 0.000     | 0.001               | 0.000        | 0.000     | 0.000  | 0.000        | 0.000     | 0.000  |  |           |                     |              |           |        |              |           |        |  |  |
| <b>Daily peak hours Paved Road Emission</b> <sup>a3</sup>     |            |             |  |                        |                                | <b>0.436</b> | 0.037     | 0.371               | <b>0.027</b> | 0.002     | 0.023  | <b>0.025</b> | 0.002     | 0.022  | <b>0.070</b>   | 0.006     | 0.059               | <b>0.006</b> | 0.000     | 0.005  | <b>0.005</b> | 0.000     | 0.004  |  |  |
| <b>Daily Non-peak hours Paved Road Emission</b> <sup>a3</sup> |            |             |  |                        |                                | <b>0.036</b> | 0.009     | 0.093               | <b>0.002</b> | 0.001     | 0.006  | <b>0.002</b> | 0.001     | 0.005  | <b>0.006</b>   | 0.001     | 0.015               | <b>0.000</b> | 0.000     | 0.001  | <b>0.000</b> | 0.000     | 0.001  |  |  |

a1 MSW building Inbound dump vehicles are loaded with MSW.  
a2 MSW building Outbound dump vehicles are empty, wastes are dumped to MSW building  
a3 Daily peak hours for MSW building is between 8 am to 2 pm, anticipated capacity is 75% of total building daily capacity

**Table A2-9 - Non-Road vehicles Emission estimated by MOVes Emissions  
Lakeshore Recycling Services - California Avenue Facility - Chicago, Illinois**

| Vehicle Type     | Brand       | # Vehicle | EPA MOVes Vehicle Category  | Equipment Horsepower (hp) | Engine Tier | Operating Hours (hrs/day) | MOVes Emission Factor <sup>a</sup> |                |                 | Emissions     |                |                 | Emissions   |              |               |
|------------------|-------------|-----------|-----------------------------|---------------------------|-------------|---------------------------|------------------------------------|----------------|-----------------|---------------|----------------|-----------------|-------------|--------------|---------------|
|                  |             |           |                             |                           |             |                           | NOx (g/hp-hr)                      | PM10 (g/hp-hr) | PM2.5 (g/hp-hr) | Nox (tons/yr) | PM10 (tons/yr) | PM2.5 (tons/yr) | NOx (lb/hr) | PM10 (lb/hr) | PM2.5 (lb/hr) |
| Excavator        | Komatsu     | 3         | Excavators                  | 165                       | 4           | 20                        | 0.06                               | 0.00           | 0.00            | 0.08          | 0.00           | 0.00            | 0.02        | 0.00         | 0.00          |
| loader           | Caterpillar | 4         | Rubber Tire Loaders         | 130                       | 4           | 20                        | 0.06                               | 0.00           | 0.00            | 0.06          | 0.00           | 0.00            | 0.02        | 0.00         | 0.00          |
| Skid Steer       | Caterpillar | 2         | Skid Steer Loaders          | 80                        | 4           | 20                        | 0.02                               | 0.00           | 0.00            | 0.01          | 0.00           | 0.00            | 0.00        | 0.00         | 0.00          |
| Forklift         | Toyota      | 1         | Forklift                    | 51                        | 4           | 20                        | 0.05                               | 0.00           | 0.00            | 0.02          | 0.00           | 0.00            | 0.01        | 0.00         | 0.00          |
| Material Handler | Sennebogen  | 1         | Other Material Handling Eqp | 230                       | 4           | 20                        | 0.02                               | 0.00           | 0.00            | 0.03          | 0.00           | 0.00            | 0.01        | 0.00         | 0.00          |
| Sweeper          | Elgin       | 1         | sweeper & scrubber          | 100                       | 4           | 20                        | 0.04                               | 0.00           | 0.00            | 0.03          | 0.00           | 0.00            | 0.01        | 0.00         | 0.00          |
| <b>Total</b>     |             |           |                             |                           |             |                           |                                    |                |                 | 0.23          |                |                 | 0.06        | 0.00         | 0.00          |

a : MOVes emission factor is controlled emission factor. The diesel engines are considered to be controlled by Diesel Particulate Filter (DPF) and Selective Catalytic Reduction (SCR)

b : Wood chipper operating rate is 80 tons/hr, C&D building wood chips maximum throughput is 35 tons/day. 30 min operating per day is estimated for wood chipper.

**Table A2-10 - Moving Vehicle Emissions - Employee Vehicles  
Lakeshore Recycling Services - California Avenue Facility - Chicago, Illinois**

| Employee Vehicles               |                          |               |   |        |        | Access Road         |           |        |         |           |        |         |           |        |
|---------------------------------|--------------------------|---------------|---|--------|--------|---------------------|-----------|--------|---------|-----------|--------|---------|-----------|--------|
| Vehicle Type                    | Potential Vehicle Amount | Mileage       | Vehicle Moving Emission Factor <sup>b</sup> |        |        | Potential Emissions |           |        |         |           |        |         |           |        |
|                                 |                          | Facility Road | Nox   | PM10   | PM2.5  | Nox                 |           |        | PM10    |           |        | PM2.5   |           |        |
|                                 | Veh/yr                   | VMT/hr        | lb/VMT                                      | lb/VMT | lb/VMT | lb/hr               | ton/month | ton/yr | lb/hr   | ton/month | ton/yr | lb/day  | ton/month | ton/yr |
| employee vehicles <sup>a1</sup> | 36,500.00                | 1.53          | 0.0002                                      | 0.0000 | 0.0000 | 0.0003              | 0.000     | 0.001  | 0.00001 | 0.000     | 0.000  | 0.00001 | 0.000     | 0.000  |

a1 Employee vehicle in Employee vehicle includes sedan & SUV, round-trip only includes access road. Vehicle amount and weight is averaged value based on permit

b MOVES emission factor for 2022 Gasoline Passenger Cars at the vehicle speed between 27.5 and 32.5 miles/hr.