

**MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION**

October 18, 2018

PERMIT TO INSTALL
138-18

ISSUED TO
Superior Materials – Plant #32

LOCATED AT
8911 West Jefferson
Detroit, Michigan

IN THE COUNTY OF
Wayne

STATE REGISTRATION NUMBER
B8763

The Air Quality Division has approved this Permit to Install, pursuant to the delegation of authority from the Michigan Department of Environmental Quality. This permit is hereby issued in accordance with and subject to Section 5505(1) of Article II, Chapter I, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Pursuant to Air Pollution Control Rule 336.1201(1), this permit constitutes the permittee's authority to install the identified emission unit(s) in accordance with all administrative rules of the Department and the attached conditions. Operation of the emission unit(s) identified in this Permit to Install is allowed pursuant to Rule 336.1201(6).

DATE OF RECEIPT OF ALL INFORMATION REQUIRED BY RULE 203:

August 24, 2018

DATE PERMIT TO INSTALL APPROVED:

October 18, 2018

SIGNATURE:

DATE PERMIT VOIDED:

SIGNATURE:

DATE PERMIT REVOKED:

SIGNATURE:

PERMIT TO INSTALL

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Common Abbreviations / Acronyms

Common Acronyms		Pollutant / Measurement Abbreviations	
AQD	Air Quality Division	acfm	Actual cubic feet per minute
BACT	Best Available Control Technology	BTU	British Thermal Unit
CAA	Clean Air Act	°C	Degrees Celsius
CAM	Compliance Assurance Monitoring	CO	Carbon Monoxide
CEM	Continuous Emission Monitoring	CO _{2e}	Carbon Dioxide Equivalent
CFR	Code of Federal Regulations	dscf	Dry standard cubic foot
COM	Continuous Opacity Monitoring	dscm	Dry standard cubic meter
Department/ department	Michigan Department of Environmental Quality	°F	Degrees Fahrenheit
EU	Emission Unit	gr	Grains
FG	Flexible Group	HAP	Hazardous Air Pollutant
GACS	Gallons of Applied Coating Solids	Hg	Mercury
GC	General Condition	hr	Hour
GHGs	Greenhouse Gases	HP	Horsepower
HVLP	High Volume Low Pressure*	H ₂ S	Hydrogen Sulfide
ID	Identification	kW	Kilowatt
IRSL	Initial Risk Screening Level	lb	Pound
ITSL	Initial Threshold Screening Level	m	Meter
LAER	Lowest Achievable Emission Rate	mg	Milligram
MACT	Maximum Achievable Control Technology	mm	Millimeter
MAERS	Michigan Air Emissions Reporting System	MM	Million
MAP	Malfunction Abatement Plan	MW	Megawatts
MDEQ	Michigan Department of Environmental Quality	NMOC	Non-methane Organic Compounds
MSDS	Material Safety Data Sheet	NO _x	Oxides of Nitrogen
NA	Not Applicable	ng	Nanogram
NAAQS	National Ambient Air Quality Standards	PM	Particulate Matter
NESHAP	National Emission Standard for Hazardous Air Pollutants	PM ₁₀	Particulate Matter equal to or less than 10 microns in diameter
NSPS	New Source Performance Standards	PM _{2.5}	Particulate Matter equal to or less than 2.5 microns in diameter
NSR	New Source Review	pph	Pounds per hour
PS	Performance Specification	ppm	Parts per million
PSD	Prevention of Significant Deterioration	ppmv	Parts per million by volume
PTE	Permanent Total Enclosure	ppmw	Parts per million by weight
PTI	Permit to Install	psia	Pounds per square inch absolute
RACT	Reasonable Available Control Technology	psig	Pounds per square inch gauge
ROP	Renewable Operating Permit	scf	Standard cubic feet
SC	Special Condition	sec	Seconds
SCR	Selective Catalytic Reduction	SO ₂	Sulfur Dioxide
SNCR	Selective Non-Catalytic Reduction	TAC	Toxic Air Contaminant
SRN	State Registration Number	Temp	Temperature
TEQ	Toxicity Equivalence Quotient	THC	Total Hydrocarbons
USEPA/EPA	United States Environmental Protection Agency	tpy	Tons per year
VE	Visible Emissions	µg	Microgram
		µm	Micrometer or Micron
		VOC	Volatile Organic Compounds
		yr	Year

*For HVLP applicators, the pressure measured at the gun air cap shall not exceed 10 psig.

GENERAL CONDITIONS

1. The process or process equipment covered by this permit shall not be reconstructed, relocated, or modified, unless a Permit to Install authorizing such action is issued by the Department, except to the extent such action is exempt from the Permit to Install requirements by any applicable rule. **(R 336.1201(1))**
2. If the installation, construction, reconstruction, relocation, or modification of the equipment for which this permit has been approved has not commenced within 18 months, or has been interrupted for 18 months, this permit shall become void unless otherwise authorized by the Department. Furthermore, the permittee or the designated authorized agent shall notify the Department via the Supervisor, Permit Section, Air Quality Division, Michigan Department of Environmental Quality, P.O. Box 30260, Lansing, Michigan 48909-7760, if it is decided not to pursue the installation, construction, reconstruction, relocation, or modification of the equipment allowed by this Permit to Install. **(R 336.1201(4))**
3. If this Permit to Install is issued for a process or process equipment located at a stationary source that is not subject to the Renewable Operating Permit program requirements pursuant to R 336.1210, operation of the process or process equipment is allowed by this permit if the equipment performs in accordance with the terms and conditions of this Permit to Install. **(R 336.1201(6)(b))**
4. The Department may, after notice and opportunity for a hearing, revoke this Permit to Install if evidence indicates the process or process equipment is not performing in accordance with the terms and conditions of this permit or is violating the Department's rules or the Clean Air Act. **(R 336.1201(8), Section 5510 of Act 451, PA 1994)**
5. The terms and conditions of this Permit to Install shall apply to any person or legal entity that now or hereafter owns or operates the process or process equipment at the location authorized by this Permit to Install. If the new owner or operator submits a written request to the Department pursuant to R 336.1219 and the Department approves the request, this permit will be amended to reflect the change of ownership or operational control. The request must include all of the information required by subrules (1)(a), (b), and (c) of R 336.1219 and shall be sent to the District Supervisor, Air Quality Division, Michigan Department of Environmental Quality. **(R 336.1219)**
6. Operation of this equipment shall not result in the emission of an air contaminant which causes injurious effects to human health or safety, animal life, plant life of significant economic value, or property, or which causes unreasonable interference with the comfortable enjoyment of life and property. **(R 336.1901)**
7. The permittee shall provide notice of an abnormal condition, start-up, shutdown, or malfunction that results in emissions of a hazardous or toxic air pollutant which continue for more than one hour in excess of any applicable standard or limitation, or emissions of any air contaminant continuing for more than two hours in excess of an applicable standard or limitation, as required in Rule 912, to the Department. The notice shall be provided not later than two business days after start-up, shutdown, or discovery of the abnormal condition or malfunction. Written reports, if required, must be filed with the Department within 10 days after the start-up or shutdown occurred, within 10 days after the abnormal conditions or malfunction has been corrected, or within 30 days of discovery of the abnormal condition or malfunction, whichever is first. The written reports shall include all of the information required in Rule 912(5). **(R 336.1912)**
8. Approval of this permit does not exempt the permittee from complying with any future applicable requirements which may be promulgated under Part 55 of 1994 PA 451, as amended or the Federal Clean Air Act.
9. Approval of this permit does not obviate the necessity of obtaining such permits or approvals from other units of government as required by law.
10. Operation of this equipment may be subject to other requirements of Part 55 of 1994 PA 451, as amended and the rules promulgated thereunder.

11. Except as provided in subrules (2) and (3) or unless the special conditions of the Permit to Install include an alternate opacity limit established pursuant to subrule (4) of R 336.1301, the permittee shall not cause or permit to be discharged into the outer air from a process or process equipment a visible emission of density greater than the most stringent of the following. The grading of visible emissions shall be determined in accordance with R 336.1303. **(R 336.1301)**
 - a) A six-minute average of 20 percent opacity, except for one six-minute average per hour of not more than 27 percent opacity.
 - b) A visible emission limit specified by an applicable federal new source performance standard.
 - c) A visible emission limit specified as a condition of this Permit to Install.

12. Collected air contaminants shall be removed as necessary to maintain the equipment at the required operating efficiency. The collection and disposal of air contaminants shall be performed in a manner so as to minimize the introduction of contaminants to the outer air. Transport of collected air contaminants in Priority I and II areas requires the use of material handling methods specified in R 336.1370(2). **(R 336.1370)**

13. The Department may require the permittee to conduct acceptable performance tests, at the permittee's expense, in accordance with R 336.2001 and R 336.2003, under any of the conditions listed in R 336.2001. **(R 336.2001)**

SPECIAL CONDITIONS

FLEXIBLE GROUP SUMMARY TABLE

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Flexible Group ID	Flexible Group Description	Associated Emission Unit IDs
FGFACILITY	All process equipment source-wide including equipment covered by other permits, grand-fathered equipment and exempt equipment.	

The following conditions apply Source-Wide to: FGFACILITY

POLLUTION CONTROL EQUIPMENT:

I. EMISSION LIMITS

NA

II. MATERIAL LIMITS

NA

III. PROCESS/OPERATIONAL RESTRICTIONS

1. The permittee shall not operate FGFACILITY unless the fugitive dust control plan specified in Appendix A, or an alternate approvable plan submitted to the AQD District Supervisor, for all plant roadways, the plant yard, all material storage piles, and all material handling operations has been implemented and is maintained. **(R 336.1371, R 336.1372, Act 451 324.5524)**

IV. DESIGN/EQUIPMENT PARAMETERS

NA

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

NA

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall keep, in a satisfactory manner, records showing the annual potential to emit calculations for PM, in tons per year, for FGFACILITY. The permittee shall up the potential to emit calculation whenever a new permitted or exempt emission unit is installed, or whenever a permitted, exempt, or grandfathered emission unit is modified or removed. Potential to emit calculations shall be based on the maximum operational capacity of the equipment operated for the entire year, except they may account for applicable permit requirements or applicable laws or rules limiting the potential to emit. The permittee shall keep all records on file at the facility and make them available to the Department upon request. **(Act 451 324.5524)**

VII. REPORTING

NA

VIII. STACK/VENT RESTRICTIONS

NA

IX. OTHER REQUIREMENTS

NA

Footnotes:

¹This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

APPENDIX A

MCL 324.5524 Operating Program

Superior Materials, LLC

Plant #32 (Jefferson Plant)

8911 West Jefferson Avenue, Detroit, Michigan 48209

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Introduction

This Operating Program has been developed and implemented for Superior Materials Plant #32 (Jefferson Plant) located at 8911 West Jefferson Ave, Detroit, Michigan 48209 (Facility/Site). The purpose of this program is to describe the tools and methods used to control fugitive dust emissions in accordance Section 5524 of the Natural Resources and Environmental Protection Act, being MCL 324.5524, *Fugitive dust sources or emissions*.

The primary industrial activity at this Site is the production and distribution of pre-mix batch concrete. Aggregates are delivered to the Site by both ship and truck, and stockpiled utilizing conveyors and front-end loaders. Front-end loaders are also used to load construction aggregates into the concrete plant feed hopper. Cement, slag cement, and fly ash are delivered to the Site by tank truck and pneumatically conveyed to storage silos. Material in silos located at the concrete plant is used to produce manufacture concrete. The JMT storage silos located at the south end of the Site contain cement and fly ash that is loaded into tank trucks for delivery to local concrete plants.

The Jefferson Plant typically operates 5 days/week in the winter months and 6 days/week in the summer months.

The facility is bordered by the River Rouge to the east, the Jefferson Avenue and the Detroit Wastewater Treatment Plant to the north and west, and industrial properties to the south. The Facility property, and all adjacent parcels are zoned M4, intensive industrial.

The following sections of this Operating Program are organized in order of the requirements of MCL 324.5524.

Applicability – MCL 324.5524(1)

The provisions of MCL 324.5524 apply to fugitive dust sources at the Jefferson Plant because the Facility meets the standard industrial classification (SIC) code and locational requirements established in MCL 324.5524. Facility operations are covered under SIC major group 32, *Stone, Clay, Glass, and Concrete Products*. The Jefferson Plant specializes in the manufacture and distribution of ready-mix concrete. The SIC code used to describe the Facility's primary industrial activities is 3273 – *Ready-mix Concrete*. The corresponding North American Industry Classification System (NAICS) code for the Facility is 327320 – *Ready-mix concrete manufacturing and distributing*.

Fugitive Dust Opacity Limits – MCL 324.5524(2)

In accordance with MCL 324.5524(2), best practices and operational controls are implemented at the Facility to limit fugitive dust emissions from paved and unpaved roads, lots, construction aggregate storage piles, and material handling activities to an opacity no greater than 5%. Emissions from any other source are limited to an opacity no greater than 20%. Specific controls used to control fugitive dust emissions are discussed in the following sections of this Operating Program.

Fugitive Dust Controls – MCL 324.5524(3)(a)

Stockpile, Conveyor Loading, and Traffic Patterns – MCL 324.5524(3)(a)(i)–(iii)

MCL 324.5524(3)(a)(i) through 324.5524(3)(a)(iii) requires specific controls to limit fugitive dust emission from stockpiles, conveyor loading activities, and traffic pattern access areas surrounding stockpiles. As explained in MCL

324.5523(3)(a)(i), most of these controls are applicable to facilities where the total uncontrolled emissions of fugitive dust from material storage piles are greater than 50 tons per year and where potential particulate emissions from all sources, including fugitive dust sources, exceeds 100 tons per year. The Jefferson Plant's total uncontrolled fugitive dust emissions from material storage piles do not exceed 50 tons per year. Therefore, the requirements of MCL 324.5524(3)(a)(i)-(iii) do not apply to this site, with the exception of the following in 324.5524(3)(iii), "All traffic pattern roads and parking facilities shall be paved or treated with water, oils, or chemical dust suppressants. All paved areas shall be cleaned in accordance with the operating program required by MCL 324.5524(4). All areas treated with water, oils, or chemical dust suppressants shall have the treatment applied in accordance with the operating program required by MCL 324.5524(4). Refer to Appendix A of this program for potential-to-emit (PTE) calculations for the Site.

Handling Materials Collected by Pollution Control Equipment – MCL 324.5524(3)(a)(iv)

All unloading and transporting operations of materials collected by pollution control equipment at the plant and JMT silos are enclosed. Concrete, fly ash, and slag cement are transferred from delivery tankers to storage silos through completely enclosed pneumatic conveyance systems.

Other Activity Controls – MCL 324.5524(3)(a)(v)

A potential for fugitive dust creation exists during stockpiling of construction aggregates from marine vessels or trucks and during loading of construction aggregates into the concrete plant feed hoppers. To minimize fugitive dust emissions, water sprays are used as needed during non-freezing conditions on stockpiles, in accordance with MCL 324.5523(3)(a)(v). The conveyor from the aggregate feed bins to the concrete plant are covered to control fugitive dust emissions.

Particulate Collection Equipment – MCL 324.5524(3)(b)

The facility does not utilize particulate collection equipment to control fugitive dust emissions. Therefore, MCL 324.5524(3)(b) is not applicable.

Vehicle Transport of Materials with High Silt Content – MCL 324.5524(3)(c)

Superior Materials' Jefferson Plant complies with the requirements of MCL 324.5524(3)(c) because the dry material content of concrete is mixed with water before vehicles leave the Site. Superior Materials' vehicles may be used to transport aggregate, cement, slag cement, and fly ash to the Site. These vehicles are completely enclosed or use tarps to control fugitive dust during transport.

Vehicle Transport of Materials – MCL 324.5524(3)(d)

Superior Materials vehicles used to transport concrete from the Site comply with section 720 of the Michigan vehicle code, Act No. 300 of the Public Acts of 1949, being section 257.720 of the Michigan Compiled Laws, and with R 28.1457 of the Michigan administrative code as applicable.

Vehicle Transport of Materials – MCL 324.5524(3)(e)-(f)

The Jefferson Plant typically handles construction aggregate materials, concrete, slag cement, and fly ash. Materials are transported to and from the Site by vehicles with more than a 2-ton capacity. Cement, slag cement and fly ash are delivered to and from the Site in tank trucks and pneumatically conveyed to and from storage silos. Therefore, the exemptions allowed by MCL 324.5524(3)(e)-(f) are not applicable to the Jefferson Plant. The Jefferson Plant complies with MCL 324.5524(3)(c)-(d) as described in the previous sections of this plan.

Vehicle Transport of Materials – MCL 324.5524(3)(g)

The Jefferson Plant typically handles construction aggregate materials, cement, fly ash, slag cement, and concrete. Slag cement is delivered to the Site at ambient temperature, and transport vehicles follow the transport practices described in the above sections of this Operating Program.

Requirement to Prepare an Operating Program – MCL 324.5524(4)

This Operating Program has been prepared in accordance with MCL 324.5524, *Fugitive dust sources or emissions*, to document the methods and controls implemented at Jefferson Plant to control fugitive dust emissions from the Site's concrete manufacturing. This program has been designed to reduce fugitive dust emissions to the lowest level possible through the application of reasonably available and economically feasible controls.

Operating Program Contents – MCL 324.5524(5)

Facility Contact Information – MCL 324.5524(5)(a)-(b)

Facility Name:	Jefferson Plant
Facility Address:	8911 West Jefferson Avenue Detroit, Michigan 48209
Facility Manger:	Jim Plohg, Area Manager (248) 514-4869
Owner/Operator:	Superior Materials, LLC. 30701 West 10 Mile Road Farmington Hills, Michigan 48336

The Jefferson Plant Area Manager, Jim Plohg, is responsible for implementation of the Operating Program with guidance and support from Superior Materials' environmental resources.

Facility Maps and Diagrams – MCL 324.5524(5)(c)

In accordance with MCL 234.5524(5)(c), maps and diagrams of the Jefferson Plant are provided as Figure 1 and Figure 2 to this Operating Program. **Figure 1** shows the general site location and its surroundings within 0.25-mile of the Facility. **Figure 2** depicts the general Facility layout, including the following details:

- Approximate storage pile locations
- Conveyor loading operations
- Traffic patterns within the Facility property

Unloading and Transporting Operation Locations – MCL 324.5524(5)(d)

Cement, slag cement, and fly ash unloading and concrete loading (into mix trucks) activities are enclosed and take place in the locations identified on **Figure 2**.

Fugitive Dust Control Best Management Practices – MCL 324.5524(5)(e)

Material Processing and Conveying

Typically, construction aggregates are delivered to the Jefferson Plant by truck and the truck unloaded directly into stockpiles. When materials are delivered by ship, they are unloaded using the ship's conveyor(s). Material transfers by conveyor may occur anywhere within the Site boundary (see **Figure 2**) and additional portable conveyors may be used. Whenever materials are loaded or unloaded by conveyor, transfer points and drop heights are minimized to the maximum extent practicable to control fugitive dust emissions. The conveyor used to transfer materials from aggregate bins to the concrete plant is enclosed. The concrete plant and JMT silos are also enclosed.

Traffic Management

Equipment and truck speeds on-site are normally restricted to 5 MPH, and communicated to employees and visitors by signage near the Facility entrance.

Dust Suppression

Calcium chloride or another acceptable chemical dust suppressant may be applied to unpaved portions of the Jefferson Plant at the owner/operator's discretion to minimize fugitive dust generated from equipment and vehicles travelling on the facility property. Additional information regarding dust suppression use and recordkeeping are discussed in the next two sections of this Program.

Use of Waste or Recycled Oils for Fugitive Dust Control – MCL 324.5524(5)(f)

No waste or recycled oils are used for fugitive dust control at the Jefferson Plant. Therefore, the requirements of MCL 324.5524(5)(f) do not apply to the Facility.

Dust Suppressant Recordkeeping – MCL 324.5524(5)(g)

In the event of extremely dry weather conditions, the Facility may have unpaved roads treated with a chloride solution applied by a third-party contractor. Superior Materials maintains records of chloride applications at the Jefferson Plant for at least 5 years.

Paved Road and Parking Facility Cleaning – MCL 324.5524(5)(h)

In accordance with MCL 324.5524(5)(h), on site, paved traffic pattern roads, and Jefferson Avenue, a paved public right-of-way, are cleaned by a wet sweeper truck at least twice per week, weather permitting. Superior Materials maintains records of paved road cleaning activities for at least 5 years.

Other Information – MCL 324.5524(5)(i)

In accordance with MCL 324.5524(5)(i), Superior Materials will provide the Michigan Department of Environmental Quality (MDEQ) with any additional information the department requests to facilitate its review of this operating program.

Operating Program Submittal – MCL 324.5524(6)

In accordance with MCL 324.5524(6), this Operating Program has been submitted to the MDEQ for approval as part of a Permit-to-Install (PTI) Application.

Operation Program Amendment – MCL 324.5524(7)

This Operating Program will be amended and resubmitted to the MDEQ for approval in the event of operational changes that may result in significant increases of fugitive dust emissions from the Site.

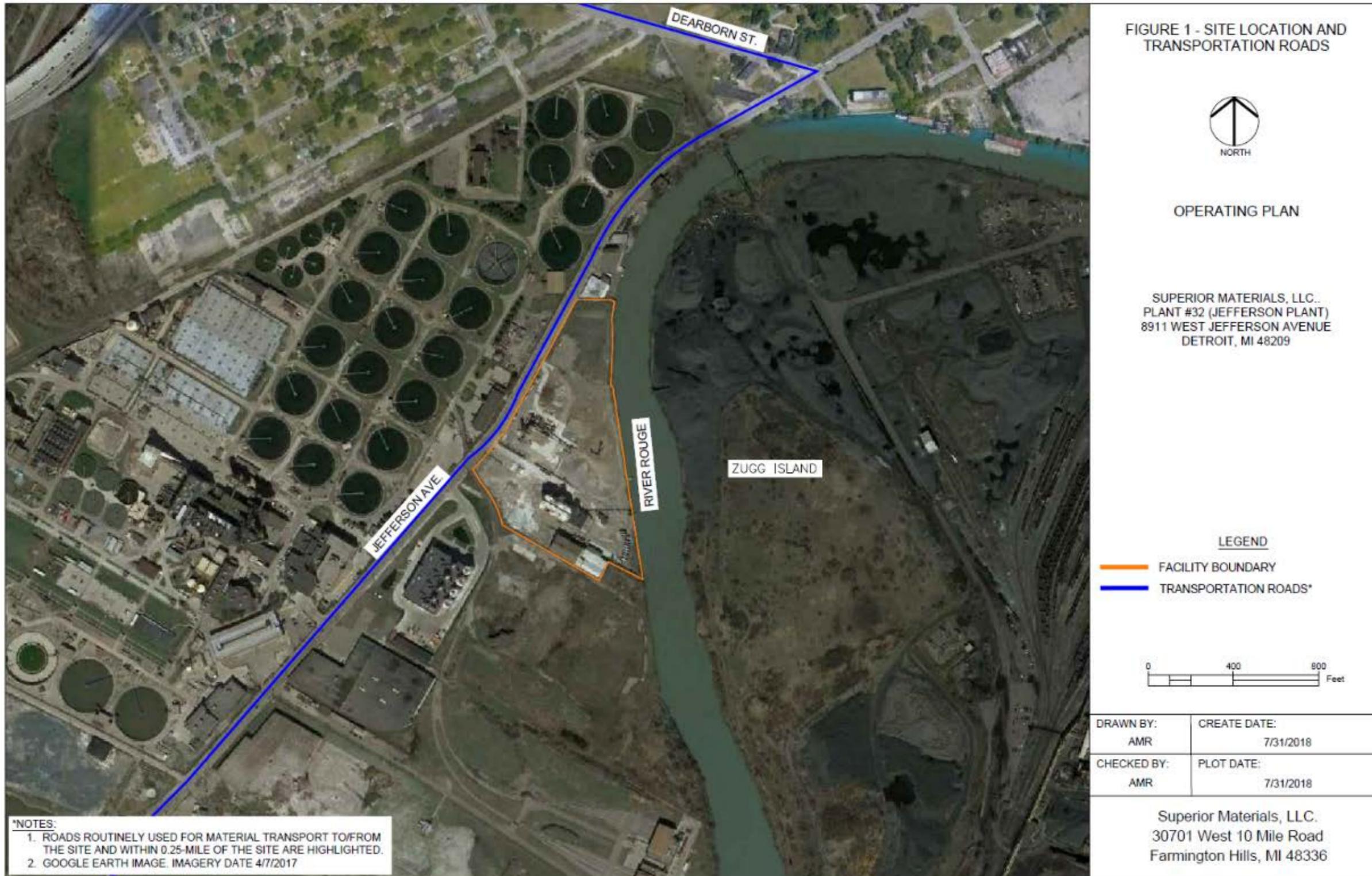
Alternate Provisions for Fugitive Dust Control – MCL 324.5524(8)

Superior Materials, LCC. is not requesting MDEQ approval of alternate fugitive dust controls to establish compliance with MCL 324.5524. Therefore, the requirements of MCL 324.5524(8) do not apply at the Jefferson Plant.

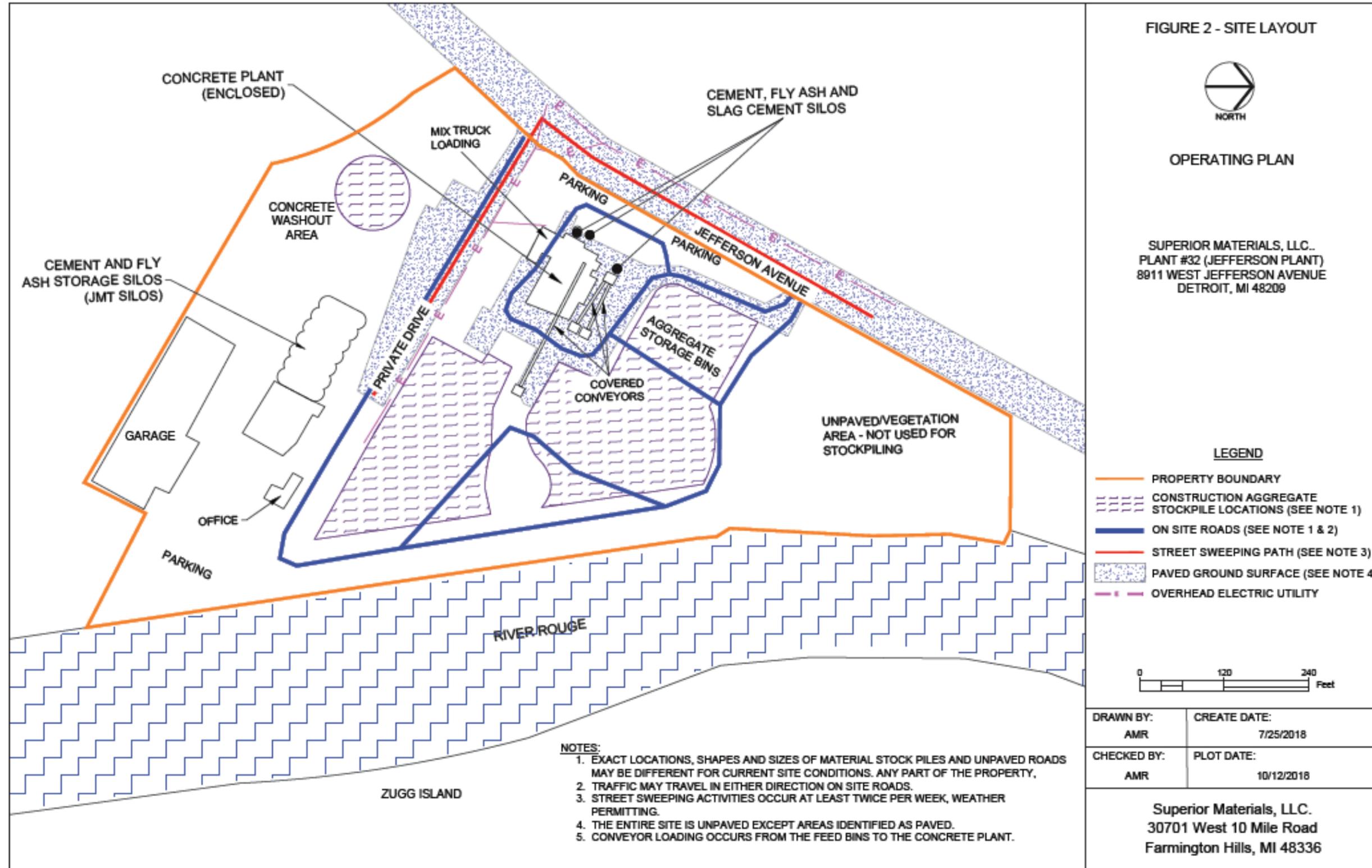
Alternate Provision Submittal to USEPA – MCL 324.5524(9)

Superior Materials, LCC. is not seeking MDEQ approval any alternate provisions for compliance with MCL 324.5524. Therefore, fugitive dust control at the Jefferson Plant does not require United States Environmental Protection Agency (USEPA) approval or incorporation in the state implementation plan.

Figures



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Appendix A – Superior Materials Plant #32 (Jefferson Plant) Potential to-Emit (PTE) Calculations

Superior Materials – Plant #32
8911 West Jefferson Ave, Detroit, MI
Potential-to-Emit Summary

Fugitive PM Potential Emissions (tons per year)		
Emission Source	Uncontrolled PM	Controlled PM
PAVED ROADS	2.46	0.49
UNPAVED ROADS	18.2	3.65
STOCKPILES - LOADING/UNLOADING	0.50	0.50
STOCKPILES - WIND	3.77	3.77
CENTRAL MIX CONCRETE BATCH PLANT - Aggregate delivery to ground storage, Sand delivery to ground storage, Aggregate transfer to conveyor, Sand transfer to conveyor, Aggregate transfer to elevated storage, Sand transfer to elevated storage	2.4	2.37
Total Potential Emissions	27.3	10.8

Point Source PM Potential Emissions (tons per year)		
Emission Source	Uncontrolled PM	Controlled PM
CENTRAL MIX CONCRETE BATCH PLANT - Cement delivery to silo, Cement supplement (<i>fly ash</i>) delivery to silo, Cement supplement (<i>slag</i>) delivery to silo, Weigh hopper loading, Central Mix Loading	17.0	1.39
JMT STORAGE SILO TRANSFERS	0.005	0.005
Total Potential Emissions	17.0	1.4

Emission Source: Fugitive Dust from Paved Roads
Air Contaminant: Total PM
Calculation Method: AP-42 13.2.1 Paved Roads - Predictive Emission Factor Equations

Emissions calculation for the quantity of particulate emissions from resuspension of loose material on the road surface due to vehicle travel on a dry paved road is estimated using the expression:

$$E = k(sL)^{0.91} \times (W)^{1.02}$$

Where: E = particulate emission factor (having units matching the units of k),
 k = particle size multiplier for particle size range and units of interest,
 sL = road surface silt loading (grams per square meter), and
 W = average weight (tons) of the vehicles traveling the road.

lf:	k (lb/VMT) (Note 1)	sL (g/m ²) (Note 2)	W (tons) (Note 3)	Then:	E (lb/VMT)
Concrete Mix Trucks	0.0022	12	34.1		0.77
Aggregate Haul Trucks	0.0022	12	72.3		1.7

Assume:

VMT per year = Total no. of trips per year x miles per trip

No. of customer truck trips per year = total tons of aggregate / capacity of average customer truck

If maximum annual material throughput = 400,000 tons/year (See Note 4)

Then, annual PTE is:

Vehicle Type	Capacity per trip (tons) (See Note 5)	Miles per trip (See Note 6)	VMT/year	E (lbs / VMT)	Uncontrolled Emissions (lbs / yr)	Control Efficiency	Controlled Emissions (lbs/yr)
Concrete Mix Truck	22	0.25	4545	0.77	3515	80%	703
Agg Haul Truck	52	0.11	846	1.7	1406	80%	281
Total (tons/year)					2.46		0.49

Notes:

- 1) PM-10 size range used for selecting Particle Size Multiplier, k in Table 13.2.1-1 of AP-42.
- 2) Average Concrete Batching facility silt Loading value, sL, selected from Table 13.2.1-3.
- 3) Average weight for mix trucks based on 0.4 mile travelled at empty weight (18 tons) and 0.11 mile travelled at max. weight (40 ton) per truck trip. Average weight for haul trucks based on 0.01 mile travelled at empty weight (25 tons) and 0.1 mile travelled at max. weight (77 ton).
- 4) Assumes 4000 lbs/yd³ of concrete and maximum production of 200,000 yd³ of concrete/year.
- 5) Capacity is the maximum amount of aggregate or concrete that can be hauled by one vehicle. Assumes all vehicles are loaded to maximum legal weight, and all aggregates used in concrete are delivered by truck.
- 6) Includes distance travelled for mix trucks to washout after returning from a delivery.

Emission Source: Fugitive Dust from Unpaved Roads

Air Contaminant: Total PM

Emission Calculation Method: AP-42 13.2.2 Unpaved Roads - Predictive Emission Factor Equations

Emissions calculation for the quantity of particulate emissions from resuspension of loose material on the road surface due to vehicle travel on a dry paved road is estimated using the expression:

$$E = k (s/12)^{0.9} \times (W/3)^{.45}$$

Where: E = site-specific emission factor (lb/Vehicle Mile Travelled VMT))

k = particle size multiplier constant s = surface material silt content (%)

W = average weight (tons) of the vehicles traveling the road

If:	k (lb/VMT) <i>(See Note 1)</i>	s (%) <i>(See Note 2)</i>	W (tons) <i>(See Note 3)</i>	Then:	E (lb/VMT)
Front Endloader	1.5	8.3	58.5		4.1
Concrete Mix Trucks	1.5	8.3	18		2.4
Aggregate Haul Trucks	1.5	8.3	64.6		4.3

VMT per year = Total no. of trips per year x miles per trip

No. of front end loader trips per year = total tons of aggregate / capacity of front loader bucket

No. of customer truck trips per year = total tons of aggregate / capacity of average customer truck

If maximum annual material throughput = 400,000 tons/year (See Note 4)

Then, annual PTE is:

Vehicle Type	Capacity per trip (tons) <i>(See Note 5)</i>	Miles per trip	VMT/yr	E (lbs / VMT)	Uncontrolled Emissions (lbs/yr)	Control Efficiency	Controlled Emissions (lbs/yr)
Front End Loader	7	0.1	5714	4.1	23414	80%	4683
Concrete Mix Truck	22	0.14	2545	2.4	6137	80%	1227
Agg Haul Truck	52	0.21	1615	4.3	6922	80%	1384
Total (tons/year)					18.2		3.65

Notes:

- 1) PM-10 size range used for selecting Particle Size Multiplier, k in Table 13.2.2-2 of AP-42.
- 2) Estimated silt content for stone quarrying and processing haul roads from AP-42 Table 13.2.2-1.
- 3) The average weight, W, of vehicles travelling on unpaved surfaces is based on the approximate distance vehicles travel unpaved surfaces with empty loads and full loads.
- 4) Throughput based on 4000 lbs/yd³ of concrete and maximum production of 200,000 yd³ of concrete/year.
- 5) Capacity is the maximum amount of aggregate or concrete that can be hauled by one vehicle. Assumes all vehicles are loaded to maximum legal weight, and all aggregates used in concrete are delivered by truck.
- 6) Includes distance travelled for mix trucks to washout after returning from a delivery.

Emission Source: Fugitive Dust from Material Handling and Stockpiling

Air Contaminant: Total PM

Calculation Method: AP-42 13.2.4 Aggregate Handling and Storage Piles - Predictive Emission Factor Eqs.

Emissions calculation for the quantity of particulate emissions generated by loading aggregate materials into stockpiles and material loadout from stockpiles:

$$E = k(0.0032) \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}$$

where: E = particulate emission factor (in units of lb/ton), k = particle size multiplier (dimensionless), U = mean wind speed (miles per hour (mph)), and M = material moisture content (%).

Assume:

k (See Note 1)	U (mph) (See Note 2)	M (%) (See Note 3)	E (lb/ton material handled)
0.35	9.7	2.1	0.002

Assume max. annual material throughput of 400,000 tons
 (See Note 4)

PTE = E x maximum annual throughput

PTE = 990 lbs/year

PTE = 0.50 tons/year

Notes:

- 1) PM-10 size range used for selecting Particle Size Multiplier, k from Aerodynamic Particle Size Multiplier Table in AP-42 13.2.4.3.
- 2) Mean Wind Speed source www.weatherbase.com (3/7/2018)
- 3) Moisture content, M, obtained from AP-42 Table 13.2.4-1 for Various Limestone Products material from the Stone Quarrying and Processing industry.
- 4) Throughput based on 4000 lbs/yd³ of concrete and maximum production of 200,000 yd³ of concrete/year.

Emission Source: Fugitive Dust from Stockpiles (Wind)
Air Contaminant: Total PM
Calculation Method: USEPA Control of Open Fugitive Dust Sources -
4.1.3 Wind Emissions from Continuously Active Piles

Equation for total suspended particulate emissions from wind erosion on continuously active stockpiles:

$$E = 1.7 \left(\frac{s}{1.5} \right) \left(\frac{365 - p}{235} \right) \left(\frac{f}{15} \right)$$

where: E = particulate emission factor (in units of lb/d/acre),
 s = silt content of aggregate, percent
 p = number of days with ≥ 0.01 in. of precipitation per year
 f = percentage of time that the unobstructed wind speed exceeds 12 mph at the mean pile height

Assume:

s (%) (See Note 1)	p (days) (See Note 2)	f (%) (See Note 3)	Then: E (lb/day/acre)
3.9	123	30	9.1

Facility stockpile areas = 2.27 acres

Annual PM Emissions = E x Stockpile Area x 365 days/year
 = 7543 lbs/day

Annual PM Emissions = 3.8 tons/year

Annual PM10 = 1.8 tons/year (See Note 4)

Notes:

- 1) Silt content from AP-42 Table 13.2.4-1 Stone quarrying, various limestone products
- 2) From NOAA NEIC Precipitation Data for Detroit City Airport and Detroit Metropolitan Airport weather stations. Precipitation data used from 1/1/2008 through 12/31/2017.
- 3) Default value
- 4) Assume total PM = 2.1* PM10 content of emissions pursuant to AP-42 ratio for aggregate processing.

Potential-to-Emit Calculations

Emission Source: Concrete Production

Air Contaminant: Total PM

Calculation Method: AP-42 11.12-6 Plant Wide Emission Factors per Yard of Central Mix Concrete

Maximum annual concrete plant production: 200,000 yd³/yr

Process/Activity	Uncontrolled EF (lb PM/yd³ of concrete)	Annual Uncontrolled Emissions (tons/yr)	Controlled EF (lb PM/yd³ of concrete)	Annual Controlled Emissions (tons/yr)
Aggregate delivery to ground storage (SCC 3-05-011-21)	0.0064	0.64	0.0064	0.64
Sand delivery to ground storage (SCC 3-05-011-22)	0.0015	0.15	0.0015	0.15
Aggregate transfer to conveyor (SCC 3-05-011-23)	0.0064	0.64	0.0064	0.64
Sand transfer to conveyor (SCC 3-05-011-24)	0.0015	0.15	0.0015	0.15
Aggregate transfer to elevated storage (SCC 3-05-011-04)	0.0064	0.64	0.0064	0.64
Sand transfer to elevated storage (SCC 3-05-011-05)	0.0015	0.15	0.0015	0.15
Total Fugitive Emissions (tons/year)		2.4		2.37
Cement delivery to silo (SCC 3-05-011-07)	0.0002	0.02	0.0002	0.02
Cement supplement (<i>fly ash</i>) delivery to silo (SCC 3-05-011-17)	0.0003	0.03	0.0003	0.03
Cement supplement (<i>slag</i>) delivery to silo (SCC 3-05-011-17)	0.0003	0.03	0.0003	0.03
Weigh hopper loading (SCC 3-05-011-08)	0.0079	0.79	0.0079	0.79
Central Mix Loading ⁽²⁾ (SCC 3-05-011-09)	0.161	16.13	0.0052	0.5189
Total Point Source Emissions (tons/year)		17.0		1.39
Total (tons/year)		19.4		3.76

Notes:

1) EF = Emission Factor

2) Central mix loading of emission factor calculated based on AP-42 Table 11.12-2 and Equation 11.12-2.

Superior Jefferson PTE Calcs-0818

Superior Materials - Plant #32

Potential-to-Emit Calculations

Emission Source: JMT Silos

Air Contaminant: Total PM

Calculation Method: AP-42 11.12-2 Emission Factors for Concrete Batching

Maximum annual throughput: 6,000 tons fly ash
 14,000 tons cement

Process/Activity	Uncontrolled EF (lb PM/lb material loaded)	Annual Uncontrolled Emissions (lbs/yr)	Controlled EF (lb PM/yd³ of concrete)	Annual Controlled Emissions (tons/yr)
Cement delivery to silo (SCC 3-05-011-07)	0.0002	2.8	0.0002	2.8
Cement supplement (<i>fly ash</i>) delivery to silo (SCC 3-05-011-17)	0.0003	1.8	0.0003	1.8
Cement delivery to truck from silo ⁽²⁾	0.0002	2.8	0.0002	2.8
Cement supplement (<i>fly ash</i>) delivery to truck from silo ⁽²⁾	0.0003	1.8	0.0003	1.8
Total (lbs/year)		9.2		9.20
Total (tons/year)		0.005		0.005

Notes:

- 1) EF = Emission Factor
- 2) Material is pneumatically conveyed from silos to tanker trucks for delivery to concrete plants. Used materials delivery emission factors from AP 42 Table 11.12-2 for transfers to trucks.

