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MONTROSE
AIR QUALITY SERVICES

April 10, 2020

Permitting Division
Air Quality Program
City of Albuquerque
PO Box 1293
Albuquerque, NM 87103

Carina Munoz-Dyer:

Subject: Vital Consulting Group, LLC – 20.2.41 NMAC – Vital Consulting Group Portable Concrete Batch Plant Permit Application

Attached please find two copies and 2 DVDs of the Part 41 revised permit application package for Vital Consulting Group Portable Concrete Batch Plant.

The exact location of the facility will be 701 Atrisco Vista Blvd at UTM coordinates Zone 13, UTM Easting 335,830, UTM Northing 3,883,170, NAD 83. The attached copy contains the original signed permit application form along with the permit application fee. The original application fee check was $2,469 and attached is an additional check for $33 to account for the increase in application fees from 2019 and 2020.

Please let me know if you have questions or need additional information. I can be reached at (505) 830-9680 ext 6. The Vital Consulting Group, LLC contact is Vince Martinez who can be reached at (505) 369-0623.

Sincerely,

Paul Wade

Paul Wade
Senior Engineer

Cc Vince Martinez

Montrose Air Quality Services, LLC
3500 Comanche Road NE Suite G
Albuquerque, NM 87107-4546

T: 505.830.9680 ext. 6
F: 505.830.9678
Pwade@montrose-env.com
www.montrose-env.com

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20.11.41 NMAC "AUTHORITY-TO-CONSTRUCT" AIR QUALITY PERMIT APPLICATION

Albuquerque, New Mexico

PREPARED FOR
VITAL CONSULTING GROUP, LLC

REVISED APRIL 2020

Prepared by

Montrose Air Quality Services, LLC

MONTROSE
AIR QUALITY SERVICES

Introduction

Vital Consulting Group, LLC (VCG) is applying for a 20.11.41 NMAC Permit to operate a portable concrete batch plant within the county of Bernalillo, state of New Mexico. VCG has retained Montrose Air Quality Services (Montrose) to assist with the permit application. The new portable concrete batch plant (CBP) will be sited just south of the proposed Amazon Warehouse site during construction at 701 Atrisco Vista Blvd, in Bernalillo County, NM. The plant will be identified as VCG's Portable Concrete Batch Plant.

The proposed new plant is rated by the manufacturer at 270 cubic yards per hour. The VCG's Portable Concrete Batch Plant is a portable plant manufactured by RexCon, Model Mobile 12 SE and include four (4) aggregate feeders and transfer conveyors, 4-bin aggregate feeder, weight batcher with delivery conveyor, cement silo and guppies (2), fly ash silo and guppy, 12 yard central mixer, cement/fly ash batcher, central baghouse, a 500 kW diesel-fired generator to power the plant, concrete additive, and control trailer. The UTM coordinates of the proposed portable CBP will be; 335,830 easting, 3,883,170 northing, zone 13, NAD 83.

VCG will limit the hourly, daily, and annual portable CBP production to 270 cubic yards per hour, 2,160 cubic yards per day, and 500,000 cubic yards per year. Portable CBP operations will be recorded by the plant's data management system to show compliance with hourly, daily, and annual throughput limits. Particulate emissions will be controlled by baghouse for silo and guppy loading and unloading, cement/fly ash weigh batcher loading and unloading, and the central mixer. No malfunction for any baghouse is anticipated, but if a malfunction occurs the unit will be shut down until repairs are completed and any excess emissions emitted during the malfunction will be notified to the department per 20.11.90 NMAC. Material handling fugitive emissions will be controlled by the application of water, as needed.

A process flow diagram can be seen in Figure A-1. The portable CBP site layout and location can be seen in Figures A-2, A-3, and A-4, respectively. A facility location topographical and aerial maps can be seen in Attachment D.

The preliminary operational plan defining the measures to be taken to mitigate source emissions during malfunction, startup, or shutdown are as follows:

STARTUP AND SHUTDOWN PROCEDURES

Water Truck

Startup
Check water supply, inspect nozzles and open all associated valves before startup.

Shutdown
Inspect nozzles and close all associated valves after shutdown.

Baghouse

Startup
Visual inspection of: product lines, vent lines and all fittings, including dust shroud, baghouse blower before startup.

Shutdown
Check that all pressurized systems are off.

OPERATIONS PLAN

Water Truck Operation

A water truck to be operated, as needed, at plant site disturbed areas, storage piles, and haul truck traffic areas to prevent excess visible emissions. These activities include; unpaved haul roads, storage piles and active disturbed areas. Water spray application rate will be determined based on the occurrence of visible dust and may vary depending on existing road conditions, traffic, wind, temperature, and precipitation.

Baghouse Operation

The baghouse will be operated at all times when pertinent equipment is operating. A visual inspection of the baghouse exit during operation will be done once per day to make sure no excess visible emissions occur to verify the baghouse is operating correctly.

MAINTENANCE PLAN

Water Truck Maintenance

A safety check and equipment check will be conducted daily. Normal vehicle maintenance will be performed regularly or as needed.

Processing Plant Water Spray Dust Suppression Maintenance

Visual inspections will be made monthly to verify proper functioning of equipment. When emissions are suspected to approach compliance values, equipment will be checked for problems.

If you have any questions regarding this permit application please call Paul Wade of Montrose Air Quality Services at (505) 830-9680 x 6 or Vince Martinez of Vital Consulting Group LLC at (505) 369-0623.

The contents of this application packet include:

20.11.41 NMAC Permit Checklist
20.11.41 NMAC Permit Fee Review
20.11.41 NMAC Permit Application Forms
Attachment A: Figure A-1: Process Flow Diagram
Figure A-2: Facility Plant Layout
Figure A-3: Facility Site Layout
Figure A-4: Facility Site Overview including Amazon Project Site
Attachment B: Emission Calculations
Attachment C: Emission Calculations Background Data
Attachment D: Figure D-1: Topographical Site Location Map
Figure D-2: Aerial Site Location Map
Attachment F: Regulatory Applicability Determinations
Attachment G: Dispersion Modeling Summary and Report
Attachment H: Public Notice Documentation
Attachment I: Other Relevant Documentation

City of Albuquerque

Environmental Health Department
Air Quality Program

Permit Application Checklist

Any person seeking a permit under 20.11.41 NMAC, Authority-to-Construct Permits, shall do so by filing a written application with the Department. Prior to ruling a submitted application complete each application submitted shall contain the required items listed below. **This checklist must be returned with the application.**

Applications that are ruled incomplete because of missing information will delay any determination or the issuance of the permit. The Department reserves the right to request additional relevant information prior to ruling the application complete in accordance with 20.11.41 NMAC.

All applicants shall:

1. † Fill out and submit the *Pre-permit Application Meeting Request* form
   a. ☐ Attach a copy to this application

2. † Attend the pre-permit application meeting
   a. ☐ Attach a copy of the completed *Pre-permit Application Meeting Checklist* to this application

3. **X** Provide public notice to the appropriate parties
   a. X Attach a copy of the completed *Notice of Intent to Construct* form to this form
      i. Neighborhood Association(s): No identified neighborhood association

      ii. Coalition(s): _____

   b. ☐ Attach a copy of the completed *Public Sign Notice Guideline* form

4. Fill out and submit the *Permit Application*. All applications shall:

   A. X be made on a form provided by the Department. Additional text, tables, calculations or clarifying information may also be attached to the form.

   B. X at the time of application, include documentary proof that all applicable permit application review fees have been paid as required by 20 NMAC 11.02. Please refer to the attached permit application worksheet.

   C. X contain the applicant's name, address, and the names and addresses of all other owners or operators of the emission sources.

   D. X contain the name, address, and phone number of a person to contact regarding questions about the facility.

E. X indicate the date the application was completed and submitted

F. X contain the company name, which identifies this particular site.

G. X contain a written description of the facility and/or modification including all operations affecting air emissions.

H. X contain the maximum and standard operating schedules for the source after completion of construction or modification in terms of hours per day, days per week, and weeks per year.

I. X provide sufficient information to describe the quantities and nature of any regulated air contaminant (including any amount of a hazardous air pollutant) that the source will emit during:

- Normal operation
- Maximum operation
- Abnormal emissions from malfunction, start-up and shutdown

J. X include anticipated operational needs to allow for reasonable operational scenarios to avoid delays from needing additional permitting in the future.

K. X contain a map, such as a 7.5-minute USGS topographic quadrangle, showing the exact location of the source; and include physical address of the proposed source.

L. X contain an aerial photograph showing the proposed location of each process equipment unit involved in the proposed construction, modification, relocation, or technical revision of the source except for federal agencies or departments involved in national defense or national security as confirmed and agreed to by the department in writing.

M. X contain the UTM zone and UTM coordinates.

N. X include the four digit Standard Industrialized Code (SIC) and the North American Industrial Classification System (NAICS).

O. X contain the types and **potential emission rate** amounts of any regulated air contaminants the new source or modification will emit. Complete appropriate sections of the application; attachments can be used to supplement the application, but not replace it.

P. X contain the types and **controlled** amounts of any regulated air contaminants the new source or modification will emit. Complete appropriate sections of the application; attachments can be used to supplement the application, but not replace it.

Q. X contain the basis or source for each emission rate (include the manufacturer's specification sheets, AP-42 Section sheets, test data, or other data when used as the source).

R. X contain all calculations used to estimate **potential emission rate** and **controlled** emissions.

S. X contain the basis for the estimated control efficiencies and sufficient engineering data for verification of the control equipment operation, including if necessary, design drawings, test reports, and factors which affect the normal operation (e.g. limits to normal operation).

T. X contain fuel data for each existing and/or proposed piece of fuel burning equipment.

U. X contain the anticipated maximum production capacity of the entire facility and the requested production capacity after construction and/or modification.

V. X contain the stack and exhaust gas parameters for all existing and proposed emission stacks.

W. X provide an ambient impact analysis using a atmospheric dispersion model approved by the US Environmental Protection Agency (EPA), and the Department to demonstrate compliance with the ambient air quality standards for the City of Albuquerque and Bernalillo County (See 20.11.01 NMAC). If you are modifying an existing source, the modeling must include the emissions of the entire source to demonstrate the impact the new or modified source(s) will have on existing plant emissions.

X. X contain a preliminary operational plan defining the measures to be taken to mitigate source emissions during malfunction, startup, or shutdown.

Y. X contain a process flow sheet, including a material balance, of all components of the facility that would be involved in routine operations. Indicate all emission points, including fugitive points.

Z. X contain a full description, including all calculations and the basis for all control efficiencies presented, of the equipment to be used for air pollution control. This shall include a process flow sheet or, if the Department so requires, layout and assembly drawings, design plans, test reports and factors which affect the normal equipment operation, including control and/or process equipment operating limitations.

AA. ☐ contain description of the equipment or methods proposed by the applicant to be used for emission measurement.

BB. X be signed under oath or affirmation by a corporate officer, authorized to bind the company into legal agreements, certifying to the best of his or her knowledge the truth of all information submitted.

City of Albuquerque

Environmental Health Department
Air Quality Program

Permit Application Review Fee Checklist

Please completely fill out the information in each section. Incompleteness of this checklist may result in the Albuquerque Environmental Health Department not accepting the application review fees. If you should have any questions concerning this checklist, please call 768-1972.

I. COMPANY INFORMATION:

Company Name	Vital Consulting Group, LLC	
Company Address	5200 Oakland Ave. STE D, Albuquerque, NM 87113	
Facility Name	Vital Consulting Group, LLC Portable Concrete Batch Plant	
Facility Address	701 Atrisco Vista Blvd , Albuquerque, NM	
Contact Person	Vince Martinez	
Contact Person Phone Number	(505) 369-0623	
Are these application review fees for an existing permitted source located within the City of Albuquerque or Bernalillo County?	**Yes**	**No**
If yes, what is the permit number associated with this modification?	**Permit #**	
Is this application review fee for a Qualified Small Business as defined in 20.11.2 NMAC? (See Definition of Qualified Small Business on Page 4)	**Yes**	**No**

II. STATIONARY SOURCE APPLICATION REVIEW FEES:

If the application is for a new stationary source facility, please check all that apply. If this application is for a modification to an existing permit please see Section III.

Check All That Apply	Stationary Sources	Review Fee	Program Element
	Air Quality Notifications		
	AQN New Application	$573.00	2801
	AQN Technical Amendment	$313.00	2802
	AQN Transfer of a Prior Authorization	$313.00	2803
X	*Not Applicable*	*See Sections Below*	
	Stationary Source Review Fees (Not Based on Proposed Allowable Emission Rate)		
	Source Registration required by 20.11.40 NMAC	$ 584.00	2401
	A Stationary Source that requires a permit pursuant to 20.11.41 NMAC or other board regulations and are not subject to the below proposed allowable emission rates	$ 1,168.00	2301
X	*Not Applicable*	*See Sections Below*	
	Stationary Source Review Fees (Based on the Proposed Allowable Emission Rate for the single highest fee pollutant)		
	Proposed Allowable Emission Rate Equal to or greater than 1 tpy and less than 5 tpy	$876	2302
X	Proposed Allowable Emission Rate Equal to or greater than 5 tpy and less than 25 tpy	$1,752	2303
	Proposed Allowable Emission Rate Equal to or greater than 25 tpy and less than 50 tpy	$3,503	2304
	Proposed Allowable Emission Rate Equal to or greater than 50 tpy and less than 75 tpy	$5,255	2305
	Proposed Allowable Emission Rate Equal to or greater than 75 tpy and less than 100 tpy	$7,006	2306
	Proposed Allowable Emission Rate Equal to or greater than 100 tpy	$8,758	2307
	Not Applicable	*See Section Above*	

Federal Program Review Fees (In addition to the Stationary Source Application Review Fees above)			
	40 CFR 60 - "New Source Performance Standards" (NSPS)	$1,168	2308
	40 CFR 61 - "Emission Standards for Hazardous Air Pollutants (NESHAPs)	$1,168	2309
	40 CFR 63 - (NESHAPs) Promulgated Standards	$1,168	2310
	40 CFR 63 - (NESHAPs) Case-by-Case MACT Review	$11,677	2311
	20.11.61 NMAC, Prevention of Significant Deterioration (PSD) Permit	$5,838	2312
	20.11.60 NMAC, Non-Attainment Area Permit	$5,838	2313
X	*Not Applicable*	*Not Applicable*	

III. MODIFICATION TO EXISTING PERMIT APPLICATION REVIEW FEES:

If the permit application is for a modification to an existing permit, please check all that apply. If this application is for a new stationary source facility, please see Section II.

Check All That Apply	Modifications	Review Fee	Program Element
Modification Application Review Fees (Not Based on Proposed Allowable Emission Rate)			
	Proposed modification to an existing stationary source that requires a permit pursuant to 20.11.41 NMAC or other board regulations and are not subject to the below proposed allowable emission rates	$ 1,168.00	2321
X	*Not Applicable*	*See Sections Below*	
Modification Application Review Fees (Based on the Proposed Allowable Emission Rate for the single highest fee pollutant)			
	Proposed Allowable Emission Rate Equal to or greater than 1 tpy and less than 5 tpy	$876	2322
	Proposed Allowable Emission Rate Equal to or greater than 5 tpy and less than 25 tpy	$1,752	2323
	Proposed Allowable Emission Rate Equal to or greater than 25 tpy and less than 50 tpy	$3,503	2324
	Proposed Allowable Emission Rate Equal to or greater than 50 tpy and less than 75 tpy	$5,255	2325
	Proposed Allowable Emission Rate Equal to or greater than 75 tpy and less than 100 tpy	$7,006	2326
	Proposed Allowable Emission Rate Equal to or greater than 100 tpy	$8,758	2327
X	*Not Applicable*	*See Section Above*	
Major Modifications Review Fees (In addition to the Modification Application Review Fees above)			
	20.11.60 NMAC, Permitting in Non-Attainment Areas	$5,838	2333
	20.11.61 NMAC, Prevention of Significant Deterioration	$5,838	2334
X	*Not Applicable*	*Not Applicable*	
Federal Program Review Fees (This section applies only if a Federal Program Review is triggered by the proposed modification) (These fees are in addition to the Modification and Major Modification Application Review Fees above)			
	40 CFR 60 - "New Source Performance Standards" (NSPS)	$1,168	2328
	40 CFR 61 - "Emission Standards for Hazardous Air Pollutants (NESHAPs)	$1,168	2329
	40 CFR 63 - (NESHAPs) Promulgated Standards	$1,168	2330
	40 CFR 63 - (NESHAPs) Case-by-Case MACT Review	$11,677	2331
	20.11.61 NMAC, Prevention of Significant Deterioration (PSD) Permit	$5,838	2332
	20.11.60 NMAC, Non-Attainment Area Permit	$5,838	2333
X	*Not Applicable*	*Not Applicable*	

IV. ADMINISTRATIVE AND TECHNICAL REVISION APPLICATION REVIEW FEES:

If the permit application is for an administrative or technical revision of an existing permit issued pursuant to 20.11.41 NMAC, please check one that applies.

Check One	Revision Type	Review Fee	Program Element
	Administrative Revisions	$ 250.00	2340
	Technical Revisions	$ 500.00	2341
X	*Not Applicable*	*See Sections II, III or V*	

V. PORTABLE STATIONARY SOURCE RELOCATION FEES:

If the permit application is for a portable stationary source relocation of an existing permit, please check one that applies.

Check One	Portable Stationary Source Relocation Type	Review Fee	Program Element
	No New Air Dispersion Modeling Required	$ 500.00	2501
X	New Air Dispersion Modeling Required	$ 750.00	2502
	Not Applicable	*See Sections II, III or V*	

VI. Please submit a check or money order in the amount shown for the total application review fee.

Section Totals	Review Fee Amount
Section II Total	$1,752
Section III Total	$
Section IV Total	$
Section V Total	$750
Total Application Review Fee	**$2,502**

I, the undersigned, a responsible official of the applicant company, certify that to the best of my knowledge, the information stated on this checklist, give a true and complete representation of the permit application review fees which are being submitted. I also understand that an incorrect submittal of permit application reviews may cause an incompleteness determination of the submitted permit application and that the balance of the appropriate permit application review fees shall be paid in full prior to further processing of the application.

Signed this_____ day of _____ 20____

_____ _____

Print Name **Print Title**

_____

Signature

Definition of Qualified Small Business as defined in 20.11.2 NMAC:
"Qualified small business" means a business that meets all of the following requirements:

(1) a business that has 100 or fewer employees;
(2) a small business concern as defined by the federal Small Business Act;
(3) a source that emits less than 50 tons per year of any individual regulated air pollutant, or less than 75 tons per year of all regulated air pollutants combined; and
(4) a source that is not a major source or major stationary source.

Note: Beginning January 1, 2011, and every January 1 thereafter, an increase based on the consumer price index shall be added to the application review fees. The application review fees established in Subsection A through D of 20.11.2.18 NMAC shall be adjusted by an amount equal to the increase in the consumer price index for the immediately-preceding year. Application review fee adjustments equal to or greater than fifty cents ($0.50) shall be rounded up to the next highest whole dollar. Application review fee adjustments totaling less than fifty cents ($0.50) shall be rounded down to the next lowest whole dollar. The department shall post the application review fees on the city of Albuquerque environmental health department air quality program website.

IV. ADMINISTRATIVE AND TECHNICAL REVISION APPLICATION REVIEW FEES:

If the permit application is for an administrative or technical revision of an existing permit issued pursuant to 20.11.41 NMAC, please check one that applies.

Check One	Revision Type	Review Fee	Program Element
	Administrative Revisions	$ 250.00	2340
	Technical Revisions	$ 500.00	2341
X	*Not Applicable*	*See Sections II, III or V*	

V. PORTABLE STATIONARY SOURCE RELOCATION FEES:

If the permit application is for a portable stationary source relocation of an existing permit, please check one that applies.

Check One	Portable Stationary Source Relocation Type	Review Fee	Program Element
	No New Air Dispersion Modeling Required	$ 500.00	2501
X	New Air Dispersion Modeling Required	$ 750.00	2502
	Not Applicable	*See Sections II, III or V*	

VI. Please submit a check or money order in the amount shown for the total application review fee.

Section Totals	Review Fee Amount
Section II Total	$1,719
Section III Total	NA
Section IV Total	NA
Section V Total	$750
Total Application Review Fee	**$2,469**

I, the undersigned, a responsible official of the applicant company, certify that to the best of my knowledge, the information stated on this checklist, give a true and complete representation of the permit application review fees which are being submitted. I also understand that an incorrect submittal of permit application reviews may cause an incompleteness determination of the submitted permit application and that the balance of the appropriate permit application review fees shall be paid in full prior to further processing of the application.

Signed this 30th **day of** March **20**20

Vince Martinez
Print Name

President
Print Title

Signature

Definition of Qualified Small Business as defined in 20.11.2 NMAC:
"Qualified small business" means a business that meets all of the following requirements:

(1) a business that has 100 or fewer employees;
(2) a small business concern as defined by the federal Small Business Act;
(3) a source that emits less than 50 tons per year of any individual regulated air pollutant, or less than 75 tons per year of all regulated air pollutants combined; and
(4) a source that is not a major source or major stationary source.

Note: Beginning January 1, 2011, and every January 1 thereafter, an increase based on the consumer price index shall be added to the application review fees. The application review fees established in Subsection A through D of 20.11.2.18 NMAC shall be adjusted by an amount equal to the increase in the consumer price index for the immediately-preceding year. Application review fee adjustments equal to or greater than fifty cents ($0.50) shall be rounded up to the next highest whole dollar. Application review fee adjustments totaling less than fifty cents ($0.50) shall be rounded down to the next lowest whole dollar. The department shall post the application review fees on the city of Albuquerque environmental health department air quality program website.

Albuquerque Environmental Health Department - Air Quality Program
Please mail this application to **P.O. Box 1293, Albuquerque, NM 87103**
or hand deliver between 8:00am - 5:00pm Monday - Friday to:
3rd Floor, Suite 3023 - One Civic Plaza NW, Albuquerque, New Mexico 87103
(505) 768 – 1972 aqd@cabq.gov (505) 768 - 1977 (Fax)

Application for Air Pollutant Sources in Bernalillo County
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)

Clearly handwrite or type

Corporate Information
Submittal Date: 03/30/2020

1. Company Name: Vital Consulting Group, LLC

2. Street Address: 5200 Oakland Ave. STE D Zip: 87113

3. Company City: Albuquerque 4. Company State: New Mexico 5. Company Phone: (505) 369-0623 6. Company Fax: (505) 349-4640

7. Company Mailing Address: PO Box 94778, Albuquerque, NM Zip: 87199

8. Company Contact and Title: Vince Martinez, President, Managing Member 9. Phone: (505) 369-0623

10. E-mail: vincent martinez@vitalgrp.net

Stationary Source (Facility) Information: **[Provide a plot plan (legal description/drawing of facility property) with overlay sketch of facility processes; Location of emission points; Pollutant type and distances to property boundaries]**

1. Facility Name: Vital Consulting Group, LLC Portable Concrete Batch Plant 2. Street Address: 701 Atrisco Vista Blvd

3. City: Albuquerque 4. State: New Mexico 5. Facility Phone: (505) 908-8015 6. Facility Fax: (505) 349-4640

7. Facility Mailing Address (Local): PO Box 94778, Albuquerque, NM Zip: 87199

8. Latitude - Longitude or UTM Coordinates of Facility: 335830E; 3883170N, Zone 13, NAD83

9. Facility Contact and Title: Vince Martinez, Managing Member 10. Phone: (505) 369-0623 11. E-mail: vincent martinez@vitalgrp net

General Operation Information (if any further information request does not pertain to your facility, write N/A on the line or in the box)

1. Facility Type (description of your facility operations): Concrete Batch Plant

2. Standard Industrial Classification (SIC 4 digit #): 3273

3. North American Industry Classification System (NAICS Code #): 327320

4. Is facility currently operating in Bernalillo County. No If yes, date of original construction____/____/_____
   If no, planned startup is 06/01/2020

5. Is facility permanent No If no, give dates for requested temporary operation - from 06/01/2020 through 05/01/2021

6. Is facility process equipment new Yes If no, give actual or estimated manufacture or installation dates in the Process Equipment Table.

7. Is application for a modification, expansion, or reconstruction (altering process, or adding, or replacing process equipment, etc.) to an existing facility which will result in a change in emissions No. If yes, give the manufacture date of modified, added, or replacement equipment in the Process Equipment Table modification date column, or the operation changes to existing process/equipment which cause an emission increase.

8. Is facility operation (circle one) [Continuous Intermittent **Batch**]

9. Estimated % of production Jan-Mar 25% Apr-Jun 25% Jul-Sep 25% Oct-Dec 25%

10. Current or requested operating times of facility 24 hrs/day 7 days/wk 52 wks/yr 12 mos/yr

11. Production Limit of 270 cubic yards per hour, 2160 cubic yards per day, and 500,000 cubic yards per year.

12. Business hrs 24 Hours per Day

13. Will there be special or seasonal operating times other than shown above No If yes, explain

14. Raw materials processed: Aggregate, Sand, Cement, Fly Ash, Water, Additives

15. Saleable item(s) produced: Concrete

15. Permitting Action Being Requested

X New Permit ☐ Permit Modification Current Permit #: _____ ☐ Technical Permit Revision Current Permit #: _____ ☐ Administrative Permit Revision Current Permit #: _____

PROCESS EQUIPMENT TABLE

(Generator-Crusher-Screen-Conveyor-Boiler-Mixer-Spray Guns-Saws-Sander-Oven-Dryer-Furnace-Incinerator, etc.) Match the Process Equipment Units listed on this Table to the same numbered line if also listed on Emissions & Stack Table (page 6).

Process Equipment Unit	Manufacturer	Model #	Serial #	Manufacture Date	Installation Date	Modification Date	Size or Process Rate (Hp;kW;Btu;ft^3;lbs; tons;yd^3;etc.)	Fuel Type
1.Feeders (4)	RexCon	12 SE CM	TBD	2019	TBD	NA	405 TONS/HR. 750,000 TONS/YR.	
2. Transfer Conveyors (4)					TBD	NA	405 TONS/HR. 750,000 TONS/YR.	
3. 4- Bin Aggregate Feeder					TBD	NA	405 TONS/HR. 750,000 TONS/YR.	
4.Weigh Batcher with Delivery Conveyor					TBD	NA	405 TONS/HR. 750,000 TONS/YR.	
5. Central Mixer with Central Dust Collector					TBD	NA	270 YDS/HR. 500,000 YDS/YR.	
6.Cement Silo and Guppies (2) with Central Dust Collector					TBD	NA	Cement 66.015 TONS/HR. 122,250 TONS/YR.	
7. Fly Ash Silo and Guppy with Central Dust Collector					TBD	NA	Fly Ash 17.82 TONS/HR. 33,000 TONS/YR.	
8.Cement/ Fly Ash Batcher with Central Dust Collector					TBD	NA	83.835 TONS/HR. 155,250 TONS/YR.	
9.CBP Engine (Plant Engine)	CAT	C15	TBD	TBD	TBD	NA	779 HP	Ultra-Low Sulfur Diesel
10. Aggregate/Sand Storage Piles	NA	NA	NA	NA	TBD	NA	405 TONS/HR. 750,000 TONS/YR.	
11. Haul Roads	NA	NA	NA	NA	TBD	NA	42 TRUCK/HR. 77,877 TRUCK/YEAR.	

1. Basis for Equipment Size or Process Rate (Manufacturers data, Field Observation/Test, etc.) Manufacture Data
   Submit information for each unit as an attachment

NOTE: Copy this table if additional space is needed (begin numbering with 16., 17., etc.)

TABLE EXEMPTED SOURCES AND EXEMPTED ACTIVITIES

(Generator-Crusher-Screen-Conveyor-Boiler-Mixer-Spray Guns-Saws-Sander-Oven-Dryer-Furnace-Incinerator, etc.) Match the Process Equipment Units listed on this Table to the same numbered line if also listed on Emissions & Stack Table (page 6).

Process Equipment Unit	Manufacturer	Model #	Serial #	Manufacture Date	Installation Date	Modification Date	Size or Process Rate (Hp;kW;Btu;ft^3;lbs; tons;yd^3;etc.)	Fuel Type
1.							HR. YR.	
2.							HR. YR.	
3.							HR. YR.	
4.							HR. YR.	
5.							HR. YR.	
6.							HR. YR.	
7.							HR. YR.	
8.							HR. YR.	
9.							HR. YR.	
10.							HR. YR.	
11.							HR. YR.	
12.							HR. YR.	
13.							HR. YR.	
14.							HR. YR.	
15.							HR. YR.	

1. Basis for Equipment Size or Process Rate (Manufacturers data, Field Observation/Test, etc.)_____
   Submit information for each unit as an attachment

NOTE: Copy this table if additional space is needed (begin numbering with 16., 17., etc.)

Application for Air Pollutant Sources in Bernalillo County
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)

UNCONTROLLED EMISSIONS OF INDIVIDUAL AND COMBINED PROCESSES

(Process potential under physical/operational limitations during a 24 hr/day and 365 day/year = 8,760 hrs)

Process Equipment Unit*	Carbon Monoxide (CO)	Oxides of Nitrogen (NOx)	Nonmethane Hydrocarbons NMHC (VOCs)	Oxides of Sulfur (SOx)	Total Suspended Particulate Matter (TSP)	Method(s) used for Determination of Emissions (AP-42, Material balance, field tests, manufacturers data, etc.)
1. Feeders (4)	1. lbs/hr	lbs/hr	lbs/hr	lbs/hr	1 29 lbs/hr	AP-42 13.2.4
	1a. tons/yr	tons/yr	tons/yr	tons/yr	5.65 tons/yr	
2. Feeder Transfer Conveyors (4)	2. lbs/hr	lbs/hr	lbs/hr	lbs/hr	1 22 lbs/hr	AP-42 11.19.2 Table 11 19.2-2 "Conveyor Transfer Point"
	2a. tons/yr	tons/yr	tons/yr	tons/yr	5 32 tons/yr	
3. Aggregate Bin (4 bins)	3. lbs/hr	lbs/hr	lbs/hr	lbs/hr	1 29 lbs/hr	AP-42 13.2.4
	3a. tons/yr	tons/yr	tons/yr	tons/yr	5.65 tons/yr	
4. Aggregate Weigh Batcher and Conveyor	4. lbs/hr	lbs/hr	lbs/hr	lbs/hr	1 22 lbs/hr	AP-42 11.19.2 Table 11 19.2-2 "Conveyor Transfer Point"
	4a. tons/yr	tons/yr	tons/yr	tons/yr	5 32 tons/yr	
5. Central Mixer	5. lbs/hr	lbs/hr	lbs/hr	lbs/hr	48.0 lbs/hr	AP-42 Section 11.12 "Concrete Batching" Table 11.12-2 "Uncontrolled Mixer Loading"
	5a. tons/yr	tons/yr	tons/yr	tons/yr	210 tons/yr	
6. Cement Silo with Guppy	6. lbs/hr	lbs/hr	lbs/hr	lbs/hr	48.0 lbs/hr	AP-42 Section 11.12 "Concrete Batching" Table 11.12-2 "Cement Unloading to Elevated Storage Silo"
	6a. tons/yr	tons/yr	tons/yr	tons/yr	210 tons/yr	
7. Fly Ash Silo with Guppy	7. lbs/hr	lbs/hr	lbs/hr	lbs/hr	56.0 lbs/hr	AP-42 Section 11.12 "Concrete Batching" Table 11.12-2 "Cement Supplement Unloading to Elevated Storage Silo"
	7a. tons/yr	tons/yr	tons/yr	tons/yr	245 tons/yr	
8. Cement/Fly Ash Batcher	8. lbs/hr	lbs/hr	lbs/hr	lbs/hr	48.0 lbs/hr	AP-42 Section 11.12 "Concrete Batching" Table 11.12-2 "Uncontrolled Mixer Loading"
	8a. tons/yr	tons/yr	tons/yr	tons/yr	210 tons/yr	
9. Concrete Bath Plant Generator/Engine	9. 0.94 lbs/hr	5.27 lbs/hr	0.060 lbs/hr	0.0075 lbs/hr	0 15 lbs/hr	Manufacturer's Data
	9a. 4.12 tons/yr	23.1 tons/yr	0.26 tons/yr	0.033 tons/yr	0.66 tons/yr	
10. Aggregate Storage Piles	10. lbs/hr	lbs/hr	lbs/hr	lbs/hr	1.69 lbs/hr	AP-42 13.2.4
	10a. tons/yr	tons/yr	tons/yr	tons/yr	7 39 tons/yr	
11. Haul Roads	11. lbs/hr	lbs/hr	lbs/hr	lbs/hr	85.6 lbs/hr	AP-42 13.2 Unpaved Road (12/03)
	11a. tons/yr	tons/yr	tons/yr	tons/yr	313 3 tons/yr	
Totals of Uncontrolled Emissions (1 - 11)	0.94 lbs/hr	5.27 lbs/hr	0.060 lbs/hr	0.0075 lbs/hr	293 lbs/hr	
	4.12 tons/yr	23.1 tons/yr	0.26 tons/yr	0.033 tons/yr	1220 tons/yr	

*** If any one (1) of these process units, <u>or</u> combination of units, has an uncontrolled emission greater than (>) 10 lbs/hr or 25 tons/yr for any of the above pollutants (based on 8760 hrs of operation), then a permit will be required. Complete this application along with additional checklist information requested on accompanying instruction sheet. <u>Copy this Table if additional space is needed (begin numbering with 11., 12., etc.)</u>**

*** If all of these process units, individually <u>and</u> in combination, have an uncontrolled emission less than or equal to (≤) 10 lbs/hr or 25 tons/yr for all of the above pollutants (based on 8760 hrs of operation), but > 1 ton/yr for any of the above pollutants - then a source registration is required.**

<u>If your facility does not require a registration or permit, based on above emissions, complete the remainder of this application to determine if a registration or permit would be required for Toxic or Hazardous air pollutants used at your facility.</u>

CONTROLLED EMISSIONS OF INDIVIDUAL AND COMBINED PROCESSES

(Based on current operations with emission controls OR requested operations with emission controls)

Process Equipment Units listed on this Table should match up to the same numbered line and Unit as listed on Uncontrolled Table (pg. 3)

Process Equipment Unit	Carbon Monoxide (CO)	Oxides of Nitrogen (NOx)	Nonmethane Hydrocarbons NMHC (VOCs)	Oxides of Sulfur (SOx)	Total Suspended Particulate Matter (TSP)	Control Method	% Efficiency
1. Feeders (4)	1. lbs/hr	lbs/hr	lbs/hr	lbs/hr	1 29 lbs/hr	None	0.0
	1a. tons/yr	tons/yr	tons/yr	tons/yr	1 19 tons/yr		
2. Feeder Transfer Conveyors (4)	2. lbs/hr	lbs/hr	lbs/hr	lbs/hr	0.057 lbs/hr	Moisture Content	95.3
	2a. tons/yr	tons/yr	tons/yr	tons/yr	0.053 tons/yr		
3. Aggregate Bin (4 bins)	3. lbs/hr	lbs/hr	lbs/hr	lbs/hr	1 29 lbs/hr	None	0.0
	3a. tons/yr	tons/yr	tons/yr	tons/yr	1 19 tons/yr		
4. Aggregate Weigh Batcher and Conveyor	4. lbs/hr	lbs/hr	lbs/hr	lbs/hr	0.057 lbs/hr	Moisture Content	95.3
	4a. tons/yr	tons/yr	tons/yr	tons/yr	0.053 tons/yr		
5. Central Mixer	5, 6, 7, 8. lbs/hr	lbs/hr	lbs/hr	lbs/hr	0 20 lbs/hr	Dust Collector	>99.9
6. Cement Silo with Guppy						Dust Collector	
7. Fly Ash Silo with Guppy	5, 6, 7, 8a. tons/yr	tons/yr	tons/yr	tons/yr	0 19 tons/yr	Dust Collector	
8. Cement/Fly Ash Batcher						Dust Collector	
9. Concrete Bath Plant Generator/Engine	9. 0.94 lbs/hr	5.27 lbs/hr	0.060 lbs/hr	0.0075 lbs/hr	0 15 lbs/hr	None	0.0
	9a. 2.35 tons/yr	13.2 tons/yr	0.15 tons/yr	0.019 tons/yr	0 38 tons/yr		
10. Aggregate Storage Piles	10. lbs/hr	lbs/hr	lbs/hr	lbs/hr	1.69 lbs/hr	None	0.0
	10a. tons/yr	tons/yr	tons/yr	tons/yr	1 56 tons/yr		
11. Haul Roads	11. lbs/hr	lbs/hr	lbs/hr	lbs/hr	8 56 lbs/hr	Surface Stabilizers and Watering	90.0
	11a. tons/yr	tons/yr	tons/yr	tons/yr	6.62 tons/yr		
Totals of Controlled Emissions (1 - 11)	0.94 lbs/hr	5.27 lbs/hr	0.060 lbs/hr	0.0075 lbs/hr	13.29 lbs/hr		
	2.35 tons/yr	13.2 tons/yr	0.15 tons/yr	0.019 tons/yr	11.24 tons/yr		

1. Basis for Control Equipment % Efficiency (Manufacturers data, Field Observation/Test, AP-42, etc.) Manufacturers data – 5, 6, 7, 8; Field Observation – Unpaved Roads; AP-42 – 2, 4 Submit information for each unit as an attachment

2. Explain and give estimated amounts of any Fugitive Emission associated with facility processes

NOTE: **Copy this table if additional space is needed (begin numbering with 16., 17., etc.)**

**TOXIC EMISSIONS

VOLATILE, HAZARDOUS, & VOLATILE HAZARDOUS AIR POLLUTANT EMISSION TABLE

Product Categories (Coatings, Solvents, Thinners, etc.)	Volatile Organic Compound (VOC), Hazardous Air Pollutant (HAP), or Volatile Hazardous Air Pollutant (VHAP) Primary To The Representative As Purchased Product	Chemical Abstract Service Number (CAS) Of VOC, HAP, Or VHAP From Representative As Purchased Product	VOC, HAP, Or VHAP Concentration Of Representative As Purchased Product (pounds/gallon, or %)	1. How were Concentrations Determined (CPDS, MSDS, etc.)	Total Product Purchases For Category	(-)	Quantity Of Product Recovered & Disposed For Category	(=)	Total Product Usage For Category
I. NA					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr
II.					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr
III.					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr
IV.					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr
V.					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr
VI.					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr
VII.					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr
VIII.					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr
IX.					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr
X.					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr
TOTAL >>>>>>>					lbs/yr gal/yr	(-)	lbs/yr gal/yr	(=)	lbs/yr gal/yr

1. Basis for percent (%) determinations (Certified Product Data Sheets, Material Safety Data Sheets, etc.). Submit, as an attachment, information on one (1) product from each Category listed above which best represents the average of all the products purchased in that Category. Copy this Table if additional space is needed (begin numbering with XI., XII., etc.)

****NOTE: A REGISTRATION IS REQUIRED, AT MINIMUM, FOR ANY AMOUNT OF HAP OR VHAP EMISSION.**
A PERMIT MAY BE REQUIRED FOR THESE EMISSIONS, DETERMINED ON A CASE-BY-CASE EVALUATION.

Application for Air Pollutant Sources in Bernalillo County
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)

MATERIAL AND FUEL STORAGE TABLE

(Tanks, barrels, silos, stockpiles, etc.) Copy this table if additional space is needed (begin numbering with 6., 7., etc.)

Storage Equipment	Product Stored	Capacity (bbls - tons gal - acres,etc)	Above or Below Ground	Construction (welded, riveted) & Color	Install Date	Loading Rate	Offloading Rate	True Vapor Pressure	Control Equipment	Seal Type	% Eff.
1. Aggregate Pile	Aggregate	1 Acre	Above	NA	TBD	256.2 TONS/HR. 475,000 TONS/YR.	256.2 TONS/HR. 475,000 TONS/YR.	Psia	None		0.0
2. Sand pile	Washed Sand	1 Acre	Above	NA	TBD	148.5 TONS/HR. 275,000 TONS/YR.	148.5 TONS/HR. 275,000 TONS/YR.	Psia	None		0.0
3. Cement Silo/Guppy	Cement	100 tons	Above	NA	TBD	25 TONS/HR. 122,250 TONS/YR.	66.0 TONS/HR. 122,250 TONS/YR.	Psia	Dust Collector		>99.9
4. Fly Ash Silo/Guppy	Fly Ash	100 tons	Above	NA	TBD	25 TONS/HR. 33,000 TONS/YR.	17.8 TONS/HR. 33,000 TONS/YR.	Psia	Dust Collector		>99.9

1. Basis for Loading/Offloading Rate (Manufacturers data, Field Observation/Test, etc.) Submit information for each unit as an attachment
Field Observation – 1, 2

2. Basis for Control Equipment % Efficiency (Manufacturers data, Field Observation/Test, AP-42, etc.) Submit information for each unit as an attachment
Manufacturers data – 3, 4

Application for Air Pollutant Sources in Bernalillo County
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)

STACK AND EMISSION MEASUREMENT TABLE

If any equipment from the Process Equipment Table (Page 2) is also listed in this Stack Table, use the same numbered line for the Process Equipment unit on both Tables to show the association between the Process Equipment and its Stack. Copy this table if additional space is needed (begin numbering with 6., 7., etc.).

Process Equipment	Pollutant (CO,NOx,TSP, Toluene,etc)	Control Equipment	Control Efficiency	Stack Height & Diameter in feet	Stack Temp.	Stack Velocity & Exit Direction	Emission Measurement Equipment Type	Range-Sensitivity-Accuracy-
5, 6, 7, 8. Central Dust Collector	PM	Dust Collector	>99.9	Height – 8 feet Diameter – 2.329 feet	Ambient	Velocity – 45 ft/sec Direction - Horizontal	None	None
9. Concrete Batch Plant Engine	PM, CO, NOx, VOC, SO2	None	0.0	Height – 12 feet Diameter – 0.67 feet	911.7° F	Velocity – 151.5 ft/sec Direction - Vertical	None	None
3.								
4.								

1. Basis for Control Equipment % Efficiency (Manufacturers data, Field Observation/Test,AP-42, etc.) Submit information for each unit as an attachment
Manufacturers data – 5, 6, 7, 8

I, the undersigned, a responsible officer of the applicant company, certify that to the best of my knowledge, the information stated on this application, together with associated drawings, specifications, and other data, give a true and complete representation of the existing, modified existing, or planned new stationary source with respect to air pollution sources and control equipment. I also understand that any significant omissions, errors, or misrepresentations in these data will be cause for revocation of part or all of the resulting registration or permit.

Signed this 30th day of March, 2020

Vince Martinez
Print Name

President / Managing Member
Print Title

Signature

Attachment A
Facility Plot Plan

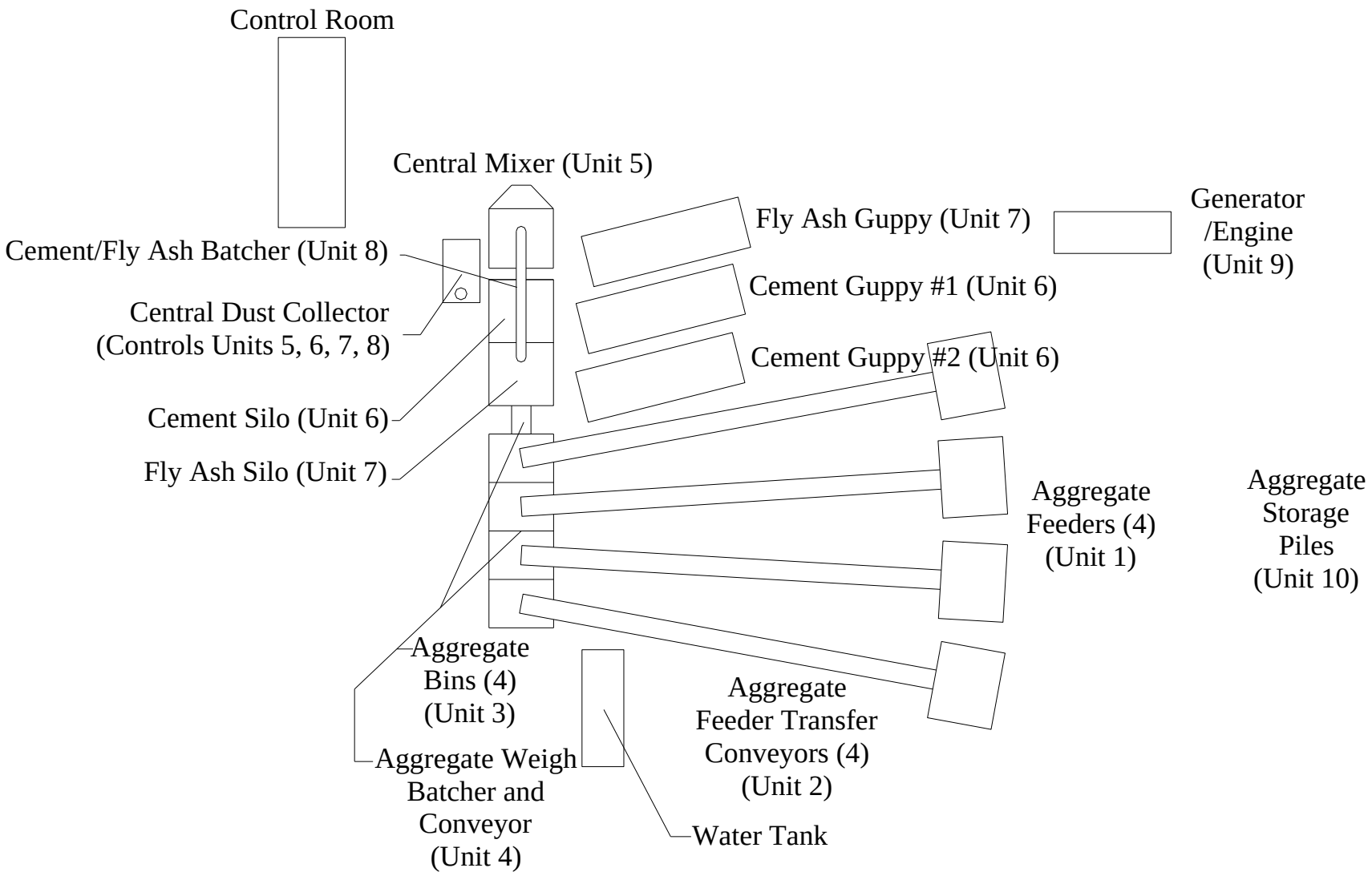

Figure A-1: VCG's Portable Concrete Batch Plant Process Flow

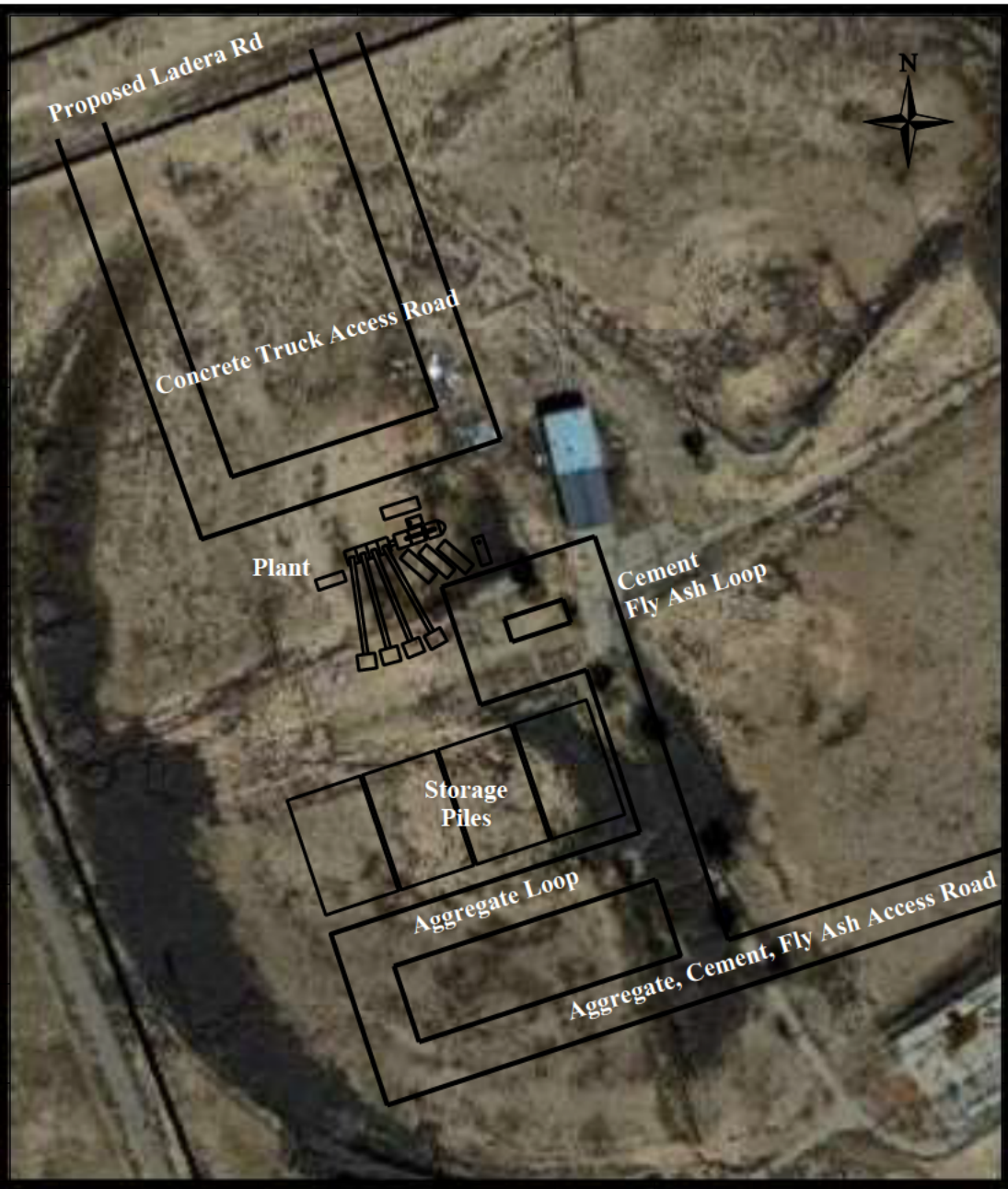

Figure A-2: VCG's Portable Concrete Batch Plant Layout

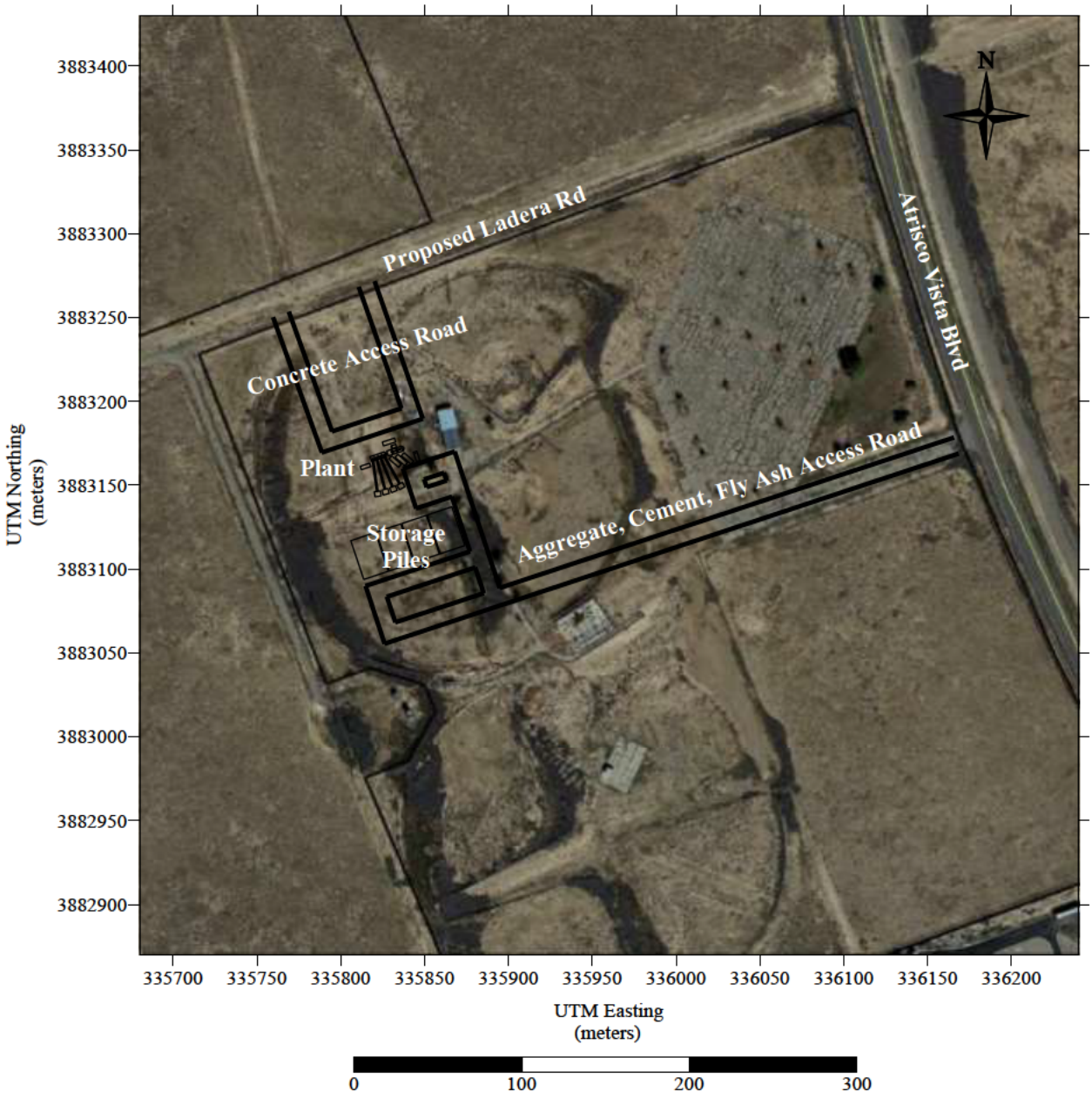

Figure A-3: VCG's Portable Concrete Batch Plant Site Layout

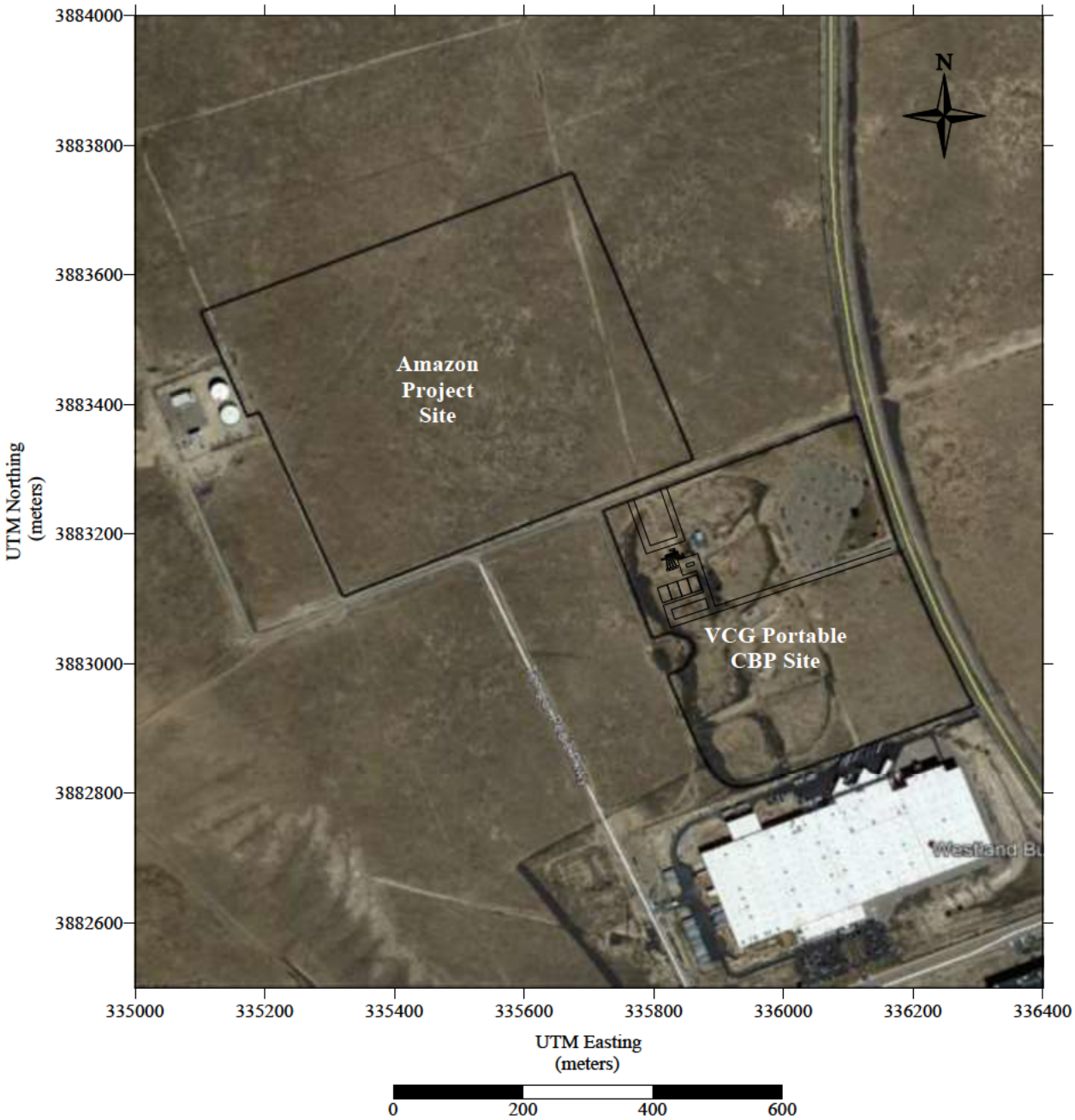

Figure A-4: VCG's Portable Concrete Batch Plant Site Location including Amazon Project Site

Attachment B
Emissions Calculations

1.0 Pre-Control Particulate Emission Rates

Estimates for Pre-Control Material Handling ($PM_{2.5}$, PM_{10} and TSP)

Typical composition of one cubic yard of concrete produced at the Portable Concrete Batch Plant will be:

Concrete Design Mix for One Cubic Yard

Materials	Weight Per Cubic Yard (in lbs)	Weights Per 270 Cubic Yards (in ton)
Cement	489	66.0
Fly Ash	132	17.8
Water	260	35.1
Coarse Aggregate(gravel)	1900	256.5
Fine Aggregate (sand)	1100	148.5
Total	3881	523.9

Hourly raw material throughputs used in material handling emission equations are based on the tons per hour throughput.

Aggregate/Sand = 405 tons/hour
Cement = 66.02 tons/hour
Fly Ash = 17.82 tons/hour

To estimate material handling pre-control particulate emission rates for aggregate handling operations (loading storage piles, loading feed hopper, aggregate bin loading), an emission equation was obtained from EPA's Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, Fifth Edition, Section 13.2.4 (1/1995), where the k is a constant (TSP = 0.74, PM10 = 0.35, PM2.5 = 0.053), wind speed is the Albuquerque 1996 – 2006 wind speed of 8.5 mph, and a moisture content for the aggregate of 1.77% and sand of 4.17% (AP-42 Section 11.12, Table 11.12-2, Footnote b). The normalized moisture content for sand and aggregate is 2.65%. To estimate pre-control particulate emissions rates for aggregate handling transfer points (unloading of the feeder, unloading the aggregate weigh batcher), emission factors were obtained from AP-42 Section 11.19.2, Table 11.19.2-2, "Conveyor Transfer Point". Uncontrolled PM2.5 emission rate is based on the PM2.5/PM10 k factor of 0.053/0.35 found in AP-42 Section 13.2.4 multiplied by the PM10 emission factor of 0.0110 lbs/ton. To estimate pre-control particulate emission rates for silo and guppy loading, cement/fly ash batcher loading operations, and concrete mixer truck loading,

emission equations were obtained from EPA's Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, Fifth Edition, Section 11.12 (06/06), Table 11.12-2. $PM_{2.5}$ emission factors for cement/fly ash batcher and concrete central mixer emissions were determined using the ratio of $PM_{2.5}/PM_{10}$ *k* factors in AP-42 Section 11.12, Table 11.12-4 (0.38/1.92 or 0.19792) and the PM_{10} central mixer emission factor in AP-42 Section 11.12, Table 11.12-2. $PM_{2.5}$ emission factors for silo dust collector were determined using the ratio of $PM_{2\ 5}/PM_{10}$ *k* factors in AP-42 Section 11.12, Table 11.12-4 (0.38/1.92 or 0.19792) and the PM_{10} silo emission factors (cement and cement supplement) in AP-42 Section 11.12, Table 11.12-2. Maximum rated material throughput is 270 cubic yards per hour. Annual uncontrolled emissions in tons per year (tpy) were calculated assuming operation for 8760 hours per year.

EPA's AP-42, Section 13.2-4 (01/95)

Aggregate Handling Emission Equation

E (lbs/ton) = k x 0.0032 x $(U/5)^{1.3}$ / $(M/2)^{1.4}$

E_{TSP} (lbs/ton) = 0.74 x 0.0032 x $(8.5/5)^{1.3}$ / $(1.77/2)^{1.4}$

E_{PM10} (lbs/ton) = 0.35 x 0.0032 x $(8.5/5)^{1.3}$ / $(1.77/2)^{1.4}$

$E_{PM2.5}$ (lbs/ton) = 0.0.053 x 0.0032 x $(8.5/5)^{1.3}$ / $(1.77/2)^{1.4}$

E_{TSP} = 0.00560 lbs/ton; E_{PM10} = 0.00265 lbs/ton; $E_{PM2.5}$ = 0.00040 lbs/ton

Sand Handling Emission Equation

E (lbs/ton) = k x 0.0032 x $(U/5)^{1.3}$ / $(M/2)^{1.4}$

E_{TSP} (lbs/ton) = 0.74 x 0.0032 x $(8.5/5)^{1.3}$ / $(4.17/2)^{1.4}$

E_{PM10} (lbs/ton) = 0.35 x 0.0032 x $(8.5/5)^{1.3}$ / $(4.17/2)^{1.4}$

$E_{PM2.5}$ (lbs/ton) = 0.0.053 x 0.0032 x $(8.5/5)^{1.3}$ / $(4.17/2)^{1.4}$

E_{TSP} = 0.00169 lbs/ton; E_{PM10} = 0.00080 lbs/ton; $E_{PM2.5}$ = 0.00012 lbs/ton

Aggregate/Sand Handling Emission Equation

E (lbs/ton) = k x 0.0032 x $(U/5)^{1.3}$ / $(M/2)^{1.4}$

E_{TSP} (lbs/ton) = 0.74 x 0.0032 x $(8.5/5)^{1.3}$ / $(2.65/2)^{1.4}$

E_{PM10} (lbs/ton) = 0.35 x 0.0032 x $(8.5/5)^{1.3}$ / $(2.65/2)^{1.4}$

$E_{PM2.5}$ (lbs/ton) = 0.0.053 x 0.0032 x $(8.5/5)^{1.3}$ / $(2.65/2)^{1.4}$

E_{TSP} = 0.00318 lbs/ton; E_{PM10} = 0.00151 lbs/ton; $E_{PM2.5}$ = 0.00023 lbs/ton

EPA's AP-42, Section 11.19.2-2 (08/04)

Conveyor Transfer Emission Factor

E_{TSP} = 0.0030 lbs/ton; E_{PM10} = 0.00110 lbs/ton; $E_{PM2.5}$ = 0.000167 lbs/ton

EPA's AP-42, Section 11.12 (06/06), Table 11.12-2

Cement Silo Loading Emission Factor

E_{TSP} = 0.73 lbs/ton; E_{PM10} = 0.47 lbs/ton; $E_{PM2.5}$ = 0.093 lbs/ton

Fly Ash Silo Loading Emission Factor

E_{TSP} = 3.14 lbs/ton; E_{PM10} = 1.10 lbs/ton; $E_{PM2.5}$ = 0.218 lbs/ton

Cement/Fly Ash Batcher Loading Emission Factor

E_{TSP} = 0.572 lbs/ton; E_{PM10} = 0.156 lbs/ton; $E_{PM2.5}$ = 0.0309 lbs/ton

Concrete Central Mixer Emission Factor

E_{TSP} = 0.572 lbs/ton; E_{PM10} = 0.156 lbs/ton; $E_{PM2.5}$ = 0.0309 lbs/ton

Emission Factors:

Process Unit	PM2.5 Emission Factor (lbs/ton)	PM10 Emission Factor (lbs/ton)	TSP Emission Factor (lbs/ton)
Aggregate Material Handling	0.00040	0.00265	0.00560
Sand Material Handling	0.00012	0.00080	0.00169
Aggregate/Sand Material Handling	0.00023	0.00151	0.00318
Aggregate Transfer Points	0.000167	0.00110	0.0030
Cement Silo Loading	0.093	0.47	0.73
Fly Ash Silo Loading	0.218	1.10	3.14
Cement/Fly Ash Batcher	0.0309	0.156	0.572
Central Mixer	0.0309	0.156	0.572

The following equations were used to calculate the hourly emission rate for each process unit:

Emission Rate (lbs/hour) = Process Rate (tons/hour) * Emission Factor (lbs/ton)

The following equations was used to calculate the annual emission rate for each process unit:

$$\text{Emission Rate (tons/year)} = \frac{\text{Emission Rate (lbs/hour)} * \text{Operating Hour (hrs/year)}}{\text{2000 lbs/ton}}$$

Table B-1: Pre-Controlled Material Handling Particulate Emissions (PER)

Process Unit #	Process Unit Description	Process Rate (tph)	TSP Emission Rate (lbs/hr)	TSP Emission Rate (tons/yr)	PM_{10} Emission Rate (lbs/hr)	PM_{10} Emission Rate (tons/yr)	$PM_{2.5}$ Emission Rate (lbs/hr)	$PM_{2.5}$ Emission Rate (tons/yr)
1a	Aggregate/Sand Feeder Loading	101.25	0.32	1.41	0.15	0.67	0.023	0.10
1b	Aggregate/Sand Feeder Loading	101.25	0.32	1.41	0.15	0.67	0.023	0.10
1c	Aggregate/Sand Feeder Loading	101.25	0.32	1.41	0.15	0.67	0.023	0.10
1d	Aggregate/Sand Feeder Loading	101.25	0.32	1.41	0.15	0.67	0.023	0.10
2a	Transfer Conveyor	101.25	0.30	1.33	0.11	0.49	0.017	0.074
2b	Transfer Conveyor	101.25	0.30	1.33	0.11	0.49	0.017	0.074
2c	Transfer Conveyor	101.25	0.30	1.33	0.11	0.49	0.017	0.074
2d	Transfer Conveyor	101.25	0.30	1.33	0.11	0.49	0.017	0.074
3	4-Bin Aggregate Feeder	405	1.29	5.65	0.61	2.67	0.092	0.40
4	Aggregate Batcher and Conveyor	405	1.22	5.32	0.45	1.95	0.067	0.30
5	Central Mixer	83.84[(1)]	48.0	210	13.1	57	2.59	11.3
6	Cement Loading	66.015	48.2	211	31.0	136	6.14	26.9
7	Fly Ash Loading	17.82	56.0	245	19.6	86	3.88	17.0
8	Cement/Fly Ash Batcher	83.84[(1)]	48.0	210	13.1	57	2.59	11.3
10	Aggregate Pile Loading	330	1.69	7.39	0.80	3.50	0.12	0.53
		TOTALS	**207**	**906**	**80**	**349**	**16**	**68**

[(1)] Combined Cement and Fly Ash hourly usage.

Haul Truck Travel

Haul truck travel emissions were estimated using AP-42, Section 13.2.2 (ver.11/06) "Unpaved Roads" emission equation. Haul trucks will be used to deliver cement, fly ash, aggregate material, and transport concrete product. The following summarizes the haul road uncontrolled particulate emission rate.

$$E = k*(s/12)^a*(W/3)^b*[(365-p)/365]*VMT$$

Where k = constant TSP = 4.9
PM10 = 1.5
PM2.5 = 0.15
s = % silt content (Table 13.2.2-1, "Sand and Gravel" 4.8%)
W = mean vehicle weight (27.5 tons per truck)
W = mean concrete truck weight (25 tons)
p = number of days with at least 0.01 in of precip. (Figure 13.2.2-1= 60 days)
(used only for annual emission calculations)
a = Constant TSP = 0.7
PM10 = 0.9
PM2.5 = 0.9
b = Constant TSP = 0.45
PM10 = 0.45
PM2.5 = 0.45
VMT = Aggregate Vehicle Miles Traveled
(roundtrip = 0.47563 miles)
VMT = Cement, Fly Ash Vehicle Miles Traveled
(roundtrip = 0.49516 miles)
VMT = Concrete Vehicle Miles Traveled
(roundtrip = 0.13346 miles)

Cement Trucks = 2.6 trucks/hr; 1.30751 miles/hr
Fly Ash Trucks = 0.7 trucks/hr; 0.35295 miles/hr
Aggregate Trucks = 16.2 trucks/hr; 7.70521 miles/hr
Concrete Trucks = 22.5 trucks/hr; 3.00283 miles/hr

Delivery Trucks Lbs/VMT = 6.99251 lbs/VMT TSP; 1.78213 lbs/VMT PM10; 0.178213 lbs/VMT PM2.5
Concrete Trucks Lbs/VMT = 6.69895 lbs/VMT TSP; 1.70732 lbs/VMT PM10; 0.170732 lbs/VMT PM2.5

	TSP Uncontrolled			
Max. Truck Emissions Road	85.6	lbs/hr	313.3	tons/yr
	PM10 Uncontrolled			
	21.8	lbs/hr	79.9	tons/yr
	PM2.5 Uncontrolled			
	2.18	lbs/hr	7.99	tons/yr

2.0 Estimates for Controlled Material Handling Air Pollutants ($PM_{2.5}$, PM_{10}, and TSP) (PTE)

To estimate material handling control particulate emission rates for aggregate handling operations (loading storage piles, loading feed hopper, aggregate bin loading), an emission equation was obtained from EPA's Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, Fifth Edition, Section 13.2.4 (1/1995), where the k is a constant (TSP = 0.74, PM10 = 0.35, PM2.5 = 0.053), wind speed is the Albuquerque 1996 – 2006 wind speed of 8.5 mph, and a moisture content for the aggregate of 1.77% and sand of 4.17% (AP-42 Section 11.12, Table 11.12-2, Footnote b). The normalized moisture content for sand and aggregate is 2.65%. To estimate control particulate emissions rates for aggregate handling transfer points (unloading of the feeder, unloading the aggregate weigh batcher), emission factors were obtained from AP-42 Section 11.19.2, Table 11.19.2-2, "Conveyor Transfer Point Controlled" to account for increased moisture content due to additional watering of the aggregate storage piles. Additional reductions for annual emissions are found in limiting annual production.

A control efficiency of 90% (Water/Surfactants/Millings) will be used for unpaved truck traffic fugitive dust particulate emissions. Additional reductions for annual emissions are found in limiting annual haul truck traffic.

Maximum rated material throughput is 270 cubic yards per hour. Annual emissions in tons per year (tpy) were calculated assuming operation of 500,000 cubic yards per year.

EPA's AP-42, Section 13.2-4 (01/95)

Aggregate Handling Emission Equation

E (lbs/ton) = k x 0.0032 x $(U/5)^{1.3}$ / $(M/2)^{1.4}$

E_{TSP} (lbs/ton) = 0.74 x 0.0032 x $(8.5/5)^{1.3}$ / $(1.77/2)^{1.4}$

E_{PM10} (lbs/ton) = 0.35 x 0.0032 x $(8.5/5)^{1.3}$ / $(1.77/2)^{1.4}$

$E_{PM2.5}$ (lbs/ton) = 0.0.053 x 0.0032 x $(8.5/5)^{1.3}$ / $(1.77/2)^{1.4}$

E_{TSP} = 0.00560 lbs/ton; E_{PM10} = 0.00265 lbs/ton; $E_{PM2.5}$ = 0.00040 lbs/ton

Sand Handling Emission Equation

E (lbs/ton) = k x 0.0032 x $(U/5)^{1.3}$ / $(M/2)^{1.4}$

E_{TSP} (lbs/ton) = 0.74 x 0.0032 x $(8.5/5)^{1.3}$ / $(4.17/2)^{1.4}$

E_{PM10} (lbs/ton) = 0.35 x 0.0032 x $(8.5/5)^{1.3}$ / $(4.17/2)^{1.4}$

$E_{PM2.5}$ (lbs/ton) = 0.0.053 x 0.0032 x $(8.5/5)^{1.3}$ / $(4.17/2)^{1.4}$

E_{TSP} = 0.00169 lbs/ton; E_{PM10} = 0.00080 lbs/ton; $E_{PM2.5}$ = 0.00012 lbs/ton

Aggregate/Sand Handling Emission Equation

E (lbs/ton) = k x 0.0032 x $(U/5)^{1.3}$ / $(M/2)^{1.4}$

E_{TSP} (lbs/ton) = 0.74 x 0.0032 x $(8.5/5)^{1.3}$ / $(2.5/2)^{1.4}$

E_{PM10} (lbs/ton) = 0.35 x 0.0032 x $(8.5/5)^{1.3}$ / $(2.5/2)^{1.4}$

$E_{PM2.5}$ (lbs/ton) = 0.0.053 x 0.0032 x $(8.5/5)^{1.3}$ / $(2.5/2)^{1.4}$

E_{TSP} = 0.00345 lbs/ton; E_{PM10} = 0.00163 lbs/ton; $E_{PM2.5}$ = 0.00025 lbs/ton

EPA's AP-42, Section 11.19.2-2 (08/04)

Conveyor Transfer Controlled Emission Factor

E_{TSP} = 0.00014 lbs/ton; E_{PM10} = 0.000046 lbs/ton; $E_{PM2.5}$ = 0.000013 lbs/ton

Controlled Emission Factors:

Process Unit	PM2.5 Emission Factor (lbs/ton)	PM10 Emission Factor (lbs/ton)	TSP Emission Factor (lbs/ton)
Aggregate Material Handling	0.00040	0.00265	0.00560
Sand Material Handling	0.00012	0.00080	0.00169
Aggregate/Sand Material Handling	0.00023	0.00151	0.00318
Aggregate Transfer Points	0.000013	0.000046	0.00014

The following equation was used to calculate the hourly emission rate for each material handling emission unit:

Emission Rate (lbs/hour) = Process Rate (tons/hour) * Controlled Emission Factor (lbs/ton)

The following equation was used to calculate the hourly emission rate for each process unit:

$$\text{Emission Rate (tons/year)} = \frac{\text{Controlled Emission Factor (lbs/ton)} * \text{Process Rate (tons/year)}}{\text{2000 lbs/ton}}$$

Table B-2: Controlled Material Handling Particulate Emission Rates

Process Unit #	Process Unit Description	Process Rate (tph)	TSP Emission Rate (lbs/hr)	TSP Emission Rate (tons/yr)	PM_{10} Emission Rate (lbs/hr)	PM_{10} Emission Rate (tons/yr)	$PM_{2.5}$ Emission Rate (lbs/hr)	$PM_{2.5}$ Emission Rate (tons/yr)
1a	Aggregate/Sand Feeder Loading	101.25 tph 187,500 tpy	0.32	0.30	0.15	0.14	0.023	0.021
1b	Aggregate/Sand Feeder Loading	101.25 tph 187,500 tpy	0.32	0.30	0.15	0.14	0.023	0.021
1c	Aggregate/Sand Feeder Loading	101.25 tph 187,500 tpy	0.32	0.30	0.15	0.14	0.023	0.021
1d	Aggregate/Sand Feeder Loading	101.25 tph 187,500 tpy	0.32	0.30	0.15	0.14	0.023	0.021
2a	Transfer Conveyor	101.25 tph 187,500 tpy	0.014	0.013	0.0047	0.0043	0.0013	0.0012
2b	Transfer Conveyor	101.25 tph 187,500 tpy	0.014	0.013	0.0047	0.0043	0.0013	0.0012
2c	Transfer Conveyor	101.25 tph 187,500 tpy	0.014	0.013	0.0047	0.0043	0.0013	0.0012
2d	Transfer Conveyor	101.25 tph 187,500 tpy	0.014	0.013	0.0047	0.0043	0.0013	0.0012
3	4-Bin Aggregate Feeder	405 tph 750,000 tpy	1.29	1.19	0.61	0.56	0.092	0.085
4	Aggregate Batcher and Conveyor	405 tph 750,000 tpy	0.057	0.053	0.019	0.017	0.0053	0.0049
10	Aggregate Pile Loading	405 tph 750,000 tpy	1.69	1.56	0.80	0.74	0.12	0.11
		TOTALS	**4.38**	**4.05**	**2.05**	**1.90**	**0.32**	**0.29**

Haul Truck Travel

Haul truck travel emissions were estimated using AP-42, Section 13.2.2 (ver.11/06) "Unpaved Roads" emission equation. The haul road around the plant will be unpaved but controlled with millings or surfactants, and watering to a 90% control efficiency. Haul trucks will be used to deliver cement, fly ash, aggregate material, and transport concrete product. Table B-3 summarizes the particulate emission rate from haul road traffic.

$$E = k * (s/12)^a * (W/3)^b * [(365 - p)/365] * VMT$$

$$E_{controlled} = E * (100\text{-}CE)/100$$

Where k = constant TSP = 4.9
PM10 = 1.5
PM2.5 = 0.15

s = % silt content (Table 13.2.2-1, "Sand and Gravel" 4.8%)
W = mean vehicle weight (27.5 tons per truck)
W = mean concrete truck weight (25 tons)

p = number of days with at least 0.01 in of precip. (Figure 13.2.2-1= 60 days)
(used only for annual emission calculations)

a = Constant TSP = 0.7
PM10 = 0.9
PM2.5 = 0.9

b = Constant TSP = 0.45
PM10 = 0.45
PM2.5 = 0.45

VMT = Aggregate Vehicle Miles Traveled
(roundtrip = 0.47563 miles)

VMT = Cement, Fly Ash Vehicle Miles Traveled
(roundtrip = 0.49516 miles)

VMT = Concrete Vehicle Miles Traveled
(roundtrip = 0.13346 miles)

Control Efficiency (CE) = 90%
Cement Trucks = 2.64 trucks/hr; 1.30751 miles/hr
Fly Ash Trucks = 0.71 trucks/hr; 0.35295 miles/hr
Aggregate Trucks = 16.20 trucks/hr; 7.70521 miles/hr
Concrete Trucks = 22.50 trucks/hr; 3.00283 miles/hr

Delivery Trucks Lbs/VMT = 0.699251 lbs/VMT TSP; 0.178213 lbs/VMT PM10; 0.0178213 lbs/VMT PM2.5
Concrete Trucks Lbs/VMT = 0.669895 lbs/VMT TSP; 0.170732 lbs/VMT PM10; 0.0170732 lbs/VMT PM2.5

Table B-3: Controlled Vehicle Fugitive Dust Emission Rates

Process Unit Number	Process Unit Description	TSP Emission Rate (lbs/hr)	TSP Emission Rate (tons/yr)	PM_{10} Emission Rate (lbs/hr)	PM_{10} Emission Rate (tons/yr)	$PM_{2.5}$ Emission Rate (lbs/hr)	$PM_{2.5}$ Emission Rate (tons/yr)
11	Haul Traffic	8.56	6.62	2.18	1.69	0.22	0.17

Controlled Emissions from Central Dust Collector

Particulate emissions are controlled by a dust collector for the central mixer, cement/fly ash batcher, cement silo and guppies (2), and fly ash silo and guppy. Manufacturer's specifications list a dust collector control efficiency of 100%, but to be conservative a generic filter maker control efficient of 99.9% was used. Using the AP-42 Section 11.12, Table 11.12-2 uncontrolled emission factors and a 99.9% control efficiency, the hourly and annual emission rates were calculated.

EPA's AP-42, Section 11.12 (06/06), Table 11.12-2 with 99.9% Control Efficiency

Cement Silo Loading Emission Factor

E_{TSP} = 0.00073 lbs/ton; E_{PM10} = 0.00047 lbs/ton; $E_{PM2.5}$ = 0.000093 lbs/ton

Fly Ash Silo Loading Emission Factor

E_{TSP} = 0.00314 lbs/ton; E_{PM10} = 0.00110 lbs/ton; $E_{PM2.5}$ = 0.000218 lbs/ton

Cement/Fly Ash Batcher Loading Emission Factor

E_{TSP} = 0.000572 lbs/ton; E_{PM10} = 0.000156 lbs/ton; $E_{PM2.5}$ = 0.0000309 lbs/ton

Concrete Central Mixer Emission Factor

E_{TSP} = 0.000572 lbs/ton; E_{PM10} = 0.000156 lbs/ton; $E_{PM2.5}$ = 0.0000309 lbs/ton

Table B-4: Controlled Central Dust Collector Particulate Emissions (PTE)

Process Unit #	Process Unit Description	Process Rate (tph)	TSP Emission Rate (lbs/hr)	TSP Emission Rate (tons/yr)	PM_{10} Emission Rate (lbs/hr)	PM_{10} Emission Rate (tons/yr)	$PM_{2.5}$ Emission Rate (lbs/hr)	$PM_{2.5}$ Emission Rate (tons/yr)
5	Central Mixer	83.84[(1)] tph 155,250 tpy	0.04795	0.04440	0.01308	0.01211	0.00259	0.00240
6	Cement Loading	66.015 tph 122,250 tpy	0.04819	0.04462	0.03103	0.02873	0.00614	0.00569
7	Fly Ash Loading	17.82 tph 33,000 tpy	0.05595	0.05181	0.01960	0.01815	0.00388	0.00359
8	Cement/Fly Ash Batcher	83.84[(1)] tph 155,250 tpy	0.04795	0.04440	0.01308	0.01211	0.00259	0.00240
		TOTALS	**0.20**	**0.19**	**0.077**	**0.071**	**0.015**	**0.014**

[(1)] Combined Cement and Fly Ash hourly usage.

To be conservative, model emission rates for both PM10 and PM2.5 dispersion modeling used the PM10 emission rate for the central dust collector.

3.0 Estimates for Engine Emissions (NO_X, CO, SO_2, VOC and PM)

A Caterpillar Model C15 diesel-fired generator/engine will power the concrete batch plant. The Caterpillar generator/engine is rated at 500 kW (779 HP) and is a Tier 3 engine. SO_2 emissions for the Caterpillar engine is based on the sulfur content of fuel burned (15 PPM) and the fuel usage (based on 35.7 gal/hr and 7.0 lbs/gal). PER emission rates are based on operating 8760 hours per year and PTE emission rates are based on limiting annual operating hours to 5000 hours per year.

Manufacturer Certified Emission Rates:

Pollutant	Emission Rate (Lbs/Hr)
NOx	5.27
Carbon Monoxides	0.94
VOC	0.060
Particulate	0.15

The following equation was used to calculate the annual emission rate for each heater pollutant:

$$\text{Emission Rate (tons/year)} = \text{Emission } \frac{\text{Rate (lbs/hour) * Operating Hour (hrs/year)}}{\text{2000 lbs/ton}}$$

The following equation calculates the emission rate for sulfur dioxide (SO_2).

Emission Rate (lbs/hr) = Fuel (gal/hr) * Density lbs/gal * % Sulfur Content * Factor

$$\text{Emission Rate (lbs/hr)} = \frac{35.7 \text{ gallons}}{\text{hr}} \left| \frac{7.0 \text{ lbs}}{\text{gallon}} \right| \frac{0.000015 \text{ lbs Sulfur}}{\text{lbs of fuel}} \left| \frac{2 \text{ lbs } SO_2}{1 \text{ lb Sulfur}} \right.$$

Emission Rate (lbs/hr) = 0.0075 lbs/hr

Table B-5: Pre-Controlled Combustion Emission Rates - 779 HP

Emission Unit Number	Pollutant	Emission Rate (lbs/hr)	Emission Rate (tons/yr)
9	NO_X	5.27	23.08
	CO	0.94	4.12
	SO_2	0.0075	0.033
	VOC	0.060	0.26
	PM	0.15	0.66

Table B-6: Controlled Combustion Emission Rates - 779 HP

Emission Unit Number	Pollutant	Emission Rate (lbs/hr)	Emission Rate (tons/yr)
9	NO_X	5.27	13.18
	CO	0.94	2.35
	SO_2	0.0075	0.019
	VOC	0.060	0.15
	PM	0.15	0.38

PER Emission Totals

ID #	Source Description	NOx		CO		SO2		VOC		TSP		PM10		PM2.5	
		lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
1a	Feeder1									0.32	1.41	0.15	0.67	0.023	0.10
1b	Feeder2									0.32	1.41	0.15	0.67	0.023	0.10
1c	Feeder3									0.32	1.41	0.15	0.67	0.023	0.10
1d	Feeder4									0.32	1.41	0.15	0.67	0.023	0.10
2a	Conveyor1									0.30	1.33	0.11	0.49	0.017	0.074
2b	Conveyor2									0.30	1.33	0.11	0.49	0.017	0.074
2c	Conveyor3									0.30	1.33	0.11	0.49	0.017	0.074
2d	Conveyor4									0.30	1.33	0.11	0.49	0.017	0.074
3	Aggregate Bin									1.29	5.65	0.61	2.67	0.092	0.40
4	Aggregate Weigh Batcher and Conveyor									1.22	5.32	0.45	1.95	0.067	0.30
5	Central Mixer									48.0	210	13.1	57	2.59	11.3
6	Cement Silo with Guppy									48.2	211	31.0	136	6.14	26.9
7	Fly Ash Silo with Guppy									56.0	245	19.6	86	3.88	17.0
8	Cement/Fly Ash Batcher									48.0	210	13.1	57	2.59	11.3
9	Concrete Batch Plant Engine	5.27	23.1	0.94	4.12	0.0075	0.033	0.060	0.26	0.15	0.66	0.15	0.66	0.15	0.66
10	Storage Piles									1.69	7.39	0.80	3.50	0.12	0.53
11	Haul Road									85.6	313.3	21.8	79.9	2.18	8.0
	Total	**5.27**	**23.1**	**0.94**	**4.12**	**0.0075**	**0.033**	**0.060**	**0.26**	**293**	**1220**	**102**	**430**	**18.0**	**77.1**

PTE Emission Totals

ID #	Source Description	NOx		CO		SO2		VOC		TSP		PM10		PM2.5	
		lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
1a	Feeder1									0.32	0.30	0.15	0.14	0.023	0.021
1b	Feeder2									0.32	0.30	0.15	0.14	0.023	0.021
1c	Feeder3									0.32	0.30	0.15	0.14	0.023	0.021
1d	Feeder4									0.32	0.30	0.15	0.14	0.023	0.021
2a	Conveyor1									0.014	0.013	0.0047	0.0043	0.0013	0.0012
2b	Conveyor2									0.014	0.013	0.0047	0.0043	0.0013	0.0012
2c	Conveyor3									0.014	0.013	0.0047	0.0043	0.0013	0.0012
2d	Conveyor4									0.014	0.013	0.0047	0.0043	0.0013	0.0012
3	Aggregate Bin									1.29	1.19	0.61	0.56	0.092	0.085
4	Aggregate Weigh Batcher and Conveyor									0.057	0.053	0.019	0.017	0.0053	0.0049
5, 6, 7, 8	Central Dust Collector									0.20	0.19	0.077	0.071	0.077	0.071
9	Concrete Batch Plant Engine	5.27	13.2	0.94	2.35	0.0075	0.019	0.060	0.15	0.15	0.38	0.15	0.38	0.15	0.38
10	Storage Piles									1.69	1.56	0.80	0.74	0.12	0.11
11	Haul Road									8.56	6.62	2.18	1.69	0.22	0.17
	Total	**5.27**	**13.2**	**0.94**	**2.35**	**0.0075**	**0.019**	**0.060**	**0.15**	**13.29**	**11.24**	**4.46**	**4.04**	**0.76**	**0.91**

Attachment C
Emissions Calculations Background

Vital Consulting Group LLC Albuquerque Portable Concrete Batch Plant Emissions Inventory
270 CuFt/Hr; 500,000 CuFt per Year

Typical cuyd of concrete

	pound	tons/hr	tons/yr
total concrete	3881	523 9	970,250
aggregate	1900	256 5	475,000
sand	1100	148 5	275,000
cement	489	66 0	122,250
flyash	132	17 8	33,000
water	260	35 1	65,000

plant capacity	270	cuyd/hr
plant capacity	2160	cuyd/day
plant capacity	500000	cuyd/yr
Daily hours of operation	24	hrs/day
Hours per year of operation based on annual throughput	1851 9	hrs/yr
Hours per year of operation	5000	hrs/yr
Uncontrolled hrs/yr of operation	8760	hrs/yr

Aggregate Storage Pile Handling

AP-42 13 2 4 — E = k x (0 0032) x (U/5)^1 3 / (M/2)^1 4 lbs/ton

Max tph	256 5	tph	475000 ton/yr
k(tsp)	0 74		
k(pm10)	0 35		
k(pm2 5)	0 053		
U	8 5	MPH	Albuquerque WS 1996-2006
M	1 77	%	AP-42 Section 11 12, Table 11 12-2, footnote b

	lb/hr	tons/yr	
E(tsp) Uncontrolled	1 43659	6 29225	
E(pm10) Uncontrolled	0 67947	2 97607	
E(pm2 5) Uncontrolled	0 10289	0 45066	
E(tsp) Uncontrolled	1 43659	1 33017	Limit Annual Material Throughput for TPY Calculation
E(pm10) Uncontrolled	0 67947	0 62914	Limit Annual Material Throughput for TPY Calculation
E(pm2 5) Uncontrolled	0 10289	0 09527	Limit Annual Material Throughput for TPY Calculation

Sand Storage Pile Handling

AP-42 13 2 4 — E = k x (0 0032) x (U/5)^1 3 / (M/2)^1 4 lbs/ton

Max tph	148 5	tph	275000 ton/yr
k(tsp)	0 74		
k(pm10)	0 35		
k(pm2 5)	0 053		
U	8 5	MPH	Albuquerque WS 1996-2006
M	4 17	%	AP-42 Section 11 12, Table 11 12-2, footnote b

	lb/hr	tons/yr	
E(tsp) Uncontrolled	0 25058	1 09753	
E(pm10) Uncontrolled	0 11852	0 51910	
E(pm2 5) Uncontrolled	0 01795	0 07861	
E(tsp) Uncontrolled	0 25058	0 23202	Limit Annual Material Throughput for TPY Calculation
E(pm10) Uncontrolled	0 11852	0 10974	Limit Annual Material Throughput for TPY Calculation
E(pm2 5) Uncontrolled	0 01795	0 01662	Limit Annual Material Throughput for TPY Calculation

Aggregate and Sand Feeder Loading

AP-42 13 2 4 — E = k x (0 0032) x (U/5)^1 3 / (M/2)^1 4 lbs/ton

Max tph	405	tph	750000 ton/yr
k(tsp)	0 74		
k(pm10)	0 35		
k(pm2 5)	0 053		
U	8 5	MPH	Albuquerque WS 1996-2006
M	2 65	%	Calculated average aggregate and sand

	lb/hr	tons/yr	
E(tsp) Uncontrolled	1 28919	5 64667	
E(pm10) Uncontrolled	0 60975	2 67072	
E(pm2 5) Uncontrolled	0 09233	0 40442	
E(tsp) Uncontrolled	1 28919	1 19370	Limit Annual Material Throughput for TPY Calculation
E(pm10) Uncontrolled	0 60975	0 56459	Limit Annual Material Throughput for TPY Calculation
E(pm2 5) Uncontrolled	0 09233	0 08549	Limit Annual Material Throughput for TPY Calculation

Aggregate and Sand Feeder Unloading

AP-42 11 19 2 Table 11 19 2-2 "Conveyor Transfer Point"

Max tph	405	tph	3240 ton/day	750000 ton/yr
E(tsp) Uncontrolled	0 003	lbs/ton		
E(pm10) Uncontrolled	0 0011	lbs/ton		
E(pm2 5) Uncontrolled	0 000167	lbs/ton		

	lb/hr	tons/yr
E(tsp) Uncontrolled	1 21500	5 32170
E(pm10) Uncontrolled	0 44550	1 95129
E(pm10) Uncontrolled	0 06746	0 29548

AP-42 11 19 2 Table 11 19 2-2 "Controlled Conveyor Transfer Point"

E(tsp) Controlled	0 00014	lbs/ton	
E(pm10) Controlled	0 000046	lbs/ton	
E(pm2 5) Controlled	0 000013	lbs/ton	95 3 % Control Efficieny

	lb/hr	tons/yr	
E(tsp) Controlled	0 05670	0 05250	Limit Annual Material Throughput for TPY Calculation
E(pm10) Controlled	0 01863	0 01725	Limit Annual Material Throughput for TPY Calculation
E(pm2 5) Controlled	0 00527	0 00488	Limit Annual Material Throughput for TPY Calculation

Aggregate Bin Loading

AP-42 13 2 4 E = k x (0 0032) x (U/5)^1 3 / (M/2)^1 4 lbs/ton

Max tph	405	tph	750000 ton/yr	
k(tsp)	0 74			
k(pm10)	0 35			
k(pm2 5)	0 053			
U	8 5	MPH	Albuquerque WS 1996-2006	
M	2 65	%	Calculated average aggregate and sand	

	lb/hr	tons/yr
E(tsp) Uncontrolled	1 28919	5 64667
E(pm10) Uncontrolled	0 60975	2 67072
E(pm2 5) Uncontrolled	0 09233	0 40442

	lb/hr	tons/yr	
E(tsp) Uncontrolled	1 28919	1 19370	Limit Annual Material Throughput for TPY Calculation
E(pm10) Uncontrolled	0 60975	0 56459	Limit Annual Material Throughput for TPY Calculation
E(pm2 5) Uncontrolled	0 09233	0 08549	Limit Annual Material Throughput for TPY Calculation

Weight Batcher Belt Loading

AP-42 11 19 2 Table 11 19 2-2 "Conveyor Transfer Point"

Max tph	405	tph	750000 ton/yr
E(tsp) Uncontrolled	0 003	lbs/ton	
E(pm10) Uncontrolled	0 0011	lbs/ton	
E(pm2 5) Uncontrolled	0 000167	lbs/ton	

	lb/hr	tons/yr
E(tsp) Uncontrolled	1 21500	5 32170
E(pm10) Uncontrolled	0 44550	1 95129
E(pm10) Uncontrolled	0 06746	0 29548

AP-42 11 19 2 Table 11 19 2-2 "Controlled Conveyor Transfer Point"

E(tsp) Controlled	0 00014	lbs/ton	
E(pm10) Controlled	0 000046	lbs/ton	
E(pm2 5) Controlled	0 000013	lbs/ton	95 3 % Control Efficieny

	lb/hr	tons/yr	
E(tsp) Controlled	0 05670	0 05250	Limit Annual Material Throughput for TPY Calculation
E(pm10) Controlled	0 01863	0 01725	Limit Annual Material Throughput for TPY Calculation
E(pm2 5) Controlled	0 00527	0 00488	Limit Annual Material Throughput for TPY Calculation

Mixer Loading

Uncontrolled emissions based on AP-42 Section 11.12 "Concrete Batching" Table 11.12-2 "Uncontrolled Mixer Loading"

E(TSP) =	0 572	lbs/ton	Uncontrolled Mixer Loading TSP
E(PM10) =	0 156	lbs/ton	Uncontrolled Mixer Loading PM10
E(PM2 5) =	0 0309	lbs/ton	Uncontrolled Mixer Loading PM2 5

Max tph Cement and Flyash	83 835	tph	155250 ton/yr

	lb/hr	tons/yr
E(tsp) uncontrolled mixer	47 95	210 0
E(pm10) uncontrolled mixer	13 08	57 3
E(pm2 5) uncontrolled mixer	2 59	11 3

99 9 % Control Efficiency

	lb/hr	tons/yr	
E(tsp) controlled mixer	0 04795	0 04440	Limit Annual Material Throughput for TPY Calculation
E(pm10) controlled mixer	0 01308	0 01211	Limit Annual Material Throughput for TPY Calculation
E(pm2 5) controlled mixer PM2 5 = PM10	0 01308	0 01211	Limit Annual Material Throughput for TPY Calculation

Controlled with central baghouse (Units 5,6,7,8) - Modeled PM2 5 emission rate assumed to be equal to PM10

Cement/Fly Ash Weigh Batcher

Uncontrolled emissions based on AP-42 Section 11.12 "Concrete Batching" Table 11.12-2 "Uncontrolled Mixer Loading"

E(TSP) =	0 572	lbs/ton	Uncontrolled Mixer Loading TSP
E(PM10) =	0 156	lbs/ton	Uncontrolled Mixer Loading PM10
E(PM2 5) =	0 0309	lbs/ton	Uncontrolled Mixer Loading PM2 5

Max tph Cement and Flyash 83 835 tph 155250 ton/yr

	lb/hr	tons/yr
E(tsp) uncontrolled batcher	47 95	210 0
E(pm10) uncontrolled batcher	13 08	57 3
E(pm2 5) uncontrolled batcher	2 59	11 3

99 9 % Control Efficiency

	lb/hr	tons/yr	
E(tsp) controlled batcher	0 04795	0 04440	Limit Annual Material Throughput for TPY Calculation
E(pm10) controlled batcher	0 01308	0 01211	Limit Annual Material Throughput for TPY Calculation
E(pm2 5) controlled batcher	0 01308	0 01211	Limit Annual Material Throughput for TPY Calculation

Controlled with central baghouse (Units 5,6,7,8) - Modeled PM2 5 emission rate assumed to be equal to PM10

Cement Silo/Guppy

Uncontrolled emissions based on AP-42 Section 11.12 "Concrete Batching" Table 11.12-2 "Cement Unloading to Elevated Storage Silo"

E(TSP) =	0 73	lbs/ton	Uncontrolled Cement Silo Loading TSP
E(PM10) =	0 47	lbs/ton	Uncontrolled Cement Silo Loading PM10
E(PM2 5) =	0 0930	lbs/ton	Uncontrolled Cement Silo Loading PM2 5

Max tph Cement 66 015 tph 122250 ton/yr

	lb/hr	tons/yr
E(tsp) uncontrolled cement	48 19095	211 07636
E(pm10) uncontrolled cement	31 02705	135 89848
E(pm2 5) uncontrolled cement	6 14077	26 89657

99 9 % Control Efficiency

	lb/hr	tons/yr	
E(tsp) controlled cement	0 04819	0 04462	Limit Annual Material Throughput for TPY Calculation
E(pm10) controlled cement	0 03103	0 02873	Limit Annual Material Throughput for TPY Calculation
E(pm2 5) controlled cement	0 03103	0 02873	Limit Annual Material Throughput for TPY Calculation

Controlled with central baghouse (Units 5,6,7,8) - Modeled PM2 5 emission rate assumed to be equal to PM10

Flyash Silo/Guppy

Uncontrolled emissions based on AP-42 Section 11.12 "Concrete Batching" Table 11.12-2 "Cement Supplement Unloading to Elevated Storage Silo"

E(TSP) =	3 14	lbs/ton	Uncontrolled Mixer Loading TSP
E(PM10) =	1 1	lbs/ton	Uncontrolled Mixer Loading PM10
E(PM10) =	0 218	lbs/ton	Uncontrolled Mixer Loading PM2 5

Max tph Fly Ash 17 82 tph 33000 ton/yr

	lb/hr	tons/yr
E(tsp) uncontrolled fly ash	55 95480	245 08202
E(pm10) uncontrolled fly ash	19 60200	85 85676
E(pm2 5) uncontrolled fly ash	3 87956	16 99248

99 9 % Control Efficiency

	lb/hr	tons/yr	
E(tsp) controlled fly ash	0 05595	0 05181	Limit Annual Material Throughput for TPY Calculation
E(pm10) controlled fly ash	0 01960	0 01815	Limit Annual Material Throughput for TPY Calculation
E(pm2 5) controlled fly ash	0 01960	0 01815	Limit Annual Material Throughput for TPY Calculation

Controlled with central baghouse (Units 5,6,7,8) - Modeled PM2 5 emission rate assumed to be equal to PM10

Road Traffic
AP-42 13 2 Unpaved Road (12/03)
Equation:
E = k(s/12)^a*(W/3)^b*[(365-p)/365] *Annual emissions only include p factor*

k TSP	4 9		
k PM10	1 5		
k PM2 5	0 15		
a TSP	0 7		
a PM10	0 9		
a PM2 5	0 9		
b TSP	0 45		
b PM10	0 45		
b PM2 5	0 45		
% Silt Content = s	4 8	%	Sand and Gravel (AP-42 13 2 2-1)
precipitation days/yr	60	days	AP-42 Figure 13 2 2-1
Hours per year	8760	hrs	
Vehicle control	90	%	Surface Stabilizers and Watering

Cement Truck VMT	797	meter/vehicle	0 495157819	miles/vehicle
Flyash Truck VMT	797	meter/vehicle	0 495157819	miles/vehicle
Aggregate Truck VMT	765	meter/vehicle	0 47563051	miles/vehicle
Concrete Truck VMT	215	meter/vehicle	0 133459114	miles/vehicle

Max Cement Truck/hr	2 64	truck/hr	25	tons/load	66 015	tons/hr
Max Flyash Truck/hr	0 71	truck/hr	25	tons/load	17 82	tons/hr
Max Aggregate Truck/hr	16 20	truck/hr	25	tons/load	405	tons/hr
Max Concrete Truck/hr	22 50	truck/hr	12	cuyd/load	270	cuyd/hr
	42 1					
Max Cement Truck/yr	4890 0	truck/yr	25	tons/load	122250	tons/yr
Max Flyash Truck/yr	1320 0	truck/yr	25	tons/load	33000	tons/yr
Max Aggregate Truck/yr	30000 0	truck/yr	25	tons/load	750000	tons/yr
Max Concrete Truck/yr	41666 7	truck/yr	12	cuyd/load	500000	tons/yr
	77876 7					

Cement Truck VMT	1 30751	miles/hr	11453 82	miles/yr uncontrolled	2421 32	miles/yr controlled
Flyash Truck VMT	0 35295	miles/hr	3091 83	miles/yr uncontrolled	653 61	miles/yr controlled
Aggregate Truck VMT	7 70521	miles/hr	67497 68	miles/yr uncontrolled	14268 92	miles/yr controlled
Concrete Truck VMT	3 00283	miles/hr	26304 79	miles/yr uncontrolled	5560 80	miles/yr controlled
			108348 12		22904 64	

Cement Truck weight	27 5	tons
Flyash Truck weight	27 5	tons
Aggregate Truck weight	27 5	tons
Concrete Truck weight	25	tons

			TSP Uncontrolled		TSP Control			
Max Cement Truck Emissions	9 142805512	lbs/hr	33 46266817	tons/yr	0 914280551	lbs/hr	0 707396165	tons/yr
Max Flyash Truck Emissions	2 46799658	lbs/hr	9 032867482	tons/yr	0 246799658	lbs/hr	0 190953566	tons/yr
Max Aggregate Truck Emissions	53 8788033	lbs/hr	197 1964201	tons/yr	5 38788033	lbs/hr	4 168704974	tons/yr
Max Concrete Truck Emissions	20 11579819	lbs/hr	73 62382136	tons/yr	2 011579819	lbs/hr	1 556397374	tons/yr
total combined traffic	85 60540358	lbs/hr	313 3157771	tons/yr	8 560540358	lbs/hr	6 623452078	tons/yr

			PM10 Uncontrolled		PM10 Control			
Max Cement Truck Emissions	2 330164914	lbs/hr	8 528403586	tons/yr	0 233016491	lbs/hr	0 180289269	tons/yr
Max Flyash Truck Emissions	0 629001572	lbs/hr	2 302145753	tons/yr	0 062900157	lbs/hr	0 048667042	tons/yr
Max Aggregate Truck Emissions	13 73172566	lbs/hr	50 25811593	tons/yr	1 373172566	lbs/hr	1 062449601	tons/yr
Max Concrete Truck Emissions	5 126777235	lbs/hr	18 76400468	tons/yr	0 512677723	lbs/hr	0 396668457	tons/yr
total combined traffic	21 81766938	lbs/hr	79 85266994	tons/yr	2 181766938	lbs/hr	1 688074369	tons/yr

			PM2 5 Uncontrolled		PM2 5 Control			
Max Cement Truck Emissions	0 233016491	lbs/hr	0 852840359	tons/yr	0 023301649	lbs/hr	0 018028927	tons/yr
Max Flyash Truck Emissions	0 062900157	lbs/hr	0 230214575	tons/yr	0 006290016	lbs/hr	0 004866704	tons/yr
Max Aggregate Truck Emissions	1 373172566	lbs/hr	5 025811593	tons/yr	0 137317257	lbs/hr	0 10624496	tons/yr
Max Concrete Truck Emissions	0 512677723	lbs/hr	1 876400468	tons/yr	0 051267772	lbs/hr	0 039666846	tons/yr
total combined traffic	2 181766938	lbs/hr	7 985266994	tons/yr	0 218176694	lbs/hr	0 168807437	tons/yr

Vital Consulting Group, LLC Engine Emissions

Concrete Batch Plant Generator/Engine CAT C15

Manufacture Certified	NOx, CO, VOC and PM Emissions				
Engine Size	500.0	kW	horsepower	779	bhp
	35.7	gal/hr	%sulfur	0.0015	%

Uncontrolled Hours	8760
Controlled Hours	5000

Emission Factors

NOx	5.27	lbs/hr	
CO	0.94	lbs/hr	SO2 emissions based on fuel usage
VOC	0.060	lbs/hr	gal/hr times 7.0 lbs/gal times fuel %
SO2	0.0075	lbs/hr	sulfur content times a factor of 2.
PM	0.15	lbs/hr	

Calculated Uncontrolled Emissions

NOx	5.27	lbs/hr	23.08	tons/yr
CO	0.94	lbs/hr	4.12	tons/yr
VOC	0.060	lbs/hr	0.26	tons/yr
SO2	0.0075	lbs/hr	0.033	tons/yr
PM	0.15	lbs/hr	0.66	tons/yr

Calculated Controlled Emissions

NOx	5.27	lbs/hr	13.18	tons/yr
CO	0.94	lbs/hr	2.35	tons/yr
VOC	0.060	lbs/hr	0.15	tons/yr
SO2	0.0075	lbs/hr	0.019	tons/yr
PM	0.15	lbs/hr	0.38	tons/yr

Vital Consulting Group LLC Albuquerque Portable Concrete Batch Plant Emissions Inventory
270 CuFt/Hr; 500,000 CuFt per Year
Emission Totals

Uncontrolled Emission Totals

ID #	Source Description	NOx		CO		SO2		VOC		TSP		PM10		PM2 5	
		lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
1a	Feeder1									0 32	1 41	0 15	0 67	0 023	0 10
1b	Feeder2									0 32	1 41	0 15	0 67	0 023	0 10
1c	Feeder3									0 32	1 41	0 15	0 67	0 023	0 10
1d	Feeder4									0 32	1 41	0 15	0 67	0 023	0 10
2a	Conveyor1									0 30	1 33	0 11	0 49	0 017	0 074
2b	Conveyor2									0 30	1 33	0 11	0 49	0 017	0 074
2c	Conveyor3									0 30	1 33	0 11	0 49	0 017	0 074
2d	Conveyor4									0 30	1 33	0 11	0 49	0 017	0 074
3	Aggregate Bin									1 29	5 65	0 61	2 67	0 092	0 40
4	Aggregate Weigh Batcher and Conveyor									1 22	5 32	0 45	1 95	0 067	0 30
5	Central Mixer									48 0	210	13 1	57	2 59	11 3
6	Cement Silo with Guppy									48 2	211	31 0	136	6 14	26 9
7	Fly Ash Silo with Guppy									56 0	245	19 6	86	3 88	17 0
8	Cement/Fly Ash Batcher									48 0	210	13 1	57	2 59	11 3
9	Concrete Batch Plant Engine	5 27	23 1	0 94	4 12	0 0075	0 033	0 060	0 26	0 15	0 66	0 15	0 66	0 15	0 66
10	Storage Piles									1 69	7 39	0 80	3 50	0 12	0 53
11	Haul Road									85 6	313 3	21 8	79 9	2 18	8 0
	Total	**5.27**	**23.1**	**0.94**	**4.12**	**0.0075**	**0.033**	**0.060**	**0.26**	**293**	**1220**	**101.7**	**430**	**18.0**	**77.1**

Controlled Emission Totals

ID #	Source Description	NOx		CO		SO2		VOC		TSP		PM10		PM2 5	
		lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
1a	Feeder1									0 32	0 30	0 15	0 14	0 023	0 021
1b	Feeder2									0 32	0 30	0 15	0 14	0 023	0 021
1c	Feeder3									0 32	0 30	0 15	0 14	0 023	0 021
1d	Feeder4									0 32	0 30	0 15	0 14	0 023	0 021
2a	Conveyor1									0 014	0 013	0 0047	0 0043	0 0013	0 0012
2b	Conveyor2									0 014	0 013	0 0047	0 0043	0 0013	0 0012
2c	Conveyor3									0 014	0 013	0 0047	0 0043	0 0013	0 0012
2d	Conveyor4									0 014	0 013	0 0047	0 0043	0 0013	0 0012
3	Aggregate Bin									1 29	1 19	0 61	0 56	0 092	0 085
4	Aggregate Weigh Batcher and Conveyor									0 057	0 053	0 019	0 017	0 0053	0 0049
5, 6, 7, 8	Central Dust Dust Collector									0 20	0 19	0 077	0 071	0 077	0 071
9	Concrete Batch Plant Engine	5 27	13 2	0 94	2 35	0 0075	0 019	0 060	0 15	0 15	0 38	0 15	0 38	0 15	0 38
10	Storage Piles									1 69	1 56	0 80	0 74	0 12	0 11
11	Haul Road									8 56	6 62	2 18	1 69	0 22	0 17
	Total	**5.27**	**13.2**	**0.94**	**2.35**	**0.0075**	**0.019**	**0.060**	**0.15**	**13.29**	**11.24**	**4.46**	**4.04**	**0.76**	**0.91**

11.12 Concrete Batching

11.12.1 Process Description [1-5]

Concrete is composed essentially of water, cement, sand (fine aggregate) and coarse aggregate. Coarse aggregate may consist of gravel, crushed stone or iron blast furnace slag. Some specialty aggregate products could be either heavyweight aggregate (of barite, magnetite, limonite, ilmenite, iron or steel) or lightweight aggregate (with sintered clay, shale, slate, diatomaceous shale, perlite, vermiculite, slag pumice, cinders, or sintered fly ash). Supplementary cementitious materials, also called mineral admixtures or pozzolan minerals may be added to make the concrete mixtures more economical, reduce permeability, increase strength, or influence other concrete properties. Typical examples are natural pozzolans, fly ash, ground granulated blast-furnace slag, and silica fume, which can be used individually with portland or blended cement or in different combinations. Chemical admixtures are usually liquid ingredients that are added to concrete to entrain air, reduce the water required to reach a required slump, retard or accelerate the setting rate, to make the concrete more flowable or other more specialized functions.

Approximately 75 percent of the U.S. concrete manufactured is produced at plants that store, convey, measure and discharge these constituents into trucks for transport to a job site. At most of these plants, sand, aggregate, cement and water are all gravity fed from the weight hopper into the mixer trucks. The concrete is mixed on the way to the site where the concrete is to be poured. At some of these plants, the concrete may also be manufactured in a central mix drum and transferred to a transport truck. Most of the remaining concrete manufactured are products cast in a factory setting. Precast products range from concrete bricks and paving stones to bridge girders, structural components, and panels for cladding. Concrete masonry, another type of manufactured concrete, may be best known for its conventional 8 x 8 x 16-inch block. In a few cases concrete is dry batched or prepared at a building construction site. Figure 11.12-1 is a generalized process diagram for concrete batching.

The raw materials can be delivered to a plant by rail, truck or barge. The cement is transferred to elevated storage silos pneumatically or by bucket elevator. The sand and coarse aggregate are transferred to elevated bins by front end loader, clam shell crane, belt conveyor, or bucket elevator. From these elevated bins, the constituents are fed by gravity or screw conveyor to weigh hoppers, which combine the proper amounts of each material.

11.12.2 Emissions and Controls [6-8]

Particulate matter, consisting primarily of cement and pozzolan dust but including some aggregate and sand dust emissions, is the primary pollutant of concern. In addition, there are emissions of metals that are associated with this particulate matter. All but one of the emission points are fugitive in nature. The only point sources are the transfer of cement and pozzolan material to silos, and these are usually vented to a fabric filter or “sock”. Fugitive sources include the transfer of sand and aggregate, truck loading, mixer loading, vehicle traffic, and wind erosion from sand and aggregate storage piles. The amount of fugitive emissions generated during the transfer of sand and aggregate depends primarily on the surface moisture content of these materials. The extent of fugitive emission control varies widely from plant to plant. Particulate emission factors for concrete batching are give in Tables 11.12-1 and 11.12-2.

TABLE 11.12-2 (ENGLISH UNITS)
EMISSION FACTORS FOR CONCRETE BATCHING [a]

Source (SCC)	Uncontrolled				Controlled			
	Total PM	Emission Factor Rating	Total PM_{10}	Emission Factor Rating	Total PM	Emission Factor Rating	Total PM_{10}	Emission Factor Rating
Aggregate transfer [b] (3-05-011-04,-21,23)	0.0069	D	0.0033	D	ND		ND	
Sand transfer [b] (3-05-011-05,22,24)	0.0021	D	0.00099	D	ND		ND	
Cement unloading to elevated storage silo (pneumatic)[c] (3-05-011-07)	0.73	E	0.47	E	0.00099	D	0.00034	D
Cement supplement unloading to elevated storage silo (pneumatic)[d] (3-05-011-17)	3.14	E	1.10	E	0.0089	D	0.0049	E
Weigh hopper loading [e] (3-05-011-08)	0.0048	D	0.0028	D	ND		ND	
Mixer loading (central mix)[f] (3-05-011-09)	0.572 or Eqn. 11.12-1	B	0.156 or Eqn. 11.12-1	B	0.0184 or Eqn. 11.12-1	B	0.0055 or Eqn. 11.12-1	B
Truck loading (truck mix)[g] (3-05-011-10)	1.118	B	0.310	B	0.098 or Eqn. 11.12-1	B	0.0263 or Eqn. 11.12-1	B
Vehicle traffic (paved roads)	See AP-42 Section 13.2.1, Paved Roads							
Vehicle traffic (unpaved roads)	See AP-42 Section 13.2.2, Unpaved Roads							
Wind erosion from aggregate and sand storage piles	See AP-42 Section 13.2.5, Industrial Wind Erosion							

ND = No data

[a] All emission factors are in lb of pollutant per ton of material loaded unless noted otherwise. Loaded material includes course aggregate, sand, cement, cement supplement and the surface moisture associated with these materials. The average material composition of concrete batches presented in references 9 and 10 was 1865 lbs course aggregate, 1428 lbs sand, 491 lbs cement and 73 lbs cement supplement. Approximately 20 gallons of water was added to this solid material to produce 4024 lbs (one cubic yard) of concrete.

[b] Reference 9 and 10. Emission factors are based upon an equation from AP-42, section 13.2.4 Aggregate Handling And Storage Piles, equation 1 with k_{PM-10} =.35, k_{PM} = .74, U = 10mph, $M_{aggregate}$ =1.77%, and M_{sand} = 4.17%. These moisture contents of the materials ($M_{aggregate}$ and M_{sand}) are the averages of the values obtained from Reference 9 and Reference 10.

[c] The uncontrolled PM & PM-10 emission factors were developed from Reference 9. The controlled emission factor for PM was developed from References 9, 10, 11, and 12. The controlled emission factor for PM-10 was developed from References 9 and 10.

[d] The controlled PM emission factor was developed from Reference 10 and Reference 12, whereas the controlled PM-10 emission factor was developed from only Reference 10.

[e] Emission factors were developed by using the Aggregate and Sand Transfer Emission Factors in conjunction with the ratio of aggregate and sand used in an average $yard^3$ of concrete. The unit for these emission factors is lb of pollutant per ton of aggregate and sand.

[f] References 9, 10, and 14. The emission factor units are lb of pollutant per ton of cement and cement supplement. The general factor is the arithmetic mean of all test data.

[g] Reference 9, 10, and 14. The emission factor units are lb of pollutant per ton of cement and cement supplement. The general factor is the arithmetic mean of all test data.

The particulate matter emissions from truck mix and central mix loading operations are calculated in accordance with the values in Tables 11.12-1 or 11.12-2 or by Equation 11.12-1[14] when site specific data are available.

$$E = k\,(0.0032)\left[\frac{U^a}{M^b}\right] + c \qquad \text{Equation 11.12-1}$$

E	=	Emission factor in lbs./ton of cement and cement supplement
k	=	Particle size multiplier (dimensionless)
U	=	Wind speed at the material drop point, miles per hour (mph)
M	=	Minimum moisture (% by weight) of cement and cement supplement
a, b	=	Exponents
c	=	Constant

The parameters for Equation 11.12-1 are summarized in Tables 11.12-3 and 11.12-4.

Table 11.12-3. Equation Parameters for Truck Mix Operations

Condition	Parameter Category	k	a	b	c
Controlled[1]	Total PM	0.8	1.75	0.3	0.013
	PM_{10}	0.32	1.75	0.3	0.0052
	$PM_{10-2.5}$	0.288	1.75	0.3	0.00468
	$PM_{2.5}$	0.048	1.75	0.3	0.00078
Uncontrolled[1]	Total PM	0.995			
	PM_{10}	0.278			
	$PM_{10-2.5}$	0.228			
	$PM_{2.5}$	0.050			

Table 11.12-4. Equation Parameters for Central Mix Operations

Condition	Parameter Category	k	a	b	c
Controlled[1]	Total PM	0.19	0.95	0.9	0.0010
	PM_{10}	0.13	0.45	0.9	0.0010
	$PM_{10-2.5}$	0.12	0.45	0.9	0.0009
	$PM_{2.5}$	0.03	0.45	0.9	0.0002
Uncontrolled[1]	Total PM	5.90	0.6	1.3	0.120
	PM_{10}	1.92	0.4	1.3	0.040
	$PM_{10-2.5}$	1.71	0.4	1.3	0.036
	$PM_{2.5}$	0.38	0.4	1.3	0

1. Emission factors expressed in lbs/tons of cement and cement supplement

To convert from units of lbs/ton to units of kilograms per mega gram, the emissions calculated by Equation 11.12-1 should be divided by 2.0.

Particulate emission factors per yard of concrete for an average batch formulation at a typical facility are given in Tables 11.12-5 and 11.12-6. For truck mix loading and central mix loading, the

11.19.2 Crushed Stone Processing and Pulverized Mineral Processing

11.19.2.1 Process Description [24, 25]

Crushed Stone Processing

Major rock types processed by the crushed stone industry include limestone, granite, dolomite, traprock, sandstone, quartz, and quartzite. Minor types include calcareous marl, marble, shell, and slate. Major mineral types processed by the pulverized minerals industry, a subset of the crushed stone processing industry, include calcium carbonate, talc, and barite. Industry classifications vary considerably and, in many cases, do not reflect actual geological definitions.

Rock and crushed stone products generally are loosened by drilling and blasting and then are loaded by power shovel or front-end loader into large haul trucks that transport the material to the processing operations. Techniques used for extraction vary with the nature and location of the deposit. Processing operations may include crushing, screening, size classification, material handling and storage operations. All of these processes can be significant sources of PM and PM-10 emissions if uncontrolled.

Quarried stone normally is delivered to the processing plant by truck and is dumped into a bin. A feeder is used as illustrated in Figure 11.19.2-1. The feeder or screens separate large boulders from finer rocks that do not require primary crushing, thus reducing the load to the primary crusher. Jaw, impactor, or gyratory crushers are usually used for initial reduction. The crusher product, normally 7.5 to 30 centimeters (3 to 12 inches) in diameter, and the grizzly throughs (undersize material) are discharged onto a belt conveyor and usually are conveyed to a surge pile for temporary storage or are sold as coarse aggregates.

The stone from the surge pile is conveyed to a vibrating inclined screen called the scalping screen. This unit separates oversized rock from the smaller stone. The undersized material from the scalping screen is considered to be a product stream and is transported to a storage pile and sold as base material. The stone that is too large to pass through the top deck of the scalping screen is processed in the secondary crusher. Cone crushers are commonly used for secondary crushing (although impact crushers are sometimes used), which typically reduces material to about 2.5 to 10 centimeters (1 to 4 inches). The material (throughs) from the second level of the screen bypasses the secondary crusher because it is sufficiently small for the last crushing step. The output from the secondary crusher and the throughs from the secondary screen are transported by conveyor to the tertiary circuit, which includes a sizing screen and a tertiary crusher.

Tertiary crushing is usually performed using cone crushers or other types of impactor crushers. Oversize material from the top deck of the sizing screen is fed to the tertiary crusher. The tertiary crusher output, which is typically about 0.50 to 2.5 centimeters (3/16th to 1 inch), is returned to the sizing screen. Various product streams with different size gradations are separated in the screening operation. The products are conveyed or trucked directly to finished product bins, to open area stock piles, or to other processing systems such as washing, air separators, and screens and classifiers (for the production of manufactured sand).

Some stone crushing plants produce manufactured sand. This is a small-sized rock product with a maximum size of 0.50 centimeters (3/16 th inch). Crushed stone from the tertiary sizing screen is sized in a vibrating inclined screen (fines screen) with relatively small mesh sizes.

Oversized material is processed in a cone crusher or a hammermill (fines crusher) adjusted to produce small diameter material. The output is returned to the fines screen for resizing.

In certain cases, stone washing is required to meet particulate end product specifications or demands.

Pulverized Mineral Processing

Pulverized minerals are produced at specialized processing plants. These plants supply mineral products ranging from sizes of approximately 1 micrometer to more than 75 micrometers aerodynamic diameter. Pharmaceutical, paint, plastics, pigment, rubber, and chemical industries use these products. Due to the specialized characteristics of the mineral products and the markets for these products, pulverized mineral processing plants have production rates that are less than 5% of the production capacities of conventional crushed stone plants. Two alternative processing systems for pulverized minerals are summarized in Figure 11-19.2-2.

In dry processing systems, the mineral aggregate material from conventional crushing and screening operations is subject to coarse and fine grinding primarily in roller mills and/or ball mills to reduce the material to the necessary product size range. A classifier is used to size the ground material and return oversized material that can be pulverized using either wet or dry processes. The classifier can either be associated with the grinding operation, or it can be a stand-alone process unit. Fabric filters control particulate matter emissions from the grinding operation and the classifier. The products are stored in silos and are shipped by truck or in bags.

In wet processing systems, the mineral aggregate material is processed in wet mode coarse and fine grinding operations. Beneficiation processes use flotation to separate mineral impurities. Finely ground material is concentrated and flash dried. Fabric filters are used to control particulate matter emissions from the flash dryer. The product is then stored in silos, bagged, and shipped.

Table 11.19.2-2 (English Units). EMISSION FACTORS FOR CRUSHED STONE PROCESSING OPERATIONS (lb/Ton)[a]

Source [b]	Total Particulate Matter [r,s]	EMISSION FACTOR RATING	Total PM-10	EMISSION FACTOR RATING	Total PM-2.5	EMISSION FACTOR RATING
Primary Crushing (SCC 3-05-020-01)	ND		ND[n]		ND[n]	
Primary Crushing (controlled) (SCC 3-05-020-01)	ND		ND[n]		ND[n]	
Secondary Crushing (SCC 3-05-020-02)	ND		ND[n]		ND[n]	
Secondary Crushing (controlled) (SCC 3-05-020-02)	ND		ND[n]		ND[n]	
Tertiary Crushing (SCC 3-050030-03)	0.0054[d]	E	0.0024[o]	C	ND[n]	
Tertiary Crushing (controlled) (SCC 3-05-020-03)	0.0012[d]	E	0.00054[p]	C	0.00010[q]	E
Fines Crushing (SCC 3-05-020-05)	0.0390[e]	E	0.0150[e]	E	ND	
Fines Crushing (controlled) (SCC 3-05-020-05)	0.0030[f]	E	0.0012[f]	E	0.000070[q]	E
Screening (SCC 3-05-020-02, 03)	0.025[c]	E	0.0087[l]	C	ND	
Screening (controlled) (SCC 3-05-020-02, 03)	0.0022[d]	E	0.00074[m]	C	0.000050[q]	E
Fines Screening (SCC 3-05-020-21)	0.30[g]	E	0.072[g]	E	ND	
Fines Screening (controlled) (SCC 3-05-020-21)	0.0036[g]	E	0.0022[g]	E	ND	
Conveyor Transfer Point (SCC 3-05-020-06)	0.0030[h]	E	0.00110[h]	D	ND	
Conveyor Transfer Point (controlled) (SCC 3-05-020-06)	0.00014[i]	E	4.6×10^{-5}[i]	D	1.3×10^{-5}[q]	E
Wet Drilling - Unfragmented Stone (SCC 3-05-020-10)	ND		8.0×10^{-5}[j]	E	ND	
Truck Unloading -Fragmented Stone (SCC 3-05-020-31)	ND		1.6×10^{-5}[j]	E	ND	
Truck Unloading - Conveyor, crushed stone (SCC 3-05-020-32)	ND		0.00010[k]	E	ND	

a. Emission factors represent uncontrolled emissions unless noted. Emission factors in lb/Ton of material of throughput. SCC = Source Classification Code. ND = No data.

b. Controlled sources (with wet suppression) are those that are part of the processing plant that employs current wet suppression technology similar to the study group. The moisture content of the study group without wet suppression systems operating (uncontrolled) ranged from 0.21 to 1.3 percent, and the same facilities operating wet suppression systems (controlled) ranged from 0.55 to 2.88 percent. Due to carry over of the small amount of moisture required, it has been shown that each source, with the exception of crushers, does not need to employ direct water sprays. Although the moisture content was the only variable measured, other process features may have as much influence on emissions from a given source. Visual observations from each source under normal operating conditions are probably the best indicator of which emission factor is most appropriate. Plants that employ substandard control measures as indicated by visual observations should use the uncontrolled factor with an appropriate control efficiency that best reflects the effectiveness of the controls employed.

c. References 1, 3, 7, and 8

d. References 3, 7, and 8

e. Reference 4

f. References 4 and 15

g. Reference 4

h. References 5 and 6

i. References 5, 6, and 15

j. Reference 11

k. Reference 12

l. References 1, 3, 7, and 8

m. References 1, 3, 7, 8, and 15

n. No data available, but emission factors for PM-10 for tertiary crushers can be used as an upper limit for primary or secondary crushing

o. References 2, 3, 7, 8

p. References 2, 3, 7, 8, and 15

q. Reference 15

r. PM emission factors are presented based on PM-100 data in the Background Support Document for Section 11.19.2

s. Emission factors for PM-30 and PM-50 are available in Figures 11.19.2-3 through 11.19.2-6.

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13.2.2 Unpaved Roads

13.2.2.1 General

When a vehicle travels an unpaved road, the force of the wheels on the road surface causes pulverization of surface material. Particles are lifted and dropped from the rolling wheels, and the road surface is exposed to strong air currents in turbulent shear with the surface. The turbulent wake behind the vehicle continues to act on the road surface after the vehicle has passed.

The particulate emission factors presented in the previous draft version of this section of AP-42, dated October 2001, implicitly included the emissions from vehicles in the form of exhaust, brake wear, and tire wear as well as resuspended road surface material[25]. EPA included these sources in the emission factor equation for unpaved public roads (equation 1b in this section) since the field testing data used to develop the equation included both the direct emissions from vehicles and emissions from resuspension of road dust.

This version of the unpaved public road emission factor equation only estimates particulate emissions from resuspended road surface material [23, 26]. The particulate emissions from vehicle exhaust, brake wear, and tire wear are now estimated separately using EPA's MOBILE6.2 [24]. This approach eliminates the possibility of double counting emissions. Double counting results when employing the previous version of the emission factor equation in this section and MOBILE6.2 to estimate particulate emissions from vehicle traffic on unpaved public roads. It also incorporates the decrease in exhaust emissions that has occurred since the unpaved public road emission factor equation was developed. The previous version of the unpaved public road emission factor equation includes estimates of emissions from exhaust, brake wear, and tire wear based on emission rates for vehicles in the 1980 calendar year fleet. The amount of PM released from vehicle exhaust has decreased since 1980 due to lower new vehicle emission standards and changes in fuel characteristics.

13.2.2.2 Emissions Calculation And Correction Parameters[1-6]

The quantity of dust emissions from a given segment of unpaved road varies linearly with the volume of traffic. Field investigations also have shown that emissions depend on source parameters that characterize the condition of a particular road and the associated vehicle traffic. Characterization of these source parameters allow for "correction" of emission estimates to specific road and traffic conditions present on public and industrial roadways.

Dust emissions from unpaved roads have been found to vary directly with the fraction of silt (particles smaller than 75 micrometers [μm] in diameter) in the road surface materials.[1] The silt fraction is determined by measuring the proportion of loose dry surface dust that passes a 200-mesh screen, using the ASTM-C-136 method. A summary of this method is contained in Appendix C of AP-42. Table 13.2.2-1 summarizes measured silt values for industrial unpaved roads. Table 13.2.2-2 summarizes measured silt values for public unpaved roads. It should be noted that the ranges of silt content vary over two orders of magnitude. Therefore, the use of data from this table can potentially introduce considerable error. Use of this data is strongly discouraged when it is feasible to obtain locally gathered data.

Since the silt content of a rural dirt road will vary with geographic location, it should be measured for use in projecting emissions. As a conservative approximation, the silt content of the parent soil in the area can be used. Tests, however, show that road silt content is normally lower than in the surrounding parent soil, because the fines are continually removed by the vehicle traffic, leaving a higher percentage of coarse particles.

Other variables are important in addition to the silt content of the road surface material. For example, at industrial sites, where haul trucks and other heavy equipment are common, emissions are highly correlated with vehicle weight. On the other hand, there is far less variability in the weights of cars and pickup trucks that commonly travel publicly accessible unpaved roads throughout the United States. For those roads, the moisture content of the road surface material may be more dominant in determining differences in emission levels between, for example a hot, desert environment and a cool, moist location.

The PM-10 and TSP emission factors presented below are the outcomes from stepwise linear regressions of field emission test results of vehicles traveling over unpaved surfaces. Due to a limited amount of information available for PM-2.5, the expression for that particle size range has been scaled against the result for PM-10. Consequently, the quality rating for the PM-2.5 factor is lower than that for the PM-10 expression.

Table 13.2.2-1. TYPICAL SILT CONTENT VALUES OF SURFACE MATERIAL ON INDUSTRIAL UNPAVED ROADS[a]

Industry	Road Use Or Surface Material	Plant Sites	No. Of Samples	Silt Content (%)	
				Range	Mean
Copper smelting	Plant road	1	3	16 - 19	17
Iron and steel production	Plant road	19	135	0.2 - 19	6.0
Sand and gravel processing	Plant road	1	3	4.1 - 6.0	4.8
	Material storage area	1	1	-	7.1
Stone quarrying and processing	Plant road	2	10	2.4 - 16	10
	Haul road to/from pit	4	20	5.0-15	8.3
Taconite mining and processing	Service road	1	8	2.4 - 7.1	4.3
	Haul road to/from pit	1	12	3.9 - 9.7	5.8
Western surface coal mining	Haul road to/from pit	3	21	2.8 - 18	8.4
	Plant road	2	2	4.9 - 5.3	5.1
	Scraper route	3	10	7.2 - 25	17
	Haul road (freshly graded)	2	5	18 - 29	24
Construction sites	Scraper routes	7	20	0.56-23	8.5
Lumber sawmills	Log yards	2	2	4.8-12	8.4
Municipal solid waste landfills	Disposal routes	4	20	2.2 - 21	6.4

[a]References 1,5-15.

The following empirical expressions may be used to estimate the quantity in pounds (lb) of size-specific particulate emissions from an unpaved road, per vehicle mile traveled (VMT):

For vehicles traveling on unpaved surfaces at industrial sites, emissions are estimated from the following equation:

$$E = k\,(s/12)^a (W/3)^b \tag{1a}$$

and, for vehicles traveling on publicly accessible roads, dominated by light duty vehicles, emissions may be estimated from the following:

$$E = \frac{k\,(s/12)^a (S/30)^d}{(M/0.5)^c} - C \tag{1b}$$

where k, a, b, c and d are empirical constants (Reference 6) given below and

E = size-specific emission factor (lb/VMT)
s = surface material silt content (%)
W = mean vehicle weight (tons)
M = surface material moisture content (%)
S = mean vehicle speed (mph)
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

The source characteristics s, W and M are referred to as correction parameters for adjusting the emission estimates to local conditions. The metric conversion from lb/VMT to grams (g) per vehicle kilometer traveled (VKT) is as follows:

1 lb/VMT = 281.9 g/VKT

The constants for Equations 1a and 1b based on the stated aerodynamic particle sizes are shown in Tables 13.2.2-2 and 13.2.2-4. The PM-2.5 particle size multipliers (k-factors) are taken from Reference 27.

Table 13.2.2-2. CONSTANTS FOR EQUATIONS 1a AND 1b

Constant	Industrial Roads (Equation 1a)			Public Roads (Equation 1b)		
	PM-2.5	PM-10	PM-30*	PM-2.5	PM-10	PM-30*
k (lb/VMT)	0.15	1.5	4.9	0.18	1.8	6.0
a	0.9	0.9	0.7	1	1	1
b	0.45	0.45	0.45	-	-	-
c	-	-	-	0.2	0.2	0.3
d	-	-	-	0.5	0.5	0.3
Quality Rating	B	B	B	B	B	B

*Assumed equivalent to total suspended particulate matter (TSP)
"-" = not used in the emission factor equation

Table 13.2.2-2 also contains the quality ratings for the various size-specific versions of Equation 1a and 1b. The equation retains the assigned quality rating, if applied within the ranges of source conditions, shown in Table 13.2.2-3, that were tested in developing the equation:

Table 13.2.2-3. RANGE OF SOURCE CONDITIONS USED IN DEVELOPING EQUATION 1a AND 1b

Emission Factor	Surface Silt Content, %	Mean Vehicle Weight		Mean Vehicle Speed		Mean No. of Wheels	Surface Moisture Content, %
		Mg	ton	km/hr	mph		
Industrial Roads (Equation 1a)	1.8-25.2	1.8-260	2-290	8-69	5-43	4-17[a]	0.03-13
Public Roads (Equation 1b)	1.8-35	1.4-2.7	1.5-3	16-88	10-55	4-4.8	0.03-13

[a] See discussion in text.

As noted earlier, the models presented as Equations 1a and 1b were developed from tests of traffic on unpaved surfaces. Unpaved roads have a hard, generally nonporous surface that usually dries quickly after a rainfall or watering, because of traffic-enhanced natural evaporation. (Factors influencing how fast a road dries are discussed in Section 13.2.2.3, below.) The quality ratings given above pertain to the mid-range of the measured source conditions for the equation. A higher mean vehicle weight and a higher than normal traffic rate may be justified when performing a worst-case analysis of emissions from unpaved roads.

The emission factors for the exhaust, brake wear and tire wear of a 1980's vehicle fleet (*C*) was obtained from EPA's MOBILE6.2 model [23]. The emission factor also varies with aerodynamic size range

13.2.4 Aggregate Handling And Storage Piles

13.2.4.1 General

Inherent in operations that use minerals in aggregate form is the maintenance of outdoor storage piles. Storage piles are usually left uncovered, partially because of the need for frequent material transfer into or out of storage.

Dust emissions occur at several points in the storage cycle, such as material loading onto the pile, disturbances by strong wind currents, and loadout from the pile. The movement of trucks and loading equipment in the storage pile area is also a substantial source of dust.

13.2.4.2 Emissions And Correction Parameters

The quantity of dust emissions from aggregate storage operations varies with the volume of aggregate passing through the storage cycle. Emissions also depend on 3 parameters of the condition of a particular storage pile: age of the pile, moisture content, and proportion of aggregate fines.

When freshly processed aggregate is loaded onto a storage pile, the potential for dust emissions is at a maximum. Fines are easily disaggregated and released to the atmosphere upon exposure to air currents, either from aggregate transfer itself or from high winds. As the aggregate pile weathers, however, potential for dust emissions is greatly reduced. Moisture causes aggregation and cementation of fines to the surfaces of larger particles. Any significant rainfall soaks the interior of the pile, and then the drying process is very slow.

Silt (particles equal to or less than 75 micrometers [μm] in diameter) content is determined by measuring the portion of dry aggregate material that passes through a 200-mesh screen, using ASTM-C-136 method.[1] Table 13.2.4-1 summarizes measured silt and moisture values for industrial aggregate materials.

The quantity of particulate emissions generated by either type of drop operation, per kilogram (kg) (ton) of material transferred, may be estimated, with a rating of A, using the following empirical expression:[11]

$$E = k(0.0016) \frac{\left(\frac{U}{2.2}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \text{ (kg/megagram [Mg])}$$

$$E = k(0.0032) \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \text{ (pound [lb]/ton)} \quad (1)$$

where:

E = emission factor
k = particle size multiplier (dimensionless)
U = mean wind speed, meters per second (m/s) (miles per hour [mph])
M = material moisture content (%)

The particle size multiplier in the equation, k, varies with aerodynamic particle size range, as follows:

Aerodynamic Particle Size Multiplier (k) For Equation 1				
< 30 µm	< 15 µm	< 10 µm	< 5 µm	< 2.5 µm
0.74	0.48	0.35	0.20	0.053[a]

[a] Multiplier for < 2.5 µm taken from Reference 14.

The equation retains the assigned quality rating if applied within the ranges of source conditions that were tested in developing the equation, as follows. Note that silt content is included, even though silt content does not appear as a correction parameter in the equation. While it is reasonable to expect that silt content and emission factors are interrelated, no significant correlation between the 2 was found during the derivation of the equation, probably because most tests with high silt contents were conducted under lower winds, and vice versa. It is recommended that estimates from the equation be reduced 1 quality rating level if the silt content used in a particular application falls outside the range given:

Ranges Of Source Conditions For Equation 1			
Silt Content (%)	Moisture Content (%)	Wind Speed	
		m/s	mph
0.44 - 19	0.25 - 4.8	0.6 - 6.7	1.3 - 15

To retain the quality rating of the equation when it is applied to a specific facility, reliable correction parameters must be determined for specific sources of interest. The field and laboratory procedures for aggregate sampling are given in Reference 3. In the event that site-specific values for

Attachment D
Aerial Site Location Map

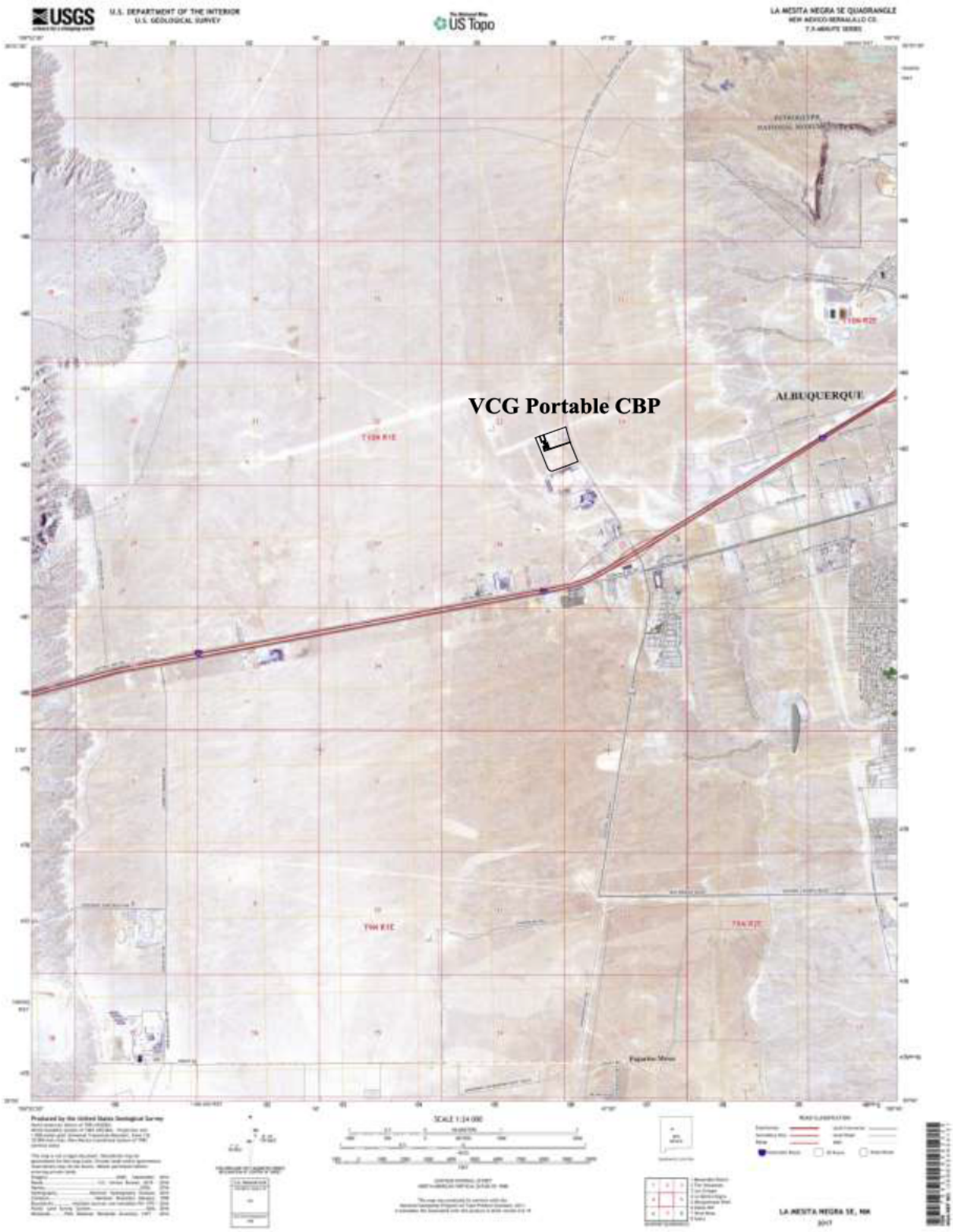

Figure D-1: 7.5' Topographical Map Showing Site Location in Relation to Albuquerque

Figure D-1: Aerial Map Showing Site Location in Relation to Albuquerque

Attachment E
Facility Process Description

Process Flow Description

The VCG's Portable Concrete Batch Plant is a portable plant manufactured by Rexcon, Model Mobile 12 SE and include four (4) aggregate feeders and transfer conveyors, 4-bin aggregate feeder, weight batcher with delivery conveyor, cement silo and guppies (2), fly ash silo and guppy, 12 yard central mixer, cement/fly ash batcher, central baghouse, a 500 kW diesel-fired generator to power the plant (Unit 9), concrete additive, and control trailer.

Raw aggregate rock and washed sand will be delivered and stored on site (Unit 10). A front-end loader will take material from the storage piles and load the appropriate aggregate feeder (Unit 1). From the aggregate feeders, the material will be transferred by conveyor (Unit 2) to a 4-bin aggregate bin (Unit 3). When needed, measured quantities of sand and aggregate will be dropped into the weight batcher (Unit 4). The measured materials will be transferred to the 12-yard central mixer (Unit 5) by a delivery conveyor (Unit 4), where the aggregate material is combined with cement, fly ash, additives, and water. Storage silos and guppies store cement (Unit 6) and fly ash (Unit 7) materials until metered to the cement/fly ash batcher (Unit 8).

Fugitive dust will be controlled by several methods. Dust created during aggregate handling will be kept to a minimum by adding water to the aggregate piles, as needed. The central baghouse will control fugitive dust emissions from loading the central concrete mixer, loading the cement silo and guppies (2), loading the fly ash silo and guppy, and loading the cement and fly ash batcher. Millings or surfactants, and watering (90% control), will be used to minimize fugitive dust on the unpaved truck traffic areas leading in and out of the facility. Process flow diagram is presented as Figure A-1 in Attachment A.

Attachment F
Regulatory Applicability Determinations

The following is a list of city and federal regulations that may or may not be applicable to VCG

Albuquerque/Bernalillo County Regulations

20.11.1 NMAC– General Provisions: Applicable to VCG

Requirement: Compliance with ambient air quality standards.

Compliance: Compliance with 20.11.8 NMAC is compliance with this regulation.

20.11.2 NMAC– Permit Fees: Applicable to VCG

Requirement: A one-time permit application fee will be assessed by the Albuquerque/Bernalillo County Environmental Department.

Compliance: VCG will pay all required permit revision application fees applicable to their facility.

20.11.5 NMAC– Visible Air Contaminants: Applicable to VCG

Requirement: Places limits of 20 percent opacity on stationary combustion equipment.

Compliance: VCG will perform any required opacity observations for the concrete batch plant engine using Method 9 and/or Method 22 with certified opacity observers.

20.11.8 NMAC– Ambient Air Quality Standards: Applicable to VCG

Requirement: Compliance with state and federal ambient air quality standards.

Compliance: VCG's Portable Concrete Batch Plant demonstrated compliance by performing and submitting dispersion modeling analysis for applicable pollutants per Albuquerque/ Bernalillo County and New Mexico State Environmental Department's modeling guidelines.

20.11.41 NMAC– Authority to Construct: Applicable to VCG

Requirement: Requires the facility to obtain a permit prior to start of construction.

Compliance: VCG is applying for a new 20.11.41 NMAC permit with this application.

20.11.49 NMAC– Excess Emissions: Applicable to VCG

Requirement: To implement requirements for the reporting of excess emissions and establish affirmative defense provisions for facility owners and operators for excess emissions.

Compliance: VCG will report all excess emissions following 20.11.49 NMAC guidelines.

20.11.63 NMAC– New Source Performance Standards: Not Applicable to VCG at this time

Requirement: Adoption of all federal 40 CFR Part 60 new source performance standards.

Compliance: 40 CFR Part 60 NSPS Subpart IIII has been identified for this permit application.

The engine is portable and will not be located more than 12 months at the initial site. Under these conditions the engine is a "non-road" engine, not a stationary source, so they are exempt under Subpart IIII. If the engine is located at one site for more than 12 consecutive months or continuously for multiple years at a seasonal facility, it would become applicable to Subpart IIII.

20.11.64 NMAC– Emission Standards for Hazardous Air Pollutants for Stationary Sources: Not Applicable to VCG at this time

Requirement: Adoption of all federal 40 CFR Part 61 and 63 National Emissions Standards for Hazardous Air Pollutants (HAPS).

Compliance: 40 CFR Part 63 NSPS Subpart ZZZZ has been identified for this permit application.

The engine is portable and will not be located more than 12 months at the initial site. Under these conditions the engine is a "non-road" engine, not stationary source, so they are exempt under Subpart ZZZZ. If the engine is located at one site for more than 12 consecutive months or continuously for multiple years at a seasonal facility, it would become applicable to Subpart ZZZZ.

20.11.66 NMAC– Process Equipment: Applicable to VCG

Requirement: The objective of this Part is to achieve attainment of regulatory air pollution standards and to minimize air pollution emissions.

Compliance: Except as otherwise provided in this section, VCG shall not cause or allow the emission of particulate matter to the atmosphere from process equipment in any one hour in total quantities in excess of the amount shown in 20.11.66.18 NMAC Table 1.

20.11.67 NMAC–Equipment, Emissions, Limitations: Not Applicable to VCG

Requirement: To prevent equipment covered by this Part from being constructed, placed, maintained, altered, used, or operated unless the equipment meets the applicable emission limitations established by 20.11.67 NMAC.

Compliance: No stationary source for Orchard Heaters; Kraft Mills; Coal, Oil, or Gas Burning Equipment is located on site.

20.11.90 NMAC– Administration, Enforcement, Inspection: Applicable to VCG

Requirement: General requirement on record keeping and data submission. VCG will notify the bureau regarding periods of excess emissions along with cause of the excess and actions taken to minimize duration and recurrence.

Compliance: It is expected that specific record keeping and data submission requirements will be specified in the 20.11.41 NMAC permit issued to VCG. It is expected the 20.11.41 NMAC permit issued to VCG will contain specific methods for determining compliance with each specific emission limitation. VCG's Portable Concrete Plant will report any periods of excess emissions as required by specific 20.11.90 NMAC provisions.

Federal Regulations

40 CFR 50 – National Ambient Air Quality Standards: Applicable to VCG

Requirement: Compliance with federal ambient air quality standards.

Compliance: VCG's Concrete Batch Plant demonstrated compliance by performing and submitting dispersion modeling analysis for applicable pollutants per Albuquerque/ Bernalillo County and New Mexico State Environmental Department's modeling guidelines in the original permit application.

40 CFR 60 Dc – NSPS Standards of Performance for Small Industrial-Commercial-Institutional Stream Generating Units: Not Applicable to VCG

Requirement: For any affected facility to which this subpart applies is each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 100 million Btu per hour of less, but greater than or equal to 10 million Btu per hour. A steam generating unit is defined as a device that combusts any fuel and produces steam or heats water or any other heat transfer medium.

Compliance: No hot water boiler is proposed for this permit.

40 CFR 60 IIII – NSPS Standards of Performance for Stationary Compression Ignition Internal Combustion Engine: Not Applicable to VCG at this time

Requirement: The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines (ICE).

Compliance: The engine is portable and will not be located more than 12 months at the initial site. Under these conditions the engine is a "non-road" engine, not stationary source, so they are exempt under Subpart IIII. If the engine is located at one site for more than 12 consecutive months or continuously for multiple years at a seasonal facility, it would become applicable to Subpart IIII.

40 CFR 63 ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines: Not Applicable to VCG at this time

Requirement: Facilities are subject to this subpart if they own or operate a stationary RICE, except if the stationary RICE is being tested at a stationary RICE test cell/stand.

Compliance: The engine is portable and will not be located more than 12 months at the initial site. Under these conditions the engine is a "non-road" engine, not stationary source, so they are exempt under Subpart ZZZZ. If the engine is located at one site for more than 12 consecutive months or continuously for multiple years at a seasonal facility, it would become applicable to Subpart ZZZZ.

Attachment G
Dispersion Modeling Summary

DISPERSION MODEL PROTOCOL
FOR VITAL CONSULTING GROUP, LLC
NEW AIR QUALITY PERMIT
NEW PORTABLE CBP SITE

Albuquerque, New Mexico

PREPARED FOR
VITAL CONSULTING GROUP, LLC

Revised April 9, 2020

Prepared by

Montrose Air Quality Services, LLC

MONTROSE
AIR QUALITY SERVICES

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1.0 INTRODUCTION

This dispersion modeling analysis will be conducted by Montrose Air Quality Services, LLC. (Montrose) on behalf of Vital Consulting Group, LLC (VCG), to evaluate ambient air quality impacts for a new portable concrete batch plant (CBP) to be sited just south of the proposed Amazon Warehouse site during construction. VCG is applying for a 20.11.41 NMAC Permit. The plant is identified as VCG's Portable Concrete Batch Plant and will be initially located just south of the proposed Amazon site at 701 Atrisco Vista Blvd, in Bernalillo County, NM. The UTM coordinates of the proposed portable CBP will be; 335,830 easting, 3,883,170 northing, zone 13, NAD 83. The objective of this evaluation is to determine whether ambient air concentrations from the maximum operation of the proposed project for nitrogen dioxide, carbon monoxide, sulfur dioxide, and particulate matter; both 10 microns or less (PM_{10}) and 2.5 microns or less ($PM_{2.5}$); are below Class II federal and state ambient air quality standards (NAAQS and NMAAQS) found in 40 CFR part 50 and the City of Albuquerque/Bernalillo County (COABC) air quality regulation 20.11.8 NMAC.

The dispersion modeling will be conducted using the American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee Dispersion Model (AERMOD), Version 19191. This model is recommended by EPA for determining Class II impacts within 50 km of the source being assessed. Additionally, AERMOD was developed to handle complex terrain. In this analysis, AERMOD will be used to estimate pollutant ambient air concentrations from the VCG Portable CBP emission sources. Montrose employs the general modeling procedures outlined in "Permit Modeling Guidelines, Albuquerque Environmental Health Department", revised 10/10/2019, "New Mexico Air Pollution Control Bureau, Dispersion Modeling Guidelines", revised 01/01/2019, and the most up to date EPA's *Guideline on Air Quality Models*.

Aggregate material handling equipment, stockpiles, and haul roads will be input into the model as volume sources. Sources with stack releases will be input into the model as point sources.

The portable concrete batch plant will be sited south of the construction project on land originally supporting softball fields. The site is presently fenced with the plant located within this site. This fence line will constitute the model boundary.

Aggregate, cement, and fly ash delivery trucks will travel from the Atrisco Vista Blvd entrance to the site of the portable CBP. Concrete trucks will travel to and from the portable CBP by a loop road that enters and leaves from the north end of the property.

No additional neighboring sources have been identified for this model analysis.

Figure 1 below shows the location of the site overview.

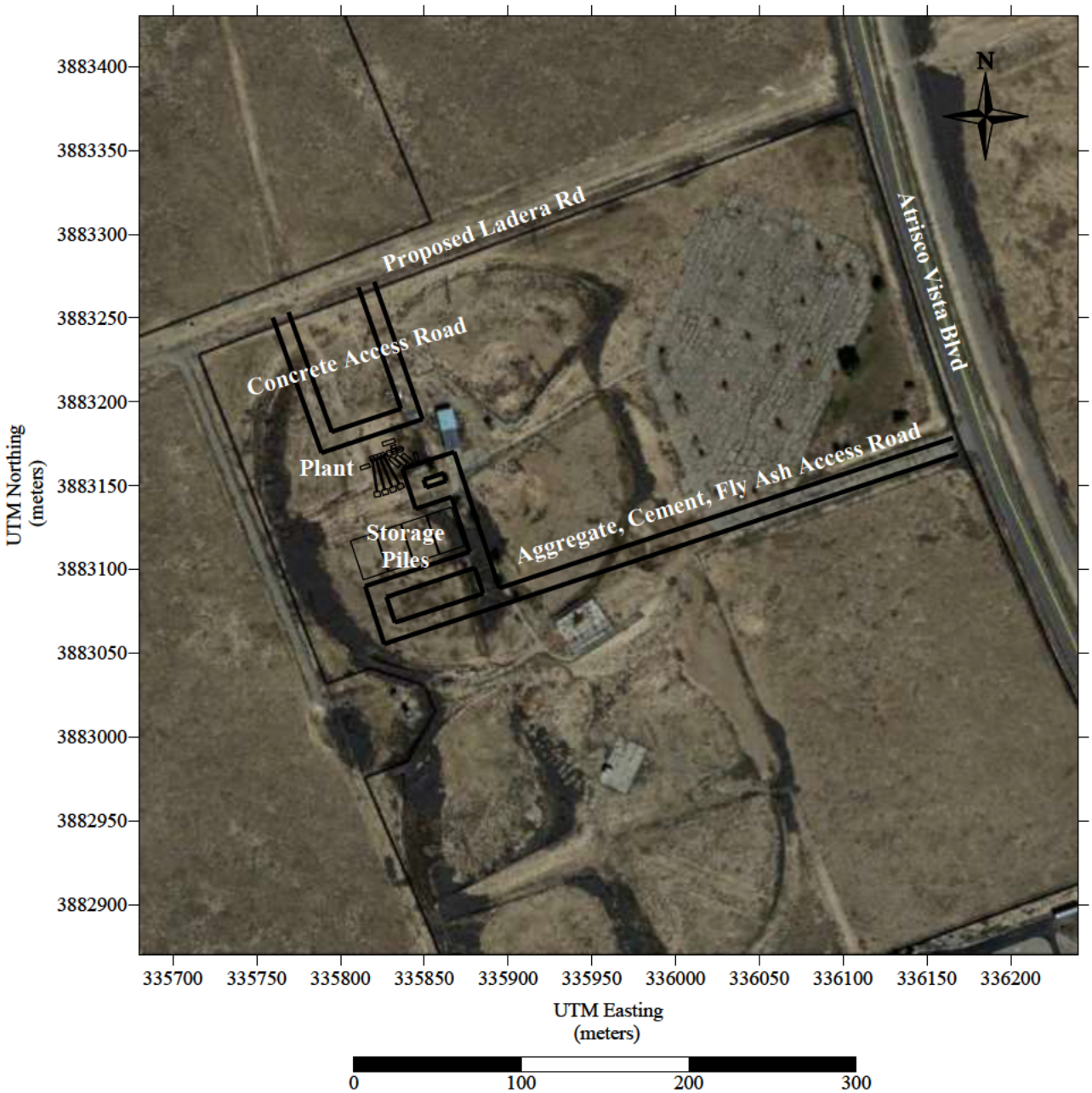


Figure 1: VCG's Portable Concrete Batch Plant Site Overview

Figure 2 below shows the location of the plant within the site.

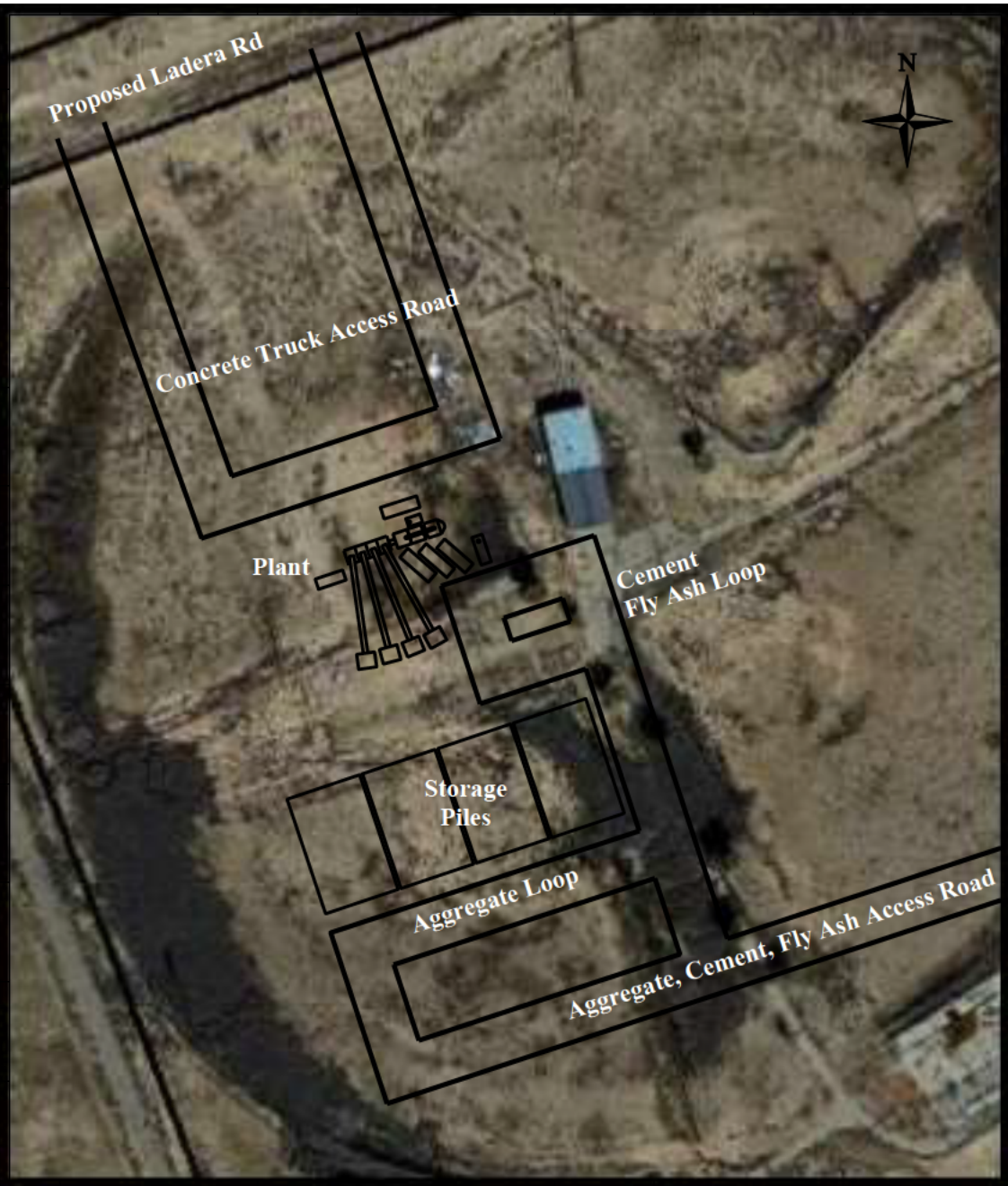


Figure 2: VCG's Portable Concrete Batch Plant Overview of Plant Layout

Figure 3 below shows the layout of the plant.

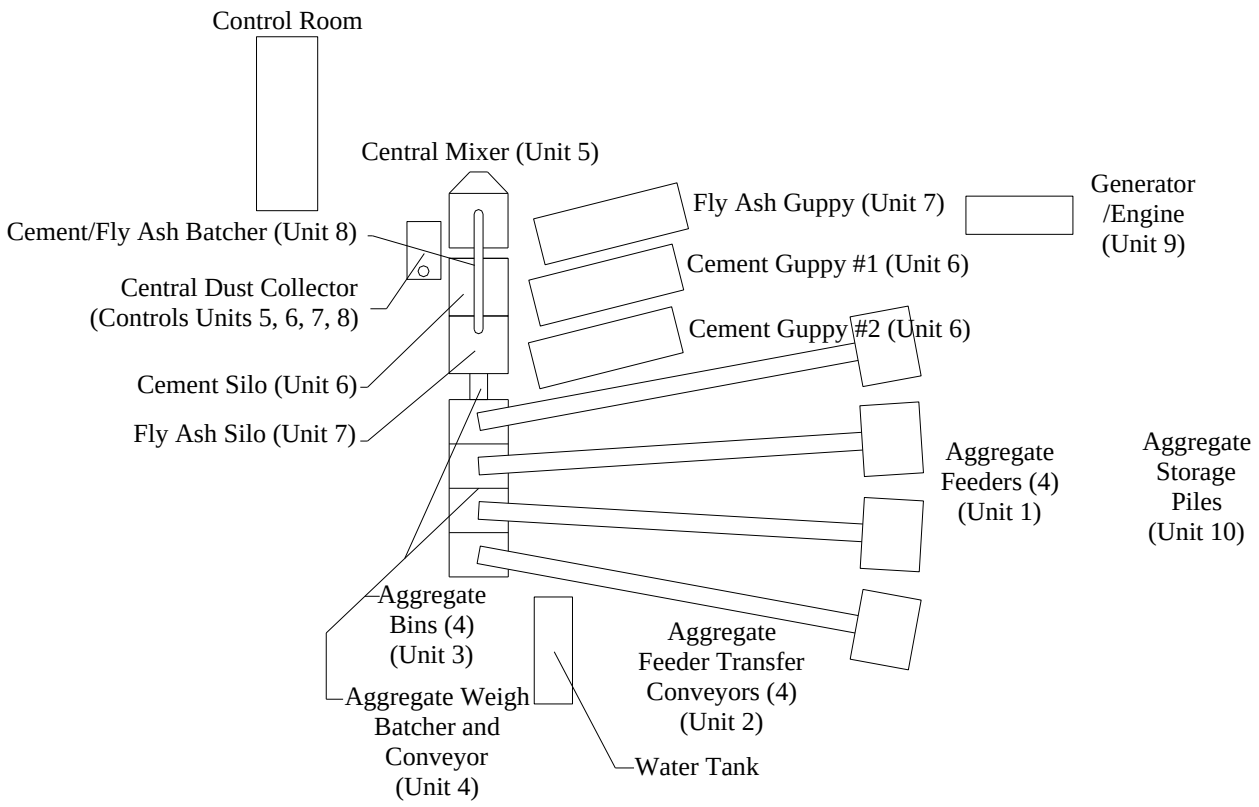


Figure 3: VCG's Portable Concrete Batch Plant Layout

2.0 DISPERSION MODELING PROTOCOL

This section identifies the technical approach and dispersion model inputs that will be used for the Class II federal and State ambient air quality standards for this source. COABC Air Quality Program (AQP) requires that all applicable criteria pollutant emissions be modeled using the most recent versions of US EPA's approved models and be compared with National Ambient Air Quality Standards (NAAQS), and New Mexico Ambient Air Quality Standards. Table 1 shows the NAAQS and Bernalillo County Ambient Air Quality Standards that the source's ambient impacts must meet in order to demonstrate compliance. Table 1 also lists the Class II Significant Impact Levels (SILs) which are used to assess whether a source has a significant impact at downwind receptors.

The dispersion modeling analysis will be performed to estimate concentrations resulting from the operation of the VCG sources using the proposed maximum permitted emission rates while all emission sources are operating. The modeling will determine the maximum off-site concentrations for nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), and particulate matter; both 10 microns or less (PM_{10}) and 2.5 microns or less ($PM_{2.5}$), for comparison with modeling significance levels, national/New Mexico ambient air quality standards (AAQS). The modeling will follow the guidance and protocols outlined in the "Permit Modeling Guidelines, Albuquerque Environmental Health Department", revised 10/10/2019, "New Mexico Air Pollution Control Bureau, Dispersion Modeling Guidelines", revised 01/01/2019, and the most up to date EPA's *Guideline on Air Quality Models*.

Initial modeling will be performed with VCG sources only to determine pollutant and averaging periods that exceeds pollutant SILs. If initial modeling for any pollutant and averaging period exceeds SILs, then cumulative modeling will be performed for those pollutants and averaging periods for all receptors that exceeds the SILs and will include background ambient concentrations. Table 1 lists the SILs, NAAQS and NMAAQS for each pollutant averaging period.

TABLE 1: National and New Mexico Ambient Air Quality Standard Summary

Pollutant	Avg. Period	Sig. Lev. ($\mu g/m^3$)	Class I Sig. Lev. ($\mu g/m^3$)	NAAQS	NMAAQS	PSD Increment Class I	PSD Increment Class II
CO	8-hour	500		9,000 ppb(1)	8,700 ppb(2)		
	1-hour	2,000		35,000 ppb(1)	13,100 ppb(2)		
NO_2	annual	1.0	0.1	53 ppb(3)	50 ppb(2)	2.5 $\mu g/m^3$	25 $\mu g/m^3$
	24-hour	5.0			100 ppb(2)		
	1-hour	7.52		100 ppb(4)			
$PM_{2.5}$	annual	0.2	0.05	12 $\mu g/m^3$(5)		1 $\mu g/m^3$	4 $\mu g/m^3$
	24-hour	1.2	0.27	35 $\mu g/m^3$(6)		2 $\mu g/m^3$	9 $\mu g/m^3$
PM_{10}	annual	1.0	0.2			4 $\mu g/m^3$	17 $\mu g/m^3$
	24-hour	5.0	0.3	150 $\mu g/m^3$(7)		8 $\mu g/m^3$	30 $\mu g/m^3$
SO_2	annual	1.0	0.1		20 ppb(2)	2 $\mu g/m^3$	20 $\mu g/m^3$
	24-hour	5.0	0.2		100 ppb(2)	5 $\mu g/m^3$	91 $\mu g/m^3$
	3-hour	25.0	1.0	500 ppb(1)		25 $\mu g/m^3$	512 $\mu g/m^3$
	1-hour	7.8		75 ppb(8)			

Standards converted from ppb to $\mu g/m^3$ use a reference temperature of 25° C and a reference pressure of 760 millimeters of mercury.
(1) Not to be exceeded more than once each year.
(2) Not to be exceeded.
(3) Annual mean.
(4) 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years.
(5) Annual mean, averaged over 3 years.
(6) 98th percentile, averaged over 3 years.
(7) Not to be exceeded more than once per year on average over 3 years.
(8) 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years.

2.1 DISPERSION MODEL SELECTION

The dispersion modeling will be conducted using the American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee Dispersion Model (AERMOD), Version 19191. This model is recommended by EPA for determining Class II impacts within 50 km of the source being assessed. Additionally, AERMOD was developed to handle complex terrain. In this analysis, AERMOD will be used to estimate pollutant ambient air concentrations of NO_2, CO, SO_2, PM_{10}, and $PM_{2\ 5}$ from VCG emission sources.

AERMOD is a Gaussian plume dispersion model that is based on planetary boundary layer principles for characterizing atmospheric stability. The model evaluates the non-Gaussian vertical behavior of plumes during convective conditions with the probability density function and the superposition of several Gaussian plumes. AERMOD modeling system has three components: AERMAP, AERMET, and AERMOD. AERMAP is the terrain preprocessor program. AERMET is the meteorological data preprocessor. AERMOD includes the dispersion modeling algorithms and was developed to handle simple and complex terrain issues using improved algorithms. AERMOD uses the dividing streamline concept to address plume interactions with elevated terrain.

AERMOD was run using all the regulatory default options including use of:

- Gradual Plume Rise
- Stack-tip Downwash
- Buoyancy-induced Dispersion
- Calms and Missing Data Processing Routine
- Upper-bound downwash concentrations for super-squat buildings
- Default wind speed profile exponents
- Calculate Vertical Potential Temperature Gradient
- No use of gradual plume rise
- Rural Dispersion

2.2 BUILDING WAKE EFFECTS

No buildings are on site that are associated with the portable CBP are included in the model to determine building downwash source parameters using the BPIP-Prime program.

2.3 METEOROLOGICAL DATA

Dispersion model meteorological input file to be used in this modeling analysis are years 2014 - 2018 Albuquerque met data (AERMET version 19191 dated 01/31/2020) available from the COABC AQP.

2.4 RECEPTORS AND TOPOGRAPHY

Modeling will be completed using as many receptor locations to ensure that the maximum estimated impacts are identified. Initial radius of impact modeling will be performed with receptors within 3 kilometers of the model boundary. Because of the nature of the emissions from the site, it is expected the maximum concentrations will be on or near the site fenceline.

The refined receptor grid will include receptors located at 50 meters apart out to 500 meters from the property line, 100 meters apart from 500 meters out to 2000 meters, and 250 meters apart from 2000 meters out to 5000 meters. Fenceline receptor spacing will be 25 meters.

All refined model receptors will be preprocessed using the AERMAP software associated with AERMOD. The AERMAP software establishes a base elevation and a height scale for each receptor location. The height scale is a measure of the receptor's location and base elevation and its relation to the terrain feature that has the greatest influence in dispersion for that receptor. AERMAP will be run using U.S. Geological Survey (USGS) digital elevation model (DEM) data. Output from AERMAP will be used as input to the AERMOD runstream file for each model run.

2.5 MODELED EMISSION SOURCES INPUTS

The proposed permitted operating time for the facilities concrete production is 24 hours per day, 7 days per week at 270 cubic yards per hour. The permitted operating time for the facilities concrete production is 24 hours per day as seen in Table 2. Within those hours the plant will limit daily throughput to 2,160 cubic yards per day or an equivalent to operate at maximum hourly throughput of 270 cubic yards per hour for 8 hours. For the VCG combustion emission source, this will be modeled for all proposed operating hours found in Table 2. For particulate modeling, the 8-hour blocks vary starting from 12 AM, then shifting on 2-hour intervals for 12 separate model runs as summarized in Table 3. Using the results of the significant impact particulate modeling, CIA modeling will include VCG Portable CBP sources and an applicable ambient background.

TABLE 2: Portable CBP Daily Hours of Operation (MST) (Engine Model Hours)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
12:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
1:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
2:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
3:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
4:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
5:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
6:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
7:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
8:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
9:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
10:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
11:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
12:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
1:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
2:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
3:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
4:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
5:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
6:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
7:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
8:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
9:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
10:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
11:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
Total	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**24**

TABLE 3: Portable Concrete Plant Particulate Model Scenario Time Segments

Model Scenario	January - December Time Segments 8-Hour Blocks
1	12 AM to 8 AM
2	2 AM to 10 AM
3	4 AM to 12 PM
4	6 AM to 2 PM
5	8 AM to 4 PM
6	10 AM to 6 PM
7	12 PM to 8 PM
8	2 PM to 10 PM
9	4 PM to 12 AM
10	6 PM to 2 AM
11	8 PM to 4 AM
12	10 PM to 6 PM

2.5.1 VCG Facility Road Vehicle Traffic Model Inputs

The access road fugitive dust for truck traffic within the construction area will be modeled as a line of volume sources. Only VCG haul truck traffic will be modeled. The NMED AQB's approved procedure for Modeling Haul Roads, large trucks, will be followed to develop modeling input parameters for haul roads. Volume source characterization followed the steps described in the NMED Air Quality Bureau's Guidelines.

2.5.2 VCG Facility Material Handling Volume Source Model Inputs

Particulate emissions from material handling and process from aggregate unloading, transfers and storage will be modeled as volume sources. Model input parameters for feeder, aggregate bins, and transfer points follow the NMED Air Quality Bureau's model guidelines Table 27. CBP storage piles (SP1, SP2, SP3, SP4) model inputs were based on a pile length of 50 feet for CBP storage piles (SYINIT), dust plume height of 16 feet (SZINIT), and release height of 8 feet.

2.5.3 VCG Facility Point Source Model Inputs

Emissions from the facility dust collector exhaust stack and combustion source will be modeled as point sources. Model input parameters are based on information provided by the manufacturer on release heights, release diameters, release velocity or flow rates, and exhaust temperatures. For horizontal or raincap releases, the AERMOD version for horizontal and raincap releases will be used with actual release parameters.

Tables 4 through 6 summarize the model input for the VCG Plant.

TABLE 4: Summary of Particulate Model Inputs for Point Sources at the VCG Portable CBP

Source Description	Model ID	Stack Height (m)	Stack Temp. (K)	Exit Vel. (m/s)	Stack Dia. (m)	PM10 Emission Rate (lbs/hr)	PM2.5 Emission Rate (lbs/hr)
Concrete Mixer Central Baghouse (Unit 5,6,7,8)	CMBH	2.4384	0.0000	13.7160	0.7099	0.07679	0.07679
Concrete Batch Plant Engine (Unit 9)	CBPE	3.6576	761.8700	46.1658	0.2033	0.15000	0.15000

TABLE 5: Summary of Combustion Model Inputs for Point Sources at the VCG Portable CBP

Source Description	Model ID	Stack Height (m)	Stack Temp. (K)	Exit Vel. (m/s)	Stack Dia. (m)	NOx Emission Rate (lbs/hr)	CO Emission Rate (lbs/hr)	SO2 Emission Rate (lbs/hr)
Concrete Batch Plant Engine (Unit 9)	CBPE	3.6576	761.8700	46.1658	0.2033	5.27000	0.94000	0.00750

TABLE 6: Summary of Model Inputs for Volume Sources at the VCG Portable CBP

Source Description	Model ID	Release Height (meter)	Horizontal Dimension (meters)	Vertical Dimension (meters)	PM10 Emission Rate (lbs/hr)	PM2.5 Emission Rate (lbs/hr)
Feed Hopper Loading 1 (Unit 1)	FH1	6.0000	1.1600	2.3300	0.15244	0.02308
Feed Hopper Loading 2 (Unit 1)	FH2	6.0000	1.1600	2.3300	0.15244	0.02308
Feed Hopper Loading 3 (Unit 1)	FH3	6.0000	1.1600	2.3300	0.15244	0.02308
Feed Hopper Loading 4 (Unit 1)	FH4	6.0000	1.1600	2.3300	0.15244	0.02308
Feed Hopper Unloading to Conveyor 1 (Unit 2)	TP1	2.0000	0.4700	0.9300	0.00466	0.00132
Feed Hopper Unloading to Conveyor 2 (Unit 2)	TP2	2.0000	0.4700	0.9300	0.00466	0.00132

Source Description	Model ID	Release Height (meter)	Horizontal Dimension (meters)	Vertical Dimension (meters)	PM10 Emission Rate (lbs/hr)	PM2.5 Emission Rate (lbs/hr)
Feed Hopper Unloading to Conveyor 3 (Unit 2)	TP3	2.0000	0.4700	0.9300	0.00466	0.00132
Feed Hopper Unloading to Conveyor 4 (Unit 2)	TP4	2.0000	0.4700	0.9300	0.00466	0.00132
Aggregate Bin Loading (Unit 3)	AB	4.0000	1.1600	2.3300	0.60975	0.09233
Aggregate Weigh Batcher and Conveyor (Unit 4)	WH	2.0000	1.1600	2.3300	0.01863	0.00527
Storage Piles (Aggregate) (Unit 10)	SP1	2.4384	3.5400	2.2700	0.19950	0.03021
Storage Piles (Aggregate) (Unit 10)	SP2	2.4384	3.5400	2.2700	0.19950	0.03021
Storage Piles (Sand) (Unit 10)	SP3	2.4384	3.5400	2.2700	0.19950	0.03021
Storage Piles (Sand) (Unit 10)	SP4	2.4384	3.5400	2.2700	0.19950	0.03021
Aggregate Truck Route Volume 1-58 (each)	AGG_0001-58	3.4000	6.0500	3.1600	0.02368	0.00237
Cement, Fly Ash, and Aggregate Truck Route Volume 1-60 (each)	CEM_0001-60	3.4000	6.0500	3.1600	0.00493	0.00049
Concrete Truck Route Volume 1-16 (each)	CON_0001-16	3.4000	6.0500	3.1600	0.03204	0.00320

2.6 PARTICLE SIZE DISTRIBUTION

PM_{10} emissions may be modeled with plume depletion. Plume deposition simulates the effect of gravity as particles "fall-out" from the plume to the ground as the plume travels downwind. Therefore, the farther the plume travels from the emission point to the receptor, the greater the effect of plume deposition and the greater the decrease in modeled impacts or concentrations. Particle size distribution, particle mass fraction, and particle density are required inputs to the model to perform this function.

The particle size distribution data used in the modeling for aggregate handling (aggregate) is based upon data obtained from the City of Albuquerque AQB's "Air Dispersion Modeling Guidelines for Air Quality Permitting", revised 12/20/18, Table 1. Particle size distribution for fugitive road dust was obtained from the New Mexico Environmental Department (NMED) Air Quality Bureau (ABQ) based on the particle size *k* factors found in the AP-42 13.2.2 emission equations for unpaved roads (ver. 11/06). Cement and fly ash silo loading baghouse emission sources particle size distribution came from NMED AQB accepted values.

The mass-mean particle diameter was calculated using the formula:

$$d = ((d^3_1 + d^2_1 d_2 + d_1 d^2_2 + d^3_2) / 4)^{1/3}$$

Where: d = mass-mean particle diameter
d_1 = low end of particle size category range
d_2 = high end of particle size category range

Representative average particle densities for particle types emitted in the modeling analysis were obtained from NMED accepted values and an internet search. For the central baghouse, aggregate, cement, and fly ash particles will be emitted. To account for the worst-case scenario, the density of fly ash was selected to account for longer deposition from the source. The list below summarizes these values.

Material	Bulk Density (g/cm^3)	Density Information Source
Aggregate, Road Dust	2.5	NMED
Soot (Exhaust)	1.5	NMED
Fly Ash	1.04	NMED

The densities and size distribution for PM_{10} emission sources are presented in Tables 7, 8, 9, 10, and 11.

TABLE 7: Aggregate Handling Fugitive Source Depletion Parameters

Particle Size Category (µm)	Mass Mean Particle Diameter (µm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
2.5 – 5	3.88	22.6	2.5
5 – 10	7.77	77.4	2.5

Parameters based on values from the Albuquerque Air Quality Division Modeling Guidelines.

TABLE 8: Vehicle Fugitive Dust Depletion Parameters

Particle Size Category (µm)	Mass Mean Particle Diameter (µm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
0 – 2.5	1.57	25.0	2.5
2.5 – 10	6.92	75.0	2.5

NMED: Based on AP-42 Section 13.2.2 k factors

TABLE 9: Combustion Depletion Parameters

Particle Size Category (µm)	Mass Mean Particle Diameter (µm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
0 – 10	1.57	100.0	1.5

NMED

TABLE 10: Facility Baghouse Source Depletion Parameters

Particle Size Category (µm)	Mass Mean Particle Diameter (µm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
0 – 2.5	1.57	25.0	1.04
2.5 – 10	6.91	75.0	1.04

NMED

2.7 $PM_{2.5}$ SECONDARY EMISSIONS MODELING

The form of the $PM_{2.5}$ 24-hour design value is based on the 98th percentile or the highest 8th high result. Calculated $PM_{2.5}$ combustion emission rates included into the model consist of both filterable and condensable components. Secondary $PM_{2.5}$ emissions from combustion sources are created by the conversion to nitrates and sulfates as the exhaust plume travels away from the source and mixes with ambient air. Fugitive dust emission sources do not consist of a condensable component and will not create secondary emissions of $PM_{2.5}$.

$PM_{2.5}$ secondary emission concentration analysis will follow EPA guidelines. Based on requested permitted emission rates, the Tier 1 analysis was used since direct $PM_{2.5}$ emissions are less than 10 tpy, and NOx and SO_2 emissions are less than 40 tpy. The comparison with the $PM_{2.5}$ 24-hour NAAQS with model results will be based on the 98th percentile or highest 8th high.

2.8 NO_2 MODELING – MULTI-TIERED SCREENING APPROACH

The AERMOD model predicts ground-level concentrations of any generic pollutant without chemical transformations. Thus, the modeled NO_X emission rate will give ground-level modeled concentrations of NO_X. NAAQS values are presented as NO_2.

EPA has a three-tier approach to modeling NO_2 concentrations.

- Tier I – total conversion, or all NOx = NO_2
- Tier II –Ambient Ratio Method 2 (ARM2)
- Tier III – case-by-case detailed screening methods, such as OLM and Plume Volume Molar Ratio Method (PVMRM) and NO_2/NO_X in-stack ratio

Initial modeling will be performed using Tier II methodologies. If these modeling iterations demonstrate that more refined methods for determining 1-hour, 24-hour, and annual NO_2 compliance would be needed for this project, then ambient impact of 1-hour, 24-hour, and annual NO_2 predicted by the model will use Tier III – OLM or PVMRM.

For PVMRM, three inputs can be selected in the model, the ISR, the NO_2/NO_X equilibrium ratio for the ambient air, and the ambient ozone concentration. The ISR will be determined for each source or group of sources. The NO_2/NO_X equilibrium ratio will be the EPA default of 0.90. Ozone input will be from monitored ozone data collected from city monitoring station concurrent to the meteorological data time period.

It is evident from modeling experience that at distances close to a modeled source, the modeled NO_2/NO_X ratio (and, thus, the NO_2 concentration) is highly dependent upon the assumed in-stack ratio. The use of the default ratio of 0.5 can result in large over predictions at a facility fence line.

Based on EPA's ISR databases, a proposed conservative NO_2/NO_X ISR ratio for the proposed site diesel-fired RICE is 0.15.

Proposed NO_2/NOx ratio are listed below.

Source Description	NO_2/NOx Ratio
VCG Plant Engine	0.15 (EPA Default)

For NO_2, NAAQS and NMAAQS applicable averaging periods include 1-hour, 24-hour and annual averages.

Model Ozone Data

For PVMRM, modeling of the project-generated 1-hour NO_2 concentrations requires use of ambient monitored O_3 concentrations. Background ambient O_3 concentrations for the project area during the 2014-2018 meteorological data years have been obtained from the Del Norte (Years 2014 - 2018) monitoring station, which is the monitoring site nearest to the project. This data set is available from the COABC AQP Modeling Section.

2.9 AMBIENT MODELING BACKGROUND

Ambient background concentrations, based on the Del Norte Monitoring Station for CO, NO_2, SO_2, and $PM_{2.5}$, and for PM_{10} the South Valley Monitor Station, will be added to the dispersion modeling results and compared to the NAAQS and NMAAQS. Background concentrations were obtained from the COABC AQP Modeling Section.

CO 1-hr:	1908 micrograms per cubic meter
CO 8-hr:	1221 micrograms per cubic meter
NO_2 24 Hour:	30 micrograms per cubic meter
NO_2 Annual:	30 micrograms per cubic meter
SO_2 1-hr:	13.1 micrograms per cubic meter
SO_2 24-hr:	0 micrograms per cubic meter
SO_2 Annual:	0 micrograms per cubic meter
PM_{10} 24-hr:	35 micrograms per cubic meter
$PM_{2.5}$ 24-hr:	16 micrograms per cubic meter
$PM_{2.5}$ annual:	5.4 micrograms per cubic meter

NO_2 1-hour Background data

NO_2 1-hour background data will be based on the Tier 2 procedure found in EPA guidance documents[1] for determining background concentrations.

> *"Based on this guidance, we believe that an appropriate methodology for incorporating background concentrations in the cumulative impact assessment for the 1-hour NO_2 standard would be to use multiyear averages of the 98th-percentile of the available background concentrations by season and hour-of-day, excluding periods when the source in question is expected to impact the monitored concentration (which is only relevant for modified sources). For situations involving a significant mobile source component to the background monitored concentrations, inclusion of a day-of-week component to the temporal variability may also be appropriate. The rank associated with the 98th-percentile of daily maximum 1-hour values should be generally consistent with the number of "samples" within that distribution for each combination based on the temporal resolution but also account for the number of samples "ignored" in specifying the 98th-percentile based on the annual distribution. For example, Table 1 in Section 5 of Appendix S specifies the rank associated with the 98th-percentile value based on the annual number of days with valid data. Since the number of days per season will range from 90 to 92, Table 1 would indicate that the 2nd-highest value from the seasonal distribution should be used to represent the 98th-percentile. On the other hand, use of the 2nd-highest value for each season would effectively "ignore" only 4 values for the year rather than the 7 values "ignored" from the annual distribution. Balancing these considerations, we recommend that background values by season and hour-of-day used in this context should be based on the 3rd-highest value for each season and hour-of-day combination, whereas the 8th-highest value should be used if values vary by hour-of-day only. For more detailed temporal pairing, such as season by hour-of- day and day-of-week or month by hour-of-day, the 1st-highest values from the distribution for each temporal combination should be used."*

The NO_2 background data was provided by the COAAQP Modeling Section and is presented below in Table 11.

[1] Memo: "Additional Clarification Regarding Application of Appendix W Modeling Guidance for 1-hour N02 National Ambient Air Quality Standard" Tyler Fox, Leader, Air Quality Modeling Group, C439-01, dated March 1, 2011.

TABLE 11: Monitored Seasonal NO_2 Background – 3rd Highest Hourly µg/m³

Hour	Winter	Spring	Summer	Fall
1	72.1	47.6	29.3	65.6
2	67.8	48.3	27.7	59.7
3	67.7	46.0	26.4	57.9
4	68.4	48.9	26.6	58.9
5	69.1	51.7	32.7	58.0
6	69.7	63.9	39.3	57.8
7	72.8	70.7	46.4	63.5
8	77.6	71.8	48.5	64.5
9	80.0	61.1	34.2	65.9
10	71.4	48.0	27.3	55.0
11	62.0	28.6	24.3	47.3
12	48.1	18.9	19.9	35.4
13	36.9	17.6	17.0	28.2
14	35.1	15.7	15.9	25.3
15	33.6	14.8	17.4	24.2
16	37.2	15.3	19.4	28.0
17	48.4	17.1	20.4	38.0
18	73.0	19.4	19.3	69.6
19	79.3	38.5	21.7	79.1
20	78.1	53.2	30.9	77.1
21	77.3	48.0	34.1	73.4
22	76.5	56.3	30.8	70.4
23	75.0	58.8	34.9	69.7
24	72.4	57.9	33.6	70.9

3.0 MODEL SUMMARY

This section summarizes the model results for Class II federal ambient air quality standards for this facility, following the technical approach approved in Section 2 of this report. Model results show for each modeled criteria pollutant and applicable averaging periods for nitrogen dioxide, carbon monoxide, sulfur dioxide, and particulate matter; both 10 microns or less (PM_{10}) and 2.5 microns or less ($PM_{2.5}$), VCG Portable CBP does not contribute to an exceedance of Class II federal and state ambient air quality standards (NAAQS and NMAAQS) and the City of Albuquerque/Bernalillo County (COABC) air quality regulation 20.11.8 NMAC. The modeling followed the guidance and protocols outlined in the model protocol found in Section 2 of this report; the "Permit Modeling Guidelines, Albuquerque Environmental Health Department", revised 12/20/2018; "New Mexico Air Pollution Control Bureau, Dispersion Modeling Guidelines", revised 01/01/2019; and the most up to date EPA's *Guideline on Air Quality Models*.

The proposed permitted operating time for the facilities concrete production is 24 hours per day, 7 days per week at 270 cubic yards per hour. The permitted engine operating time for the facility's concrete production is 24 hours per day as seen in Table 12. Within those hours the plant will limit daily throughput to 2,160 cubic yards per day or an equivalent to operate at maximum hourly throughput of 270 cubic yards per hour for 8 hours. For the VCG combustion emission source, this will be modeled for all proposed operating hours found in Table 12. For particulate modeling, the 8-hour blocks vary starting from 12 AM, then shifting on 2-hour intervals for 12 separate model runs as summarized in Table 13. Using the results of the significant impact particulate modeling, CIA modeling will include VCG Portable CBP sources and an applicable ambient background.

No additional neighboring sources have been identified by the COABC AQP Program to be included in the cumulative impact analysis (CIA) dispersion model.

TABLE 12: Portable CBP Daily Hours of Operation (MST) (Engine Model Hours)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
12:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
1:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
2:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
3:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
4:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
5:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
6:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
7:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
8:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
9:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
10:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
11:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
12:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
1:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
2:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
3:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
4:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
5:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
6:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
7:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
8:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
9:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
10:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
11:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
Total	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**24**

TABLE 13: Portable Concrete Plant Particulate Model Scenario Time Segments

Model Scenario	January - December Time Segments 8-Hour Blocks
1	12 AM to 8 AM
2	2 AM to 10 AM
3	4 AM to 12 PM
4	6 AM to 2 PM
5	8 AM to 4 PM
6	10 AM to 6 PM
7	12 PM to 8 PM
8	2 PM to 10 PM
9	4 PM to 12 AM
10	6 PM to 2 AM
11	8 PM to 4 AM
12	10 PM to 6 PM

3.1 SIGNIFICANT IMPACT LEVEL (SILs) MODELING ANALYSIS

Significant impact level AERMOD dispersion modeling was completed for NO_2, CO, SO_2, PM_{10}, and $PM_{2.5}$. All SIL models were run in terrain mode with VCG Portable CBP emission sources only. Table 14 lists the results of the modeling for pollutants and averaging periods that falls below the applicable SILs.

TABLE 14: Summary of Air Dispersion Modeling Results below SILs

Parameter	Maximum Modeled Concentration ($\mu g/m^3$)	Significant Impact Level ($\mu g/m^3$)	% of SIL
CO 1 Hr.	30.3	2000	1.5
CO 8 Hr.	24.4	500	4.9
SO_2 1 Hr.	0.24	7.8	3.1
SO_2 3 Hr.	0.23	25.0	0.9
SO_2 24 Hr.	0.14	5.0	2.8
SO_2 Annual	0.0097	1.0	1.0

For CO 1-hour and 8-hour averaging periods and SO_2 1-hour, 3-hour, 24-hour and annual averaging periods the model results show impacts below the SILs. No cumulative impact analysis modeling was performed for CO 1-hour and 8-hour averaging periods and SO_2 1-hour, 3-hour, 24-hour and annual averaging periods.

3.2 CUMULATIVE IMPACT ANALYSIS (CIA) MODEL RESULTS

The model results using the maximum operation at VCG Portable CBP and approved ambient background are summarized below in Table 15. Dispersion modeling analysis followed the modeling protocol outline in Section 2 of this report.

TABLE 15: Summary of CIA Modeling Results Including Background

Parameter	Maximum Modeled Concentration ($\mu g/m^3$)	Significant Impact Level ($\mu g/m^3$)	Maximum Modeled Concentration With Background ($\mu g/m^3$)	Lowest Applicable Standard ($\mu g/m^3$)	% of Standard
NO_2 1 Hr. 8th highest 1-hour daily maximum	124.1	7.52	187.4	188	99.7
NO_2 24 Hr.	83.7	5	113.7	188	60.5
NO_2 Annual	6.0	1	36.0	94	38.3
$PM_{2.5}$ 24 Hr. High 8th High	11.8	1.2	27.8	35	79.4
$PM_{2.5}$ Annual	3.05	0.2	8.45	12	70.4
PM_{10} 24 Hr. High 2nd High	105.4	5	140.4	150	93.6

Note: Background concentrations are found in Section 2.9 of the modeling protocol. Dispersion modeling inputs and settings are presented in Section 2.

3.2.1 NO_2 Cumulative Impact Analysis Modeling Results

NO_2 CIA modeling was performed with terrain elevations for VCG Portable CBP. NOx emission rates represented the maximum hourly rate for VCG Portable CBP engine. Dispersion modeling included all initial modeling receptors that were above the NO_2 SILs. For each hour an applicable background was added to the model results.

Table 16 shows the NO_2 8th highest 1-hour daily maximum, 24-hour maximum, and annual model results and highest impact locations for receptors above the SILs.

TABLE 16: NO_2 CIA MODEL RESULTS

	Modeled Concentration ($\mu g/m^3$)	Modeled Concentration With Background ($\mu g/m^3$)	Location UTMs E/N	
NO_2 1 Hr. high 8th highest 1-hour daily maximum	124.1	187.4	335736.0	3883164.7
NO_2 24 Hr.	83.7	113.7	335850.2	3883282.1
NO_2 Annual	6.0	36.0	335727.0	3883187.6

For NO_2 1-hour modeling, 24-hour modeling, and annual averaging periods, the Tier II ARM2 approach found in Section 2.9 of this report was used for the analysis.

Dispersion modeling meteorology for this analysis included 5 years of data, 2014 – 2018 Albuquerque Meteorological data, was obtained from the COABC AQP.

Albuquerque Del Norte Monitor, years 2012 – 2014, 1-hour NO_2 background concentrations found in Section 2.8 of this report were added to the NO_2 1-hour modeled results and compared to the lowest applicable ambient standard.

Model results show the highest annual concentrations, where VCG Portable CBP source makes a significant contribution, occurred at the northwest corner of the site restricted boundary. Model results show the highest 24-hour concentrations, where VCG Portable CBP source makes a significant contribution, occurred along the northern site restricted boundary. For the NO_2 1-hour model, where VCG Portable CBP source makes a significant contribution, occurred along the western site restricted boundary.

Figure 4 shows an aerial map of the NO_2 high 8th highest 1-hour daily maximum concentration, highest 24-hour concentration, and highest annual concentration locations including background where VCG Portable CBP sources contribute above the NO_2 SILs.

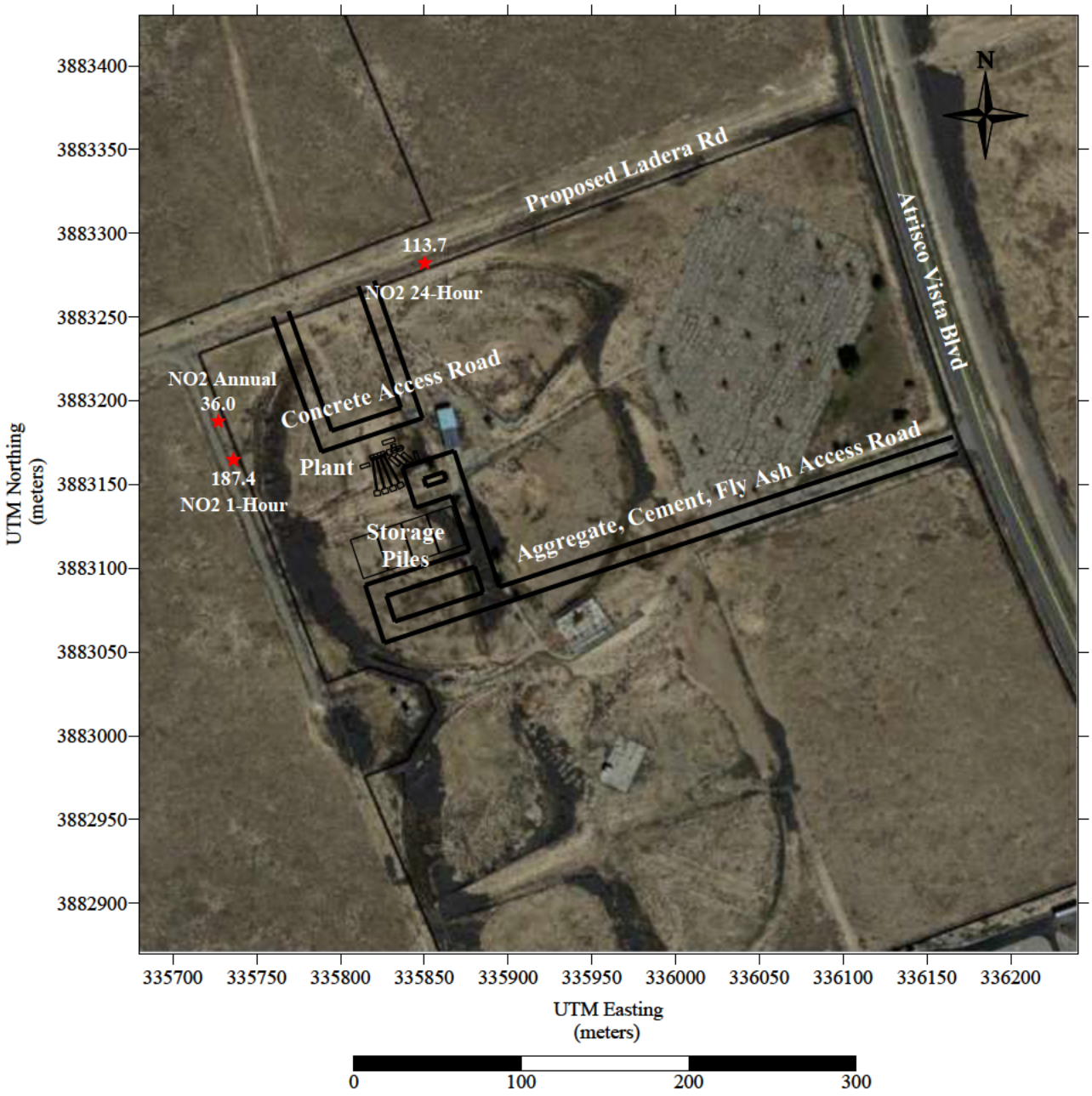


Figure 4: Aerial Map Showing the Location of the NO_2 Highest Applicable Model Result ($\mu g/m^3$)

3.2.2 $PM_{2.5}$ Direct and Secondary Formation CIA Modeling Results

Particulate matter includes both "primary" PM, which is directly emitted into the air, and "secondary" PM, which forms indirectly from fuel combustion and other sources. Primary PM consists of carbon (soot)—emitted from cars, trucks, heavy equipment, forest fires, and burning waste—and crustal material from unpaved roads, stone crushing, construction sites, and metallurgical operations. Secondary PM forms in the atmosphere from gases. Some of these reactions require sunlight and/or water vapor. Secondary PM includes:

- Sulfates formed from sulfur dioxide emissions from power plants and industrial facilities;
- Nitrates formed from nitrogen oxide emissions from cars, trucks, industrial facilities, and power plants; and
- Carbon formed from reactive organic gas emissions from cars, trucks, industrial facilities, forest fires, and biogenic sources such as trees.

AERMOD does not account for secondary formation of $PM_{2.5}$ for near-field modeling. Any secondary contribution of the VCG Portable CBP's source emissions is not explicitly accounted for in the model results. While representative background monitoring data for $PM_{2.5}$ should adequately account for secondary contribution from existing background sources, VCG Portable CBP sources emits less than significant emission rate (SER) of $PM_{2.5}$ precursors (NO_X, SO_2, VOC), so no assessment of their potential contribution to cumulative impacts as secondary $PM_{2.5}$ was performed. Total permit modification emissions of precursors include:

- Nitrogen Oxides (NO_X) – 13.3 tons per year (below SER)
- Sulfur Dioxides (SO_2) – 0.19 tons per year (below SER)
- Volatile Organic Carbon (VOC) – 0.15 tons per year (below SER).

For the VCG Portable CBP, direct "primary" $PM_{2.5}$ emission rates are less than 10 tons per year (Significant Emission Rate - SER), and NO_X and SO_2 emission rates are less than 40 tons per year (SER), falling into category "Case 1" in EPA's May, 2014 "Guidance for $PM_{2.5}$ Permit Modeling". For Case 1, no secondary $PM_{2.5}$ ambient impacts associated with the VCG Portable CBP are required to be addressed.

CIA direct "primary" $PM_{2.5}$ modeling was performed with terrain and meteorology which included 5 years of data, 2014 – 2018 Albuquerque Meteorological data, obtained from the AEHD AQP. Modeling was performed for both 24-hour and annual averaging periods with maximum $PM_{2.5}$ hourly emission rate for VCG Portable CBP sources and all VCG Portable CBP initial modeling receptors that were above the $PM_{2.5}$ SILs. Del Norte representative 24-hour and annual $PM_{2.5}$ background concentrations was added to the modeled results and compared to the lowest applicable ambient standard. The 24-hour and annual background concentrations that were used for $PM_{2.5}$ averaging periods are found in Section 2.9 of this report.

Results showed that direct "primary" $PM_{2.5}$ 24-hour and annual averaging period from VCG The result from direct "primary" $PM_{2.5}$ emissions dispersion modeling, plus a representative $PM_{2.5}$ background concentrations from Section 2.9 of this report, which includes monitored secondary $PM_{2.5}$ concentrations, were used to show compliance with national $PM_{2.5}$ annual and 24-hour average AAQS. Portable CBP sources, where VCG Portable CBP source makes a significant contribution, are located on the northern site boundary. Table 17 below presents the results of all 12 model scenario results. The scenario with the highest modeled concentrations is highlighted below.

TABLE 17: $PM_{2.5}$ CIA MODEL RESULTS - EACH SCENARIO

Model Scenario	24 Hour Average Highest 8th High (µg/m³)	24 Hour Average Highest 8th High with Background (µg/m³)	Annual Average High (µg/m³)	Annual Average High with Background (µg/m³)
1	11.8	27.8	2.91	8.31
2	9.7	25.7	2.48	7.88
3	7.9	23.9	1.88	7.28
4	4.6	20.6	1.15	6.55
5	3.0	19.0	0.79	6.19
6	4.6	20.6	1.03	6.43
7	5.8	21.8	1.30	6.70
8	7.1	23.1	1.57	6.97
9	9.1	25.1	2.09	7.49
10	9.4	25.4	2.60	8.00
11	9.9	25.9	2.91	8.31
12	11.1	27.1	3.11	8.51

Table 18 shows the $PM_{2.5}$ highest 8th high 24-hour daily maximum and highest annual model results and locations.

TABLE 18: $PM_{2.5}$ CIA MODEL RESULTS

	Modeled Concentration (µg/m³)	Modeled Concentration With Background (µg/m³)	Location UTMs E/N	
24-Hour Average Highest 8th High	11.8	27.8	335756.1	3883248.7
Annual Average	3.11	8.51	335756.1	3883248.7

Figure 5 summarize the results of the modeling analysis.

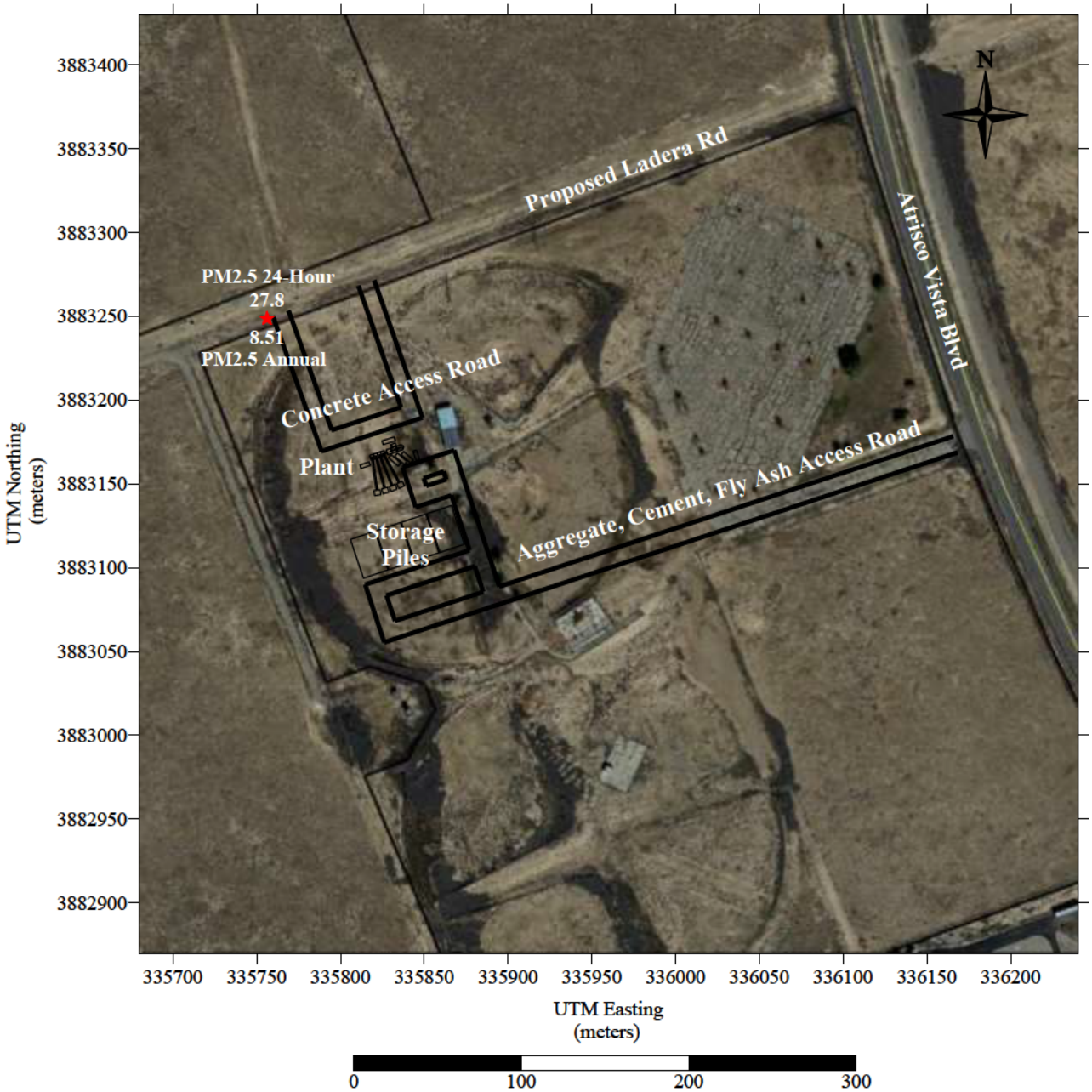


Figure 5: Aerial Map Showing the Location of the $PM_{2.5}$ Applicable Model Results ($\mu g/m^3$)

3.2.3 PM_{10} Cumulative Impact Analysis Modeling Results

CIA PM_{10} modeling was performed with terrain and meteorology which included 5 years of data, 2014 – 2018 Albuquerque Meteorological data, obtained from the AEHD AQP. No plume depletion was incorporated into the model analysis. Modeling was performed for 24-hour averaging period with maximum PM_{10} hourly emission rate for VCG Portable CBP sources and all VCG Portable CBP initial modeling receptors that were above the PM_{10} SILs. South Valley representative 24-hour PM_{10} background concentrations was added to the modeled results and compared to the lowest applicable ambient standard. The 24-hour background concentration that was used for PM_{10} averaging period is found in Section 2.9 of this report.

Results showed that PM_{10}, where VCG Portable CBP source makes a significant contribution, is located on the northern VCG Portable CBP boundary.

The result from PM_{10} emissions dispersion modeling, plus a representative PM_{10} background concentrations from Section 2.9 of this report, were used to show compliance with national PM_{10} 24-hour average AAQS. Table 19 below presents the results of all 12 model scenario results. The scenario with the highest modeled concentrations is highlighted below.

TABLE 19: PM_{10} CIA MODEL RESULTS - EACH SCENARIO

Model Scenario	24 Hour Average High 2nd High ($\mu g/m^3$)	24 Hour Average High 2nd High with Background ($\mu g/m^3$)
1	105.4	140.4
2	89.6	124.6
3	79.2	114.2
4	52.9	87.9
5	32.5	67.5
6	61.5	96.5
7	68.9	103.9
8	78.6	113.6
9	100.2	135.2
10	100.2	135.2
11	97.3	132.3
12	91.1	126.1

Table 20 shows the PM_{10} high 2nd highest 24-hour daily maximum model result and location.

TABLE 20: PM_{10} CIA MODEL RESULTS

	Modeled Concentration ($\mu g/m^3$)	Modeled Concentration With Background ($\mu g/m^3$)	Location UTMs E/N	
24 Hour Average Highest 2nd High	105.4	140.4	335756.1	3883248.7

Figure 6 summarize the results of the modeling analysis.

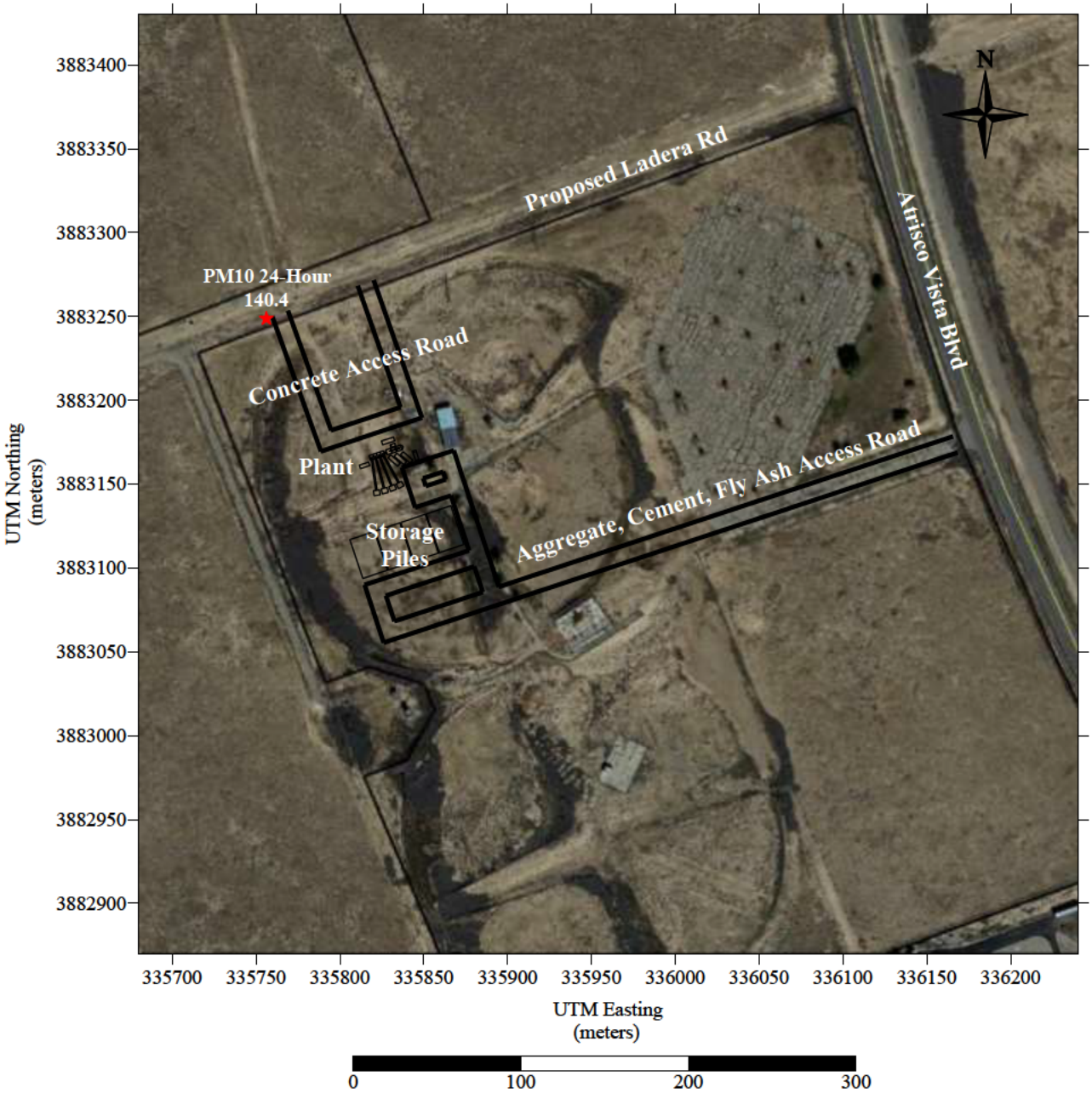


Figure 6: Aerial Map Showing the Location of the PM_{10} High 2nd Highest Model Results ($\mu g/m^3$)

Modeling File List

Model File Name	Description
VitalAmazonCombustROI	VCG Portable CBP Combustion ROI modeling
VitalAmazonPMROIS1-12	VCG Portable CBP PM10 and PM2.5 ROI and CIA modeling, operating scenarios 1 - 12
VitalAmazonNO2 ARM CIA	VCG Portable CBP CIA NO2 ARM2 24-hour and annual averaging periods
VitalAmazonNO2 1HR ARM CIA	VCG Portable CBP CIA NO2 ARM2 1-hour averaging period

Attachment H
Public Notice Documentation

Public notice consists of placing a public notice yellow board at the site entrance. No neighborhoods or associations have been identified within 0.5 mile of the site.

Notice of Intent to Construct

Under 20.11.41.13B NMAC, the owner/operator is required to *provide public notice by certified mail or electronic mail to the designated representative(s) of the recognized neighborhood associations and recognized coalitions that are with-in one-half mile of the exterior boundaries of the property on which the source is or is proposed to be located* if they propose to construct or establish a new facility or make modifications to an existing facility that is subject to 20.11.41 NMAC – Construction Permits. **A copy of this form must be included with the application.**

Applicant's Name and Address: Vital Consulting Group, LLC, 5200 Oakland Ave. STE D, Albuquerque, NM 87113; Mail Address: PO Box 94778, Albuquerque, NM 87199

Owner / Operator's Name and Address: Vital Consulting Group, LLC, 5200 Oakland Ave. STE D, Albuquerque, NM 87113

Actual or Estimated Date the Application will be submitted to the Department: March 30, 2020

Exact Location of the Source or Proposed Source: 701 Atrisco Vista Blvd, Albuquerque, NM 87120. UTM coordinate is 335,830 Easting; 3,883,170 Nothing, NAD 83, Zone 13.

Description of the Source: The permit application is for a new portable concrete batch plant air quality permit. The proposed concrete batch plant is rated by the manufacturer at 270 cubic yards per hour.

Nature of the Business: Portable concrete batch plant to produce concrete at a maximum rate of 270 cubic yards per hour.

Process or Change for which the permit is requested: Permit will include a new portable concrete batch plant which will process 270 cubic yards per hour, 2,160 cubic yards per day, and 500,000 cubic yards per year of concrete.

Preliminary Estimate of the Maximum Quantities of each regulated air contaminant the source will emit:

Initial Construction Permit

	Pounds Per Hour (lbs/hr)	Tons Per Year (tpy)
CO	0.94	2.35
NOx	5.27	13.2
NOx + NMHC	***	***
VOC	0.060	0.15
SO_2	0.0075	0.019
TSP	13.29	11.24
PM10	4.46	4.04
PM2.5	0.76	0.91
VHAP	***	***

Net Changes In Emissions

(Only for permit Modifications or Technical Revisions)

	lbs/hr	tpy	Estimated Total TPY
CO	+/- ***	+/- ***	***
NOx	+/- ***	+/- ***	***
NOx + NMHC	+/- ***	+/- ***	***
VOC	+/- ***	+/- ***	***
SO_2	+/- ***	+/- ***	***
TSP	+/- ***	+/- ***	***
PM10	+/- ***	+/- ***	***
PM2.5	+/- ***	+/- ***	***
VHAP	+/- ***	+/- ***	***

City of Albuquerque- Environmental Health Department
Air Quality Program- Permitting Division
Phone: (505) 768-1972 Email: aqd@cabq.gov

Maximum Operating Schedule: 24 hours per day, 7 days per week, up to 2,160 cubic yards per day

Normal Operating Schedule: Daylight hours, 7 days per week, up to 2,160 cubic yards per day

Current Contact Information for Comments and Inquires:

Name: Vince Martinez, President, Managing Member
Address: PO Box 94778, Albuquerque, NM 87199
Phone Number: (505) 369-0623
E-Mail Address: vincent.martinez@vitalgrp.net

If you have any comments about the construction or operation of the above facility, and you want your comments to be made as part of the permit review process, you must submit your comments in writing to the address below:

Environmental Health Manager

Permitting Division

Albuquerque Environmental Health Department

Air Quality Program

PO Box 1293

Albuquerque, New Mexico 87103

(505) 768-1972

Other comments and questions may be submitted verbally.

Please refer to the company name and facility name, as used in this notice or send a copy of this notice along with your comments, since the Department may not have received the permit application at the time of this notice. Please include a legible mailing address with your comments. Once the Department has performed a preliminary review of the application and its air quality impacts, if required, the Department's notice will be published on the City of Albuquerque's website, https://www.cabq.gov/airquality/air-quality-permits and mailed to neighborhood associations and neighborhood coalitions near the facility location or near the facility proposed location.

NEW M O
SPORTS C R
BASEBALL • SOFTBALL • VOLLEYBALL
COMING EVENTS
VOLLEY BALL · HORSE SHOE
4X4
Mar 30, 2020 10:56:32 AM
630 Tempur Pedic Parkway
Albuquerque
Bernalillo County
New Mexico

PROPOSED AIR QUALITY CONSTRUCTION PERMIT

1. Applicant's Name: Vital Consulting Group, LLC Address: 5200 Oakland Ave., Suite D, Albuquerque, NM 87113
   Owner or Operator's Name: Vital Consulting Group, LLC
   Owner or Operator's Address: 5200 Oakland Ave. Suite D, Albuquerque NM 87113
   Actual or Estimated Date the Application will be Submitted to the Department: March 30, 2020
2. Exact Location of the Source or Proposed Source: 701 Atrisco Vista Blvd UTM: 335,830E; 3,883,170N NAD 83, Zone 13
3. Description of the Source: Concrete Batch Plant, 270 yards per hour

   Nature of the Business: Produce concrete at a maximum rate of 270 yards per hour

   Process or Change for which the permit is being requested: Permit will include a new portable concrete batch plant which will process 270 yard/hr, 3,160 yard/day and 500,000 yards/yr of concrete

   Preliminary Estimate of the Maximum Quantities of each regulated air contaminant the source will emit:

Initial Construction Permit

	Pounds Per Hour (lbs/hr)	Tons Per Year (tpy)
CO	0.94	2.35
NOx	5.27	13.2
SO2	0.0075	0.019
VOC	0.060	0.15
TSP	13.29	11.24
PM10	4.46	4.04
PM2.5	0.76	0.91
VHAP	—	—

Net Changes In Emissions
(for permit Modifications or Technical Revisions)

	Pounds Per Hour (lbs/hr)	Tons Per Year (tpy)	Estimated Total Tons Per Year
CO	+/- —	+/- —	—
NOx	+/- —	+/- —	—
SO2	+/- —	+/- —	—
VOC	+/- —	+/- —	—
TSP	+/- —	+/- —	—
PM10	+/- —	+/- —	—
PM2.5	+/- —	+/- —	—
VHAP	+/- —	+/- —	—

4. Maximum Operating Schedule: 24 hours/day; 7 days/week, up to 3,160 yards/day
   Normal Operating Schedule: Daylight hours; 7 days/week, up to 3,160 yards/day
5. Current Contact Information for Comments and Inquires:
   Name: Vince Martinez
   Address: PO Box 94778, Albuquerque, NM 87199
   Phone Number: (505) 369-0623
   E-Mail Address: vincent.martinez@vitalgrp.net

City of Albuquerque - Environmental Health Department - Air Quality Program - Stationary Source Permitting
Phone Number (505) 768-1972 E-Mail Address: aqd@cabq.gov

THIS SIGN SHALL REMAIN POSTED UNTIL THE DEPARTMENT TAKES FINAL ACTION ON THE PERMIT APPLICATION

Mar 30, 2020 10:56:00 AM
630 Tempur Pedic Parkway
Albuquerque
Bernalillo County
New Mexico

Attachment I

Other Relevant Documentation

Mobile 12 SE in travel position

Single freight load conveyor/hopper system

Mobile central dust collector unit

Nothing Beats a Rex!

Mobile 12 SE CM with self-suporting dump cone

Mobile 12 SE TM

Mobile 12 SE CM with dust hood truss support

Mobile 12 SE TM with decumulative batchers and loading ramp

2841 WHITING ROAD BURLINGTON WI 53105
Tel (262) 539-4050 Fax (262) 539-4487
www.REXCON.com

MADE IN THE USA

REXCON

THE MOST VERSATILE PORTABLE BATCH PLANT

Mobile 12 SE

Self-Erecting Portable Concrete Batch Plant

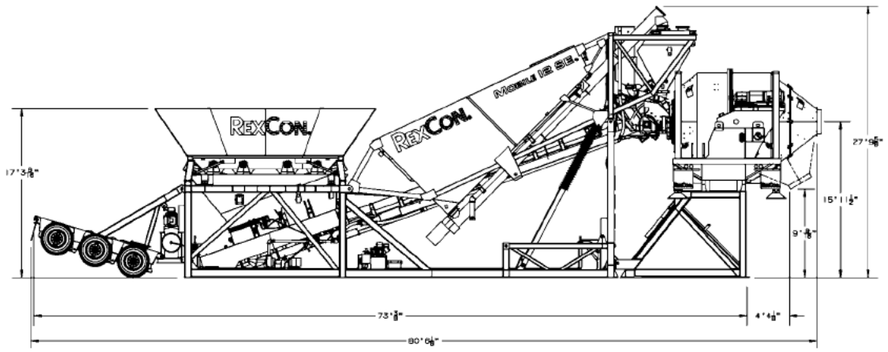
Estimated Production 240 - 270 yds^3/hr

The **RexCon Mobile 12 SE** offers the highest standard in quality, design and durability in the industry today. The plant comes in transit or central mix configurations. **The Mobile 12 SE** plant is versatile and can be custom engineered to meet your individual specifications. **The Mobile 12 SE** is constantly updated to improve its performance and keep up with changes in the concrete industry. This rugged Rex design is built to last!

NO CRANE NEEDED!!!

MOBILE 12 SE CM

When high production and portability are crucial, you can trust that the **Mobile 12 SE CM** will get the job done. With its own self-supporting sub frame and superior hydraulic system, this low profile plant has a fast erection and take down time. This unique design reduces the need for site preparation and foundations. Mobility, reliability, and performance make the **Mobile 12 SE CM** the plant to own.



STANDARD CONFIGURATION

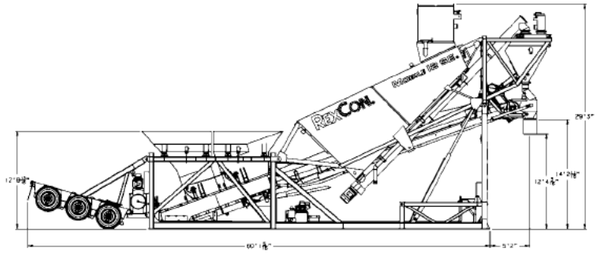
- Self-erect single load batch plant
- Hydraulic leveling main frame
- Gas powered self-erect hydraulic system
- 66 Ton, 4 compartment aggregate bin
- Pneumatic vibrators
- 300 bbl split cement silo with 5" fill pipes
- High and low cement bin level indicators
- Two 12" screw conveyors with 40 HP direct drives
- Aeration pads in the silo and batcher
- 12 yard aggregate and cement batchers
- Load cell scale systems
- 48" high production batch transfer belt
- Vulcanized belt splice
- 12 cubic yard mobile self-erect tilt mixer
- Dual 100 HP mixer drives
- Polyurethane lined drum with steel blades
- Two (2) 3" water meters
- 500 gallon batched water holding reservoir
- 20HP high pressure air compressor
- Regenerative aeration blower
- NEMA power panel

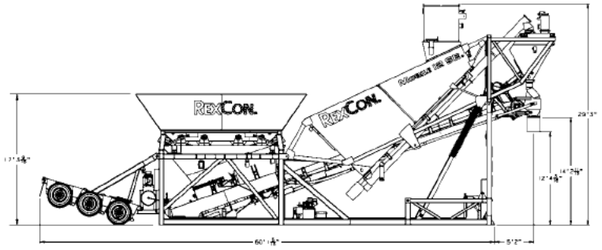
OPTIONAL FEATURES

- Decumulative aggregate batchers
- Aggregate extensions
- 135 ton aggregate bin
- AR steel or polyurethane bin and batcher liners
- Moisture probes
- RC3 Batch Automation Control
- Anti-overfill valves
- Poly wrap blade liners
- Self-supporting dump cone
- Dust hood truss support
- Rooftop dust collectors
- Mobile central dust collector
- Central lube system
- Auto grease system
- Single freight load conveyor/hopper system
- 15 HP water pump
- Weighed water

Mobile 12 SE TM

The **Mobile 12 SE TM** offers the best in a high production mobile transit mix plant. With its self-supporting sub frame and superior hydraulic system, the **Mobile 12 SE TM** moves quickly, provides greater profitability and can be built to accept expansion; no modifications are needed later.





STANDARD CONFIGURATION

- Self-erect single load batch plant
- Hydraulic leveling main frame
- Gas powered self-erect hydraulic system
- Two decumulative aggregate batchers
- 300 bbl split cement silo with 5" fill pipes
- Two (2) 12" screw conveyors/40 HP direct drives
- Aeration pads in the silo and batcher
- 12 yard cement batcher
- Load cell scale systems
- 36" mechanical batch transfer belt
- 3" water meter
- 20 HP high pressure air compressor
- Regenerative aeration blower
- NEMA power panel

OPTIONAL FEATURES

- Side protection guard for ramping
- 66 ton, 4 compartment fold up aggregate bin
- Aggregate extensions
- 135 ton aggregate bin
- AR steel or polyurethane bin and batcher liners
- Moisture probes
- RC3 Batch Automation Control
- 48" high production batch transfer belt
- Central mix conversion package
- Rooftop dust collectors
- Central dust collector and shroud
- Central lube system
- Auto grease system
- Material handling systems
- 15 HP water pump

Mobile 12 SE TM
shown with decumulative aggregate batchers

Mobile 12 SE TM
shown with 66 ton, (4) compartment aggregate batchers

Specifications	CP-1000	CP-1200	CP-1500	CP-1800	CP-2100
CFM	5000	6500	8000	10000	11500
# Cartridges	20	24	30	36	40
Length of Cartridge	54"	54"	54"	54"	54"
# Solenoids	4	4	5	6	7
Solenoid Size	1"	1"	1"	1"	1"
Total Filtration Area	1000	1200	1500	1800	2100
Min. Design Efficiency	100%	100%	100%	100%	100%
Air to Cloth Ratio (ACFM/Ft.2)	5	5	5	6	5
Filtration Velocity (Ft./Min.)	5	5	5	6	5
Blower Horsepower	15	15	20	20	25
Static Pressure Drop (WC)	8"	8"	8"	8"	8"
Normal Air Capacity	5000	6500	8000	10000	11500
Outlet Area (Ft.2)	1	2	2	3	4
Outlet Velocity (Ft./Sec.)	63	47	46	48	45
Outlet Moisture Content (Ideal)	0	0	0	0	0
Cleaning Mechanism	Pulse w/ Timer	Pulse w/ Timer	Pulse w/ Timer	Pulse w/ Timer	Pulse w/ Timer

Heat Rejection Data

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHUAST RECOVERY TO 350F	FROM OIL COOLER	FROM AFTERCOOLER	WORK ENERGY	LOW HEAT VALUE ENERGY	HIGH HEAT VALUE ENERGY
EKW	%	BHP	BTU/MIN	BTU/MIN	BTU/MIN	BTU/M N	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/M N
500 0	100	736	14,286	5,092	24,449	13,541	4,081	6,568	31,227	76,622	81,621
450 0	90	664	13,063	4,609	22,707	12,313	3,738	6,194	28,178	70,171	74,750
400 0	80	593	11,849	4,057	20,897	11,029	3,386	5,764	25,158	63,576	67,725
375 0	75	558	11,250	3,829	19,961	10,427	3,211	5,532	23,657	60,294	64,229
350 0	70	522	10,657	3,619	19,006	9,817	3,035	5,262	22,154	56,980	60,698
300 0	60	452	9,498	3,247	17,042	8,564	2,679	4,621	19,168	50,294	53,576
250 0	50	382	8,398	2,951	14,907	7,195	2,313	3,797	16,198	43,418	46,252
200 0	40	313	7,486	2,783	12,263	5,493	1,920	2,573	13,288	36,042	38,394
150 0	30	244	6,502	2,580	9,481	4,021	1,526	1,587	10,366	28,647	30,517
125 0	25	210	5,939	2,435	8,143	3,419	1,331	1,220	8,889	24,995	26,626
100 0	20	174	5,288	2,233	6,971	2,802	1,143	967	7,392	21,450	22,850
50.0	10	102	3,794	1,702	5,016	1,502	775	662	4,319	14,544	15,493

Emissions Data

RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM

GENSET POWER WITH FAN		EKW	500.0	375.0	250.0	125.0	50.0
PERCENT LOAD		%	100	75	50	25	10
ENGINE POWER		BHP	736	558	382	210	102
TOTAL NOX (AS NO2)		G/HR	2,388	1,500	846	648	542
TOTAL CO		G/HR	429	238	218	320	350
TOTAL HC		G/HR	27	36	46	49	63
PART MATTER		G/HR	42.0	28.7	38.7	27.7	23.5
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	1,558 2	1,247.2	955.7	1,270 6	1,879.7
TOTAL CO	(CORR 5% O2)	MG/NM3	279 6	193.6	248.5	640 3	1,228.8
TOTAL HC	(CORR 5% O2)	MG/NM3	15.5	25.3	45 5	86.1	197.1
PART MATTER	(CORR 5% O2)	MG/NM3	22.1	20.1	37 2	46.5	73.8
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	759	607	465	619	916
TOTAL CO	(CORR 5% O2)	PPM	224	155	199	512	983
TOTAL HC	(CORR 5% O2)	PPM	29	47	85	161	368
TOTAL NOX (AS NO2)		G/HP-HR	3.27	2.70	2.22	3.10	5 33
TOTAL CO		G/HP-HR	0.59	0.43	0.57	1.53	3.44
TOTAL HC		G/HP-HR	0.04	0 06	0.12	0.23	0 62
PART MATTER		G/HP-HR	0.06	0 05	0.10	0.13	0 23
TOTAL NOX (AS NO2)		LB/HR	5.27	3 31	1.86	1.43	1.19
TOTAL CO		LB/HR	0.94	0 52	0.48	0.70	0.77
TOTAL HC		LB/HR	0.06	0 08	0.10	0.11	0.14
PART MATTER		LB/HR	0.09	0 06	0.09	0.06	0 05

RATED SPEED NOMINAL DATA: 1800 RPM

GENSET POWER WITH FAN		EKW	500.0	375.0	250.0	125.0	50.0
PERCENT LOAD		%	100	75	50	25	10
ENGINE POWER		BHP	736	558	382	210	102
TOTAL NOX (AS NO2)		G/HR	1,958	1,229	693	531	444
TOTAL CO		G/HR	280	156	143	209	228
TOTAL HC		G/HR	19	24	31	33	43
TOTAL CO2		KG/HR	357	280	203	114	66
PART MATTER		G/HR	22.6	15.4	20 8	14.9	12.7
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	1,277 2	1,022.3	783.3	1,041 5	1,540.7
TOTAL CO	(CORR 5% O2)	MG/NM3	182.7	126.5	162.4	418 5	803.2
TOTAL HC	(CORR 5% O2)	MG/NM3	10.6	17.3	31 2	59.0	135.0
PART MATTER	(CORR 5% O2)	MG/NM3	11.9	10.8	20 0	25.0	39.7
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	622	498	382	507	750
TOTAL CO	(CORR 5% O2)	PPM	146	101	130	335	643
TOTAL HC	(CORR 5% O2)	PPM	20	32	58	110	252
FORMALDEHYDE	(CORR 15% O2)	PPM	0.43	0 55	0.95	1.23	2.71
ACROLEIN	(CORR 15% O2)	PPM	0.22	0 20	0.07	0.15	0 03
ACETALDEHYDE	(CORR 15% O2)	PPM	0.32	0 60	0.87	0.96	2 08

PERFORMANCE DATA[EM0177]

December 9, 2015

Performance Number: EM0177 **Change Level: 07**

SALES MODEL	C15	**COMBUSTION**	DI
ENGINE POWER (BHP)	779	**ENGINE SPEED (RPM)**	1,800
GEN POWER WITH FAN (EKW)	500.0	**HERTZ**	60
COMPRESSION RATIO	16.0	**FAN POWER (HP)**	26.8
RATING LEVEL	STANDBY	**ASPIRATION**	TA
PUMP QUANTITY	1	**AFTERCOOLER TYPE**	ATAAC
FUEL TYPE	D ESEL	**AFTERCOOLER CIRCUIT TYPE**	JW+OC, ATAAC
MANIFOLD TYPE	DRY	**INLET MANIFOLD AIR TEMP (F)**	122
GOVERNOR TYPE	ELEC	**JACKET WATER TEMP (F)**	192.2
ELECTRONICS TYPE	ADEM4	**TURBO CONFIGURATION**	SINGLE
CAMSHAFT TYPE	STANDARD	**TURBO QUANTITY**	1
IGNITION TYPE	CI	**TURBOCHARGER MODEL**	GTB4708-1.42
INJECTOR TYPE	EUI	**CERTIFICATION YEAR**	2011
REF EXH STACK DIAMETER (IN)	6	**PISTON SPD @ RATED ENG SPD (FT/MIN)**	2,025.0
MAX OPERATING ALTITUDE (FT)	4,541		

INDUSTRY	SUBINDUSTRY	APPLICATION
ELECTRIC POWER	STANDARD	PACKAGED GENSET
OIL AND GAS	LAND PRODUCTION	PACKAGED GENSET

General Performance Data

INLET MANIFOLD AIR TEMPERATURE ("INLET MFLD TEMP") FOR THIS CONFIGURATION IS MEASURED AT THE OUTLET OF THE AFTERCOOLER.

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP
EKW	%	BHP	PSI	LB/BHP-HR	GAL/HR	N-HG	DEG F	DEG F	N-HG	DEG F
500 0	100	736	349	0.339	35.7	73.6	120.1	1,259.6	74.9	911.7
450 0	90	664	315	0.344	32.7	70.6	117.9	1,210.4	71.5	875.7
400 0	80	593	281	0.350	29.6	66.7	114.5	1,159.2	67.3	838.4
375 0	75	558	265	0.353	28.1	64.5	112.6	1,133.8	64.8	821.6
350 0	70	522	248	0.356	26.5	61.9	110.6	1,108.3	62.0	805.4
300 0	60	452	214	0.363	23.4	55.8	106.0	1,057.5	55.4	773.8
250 0	50	382	181	0.371	20.2	47.8	100.4	1,006.2	47.2	741.7
200 0	40	313	149	0.375	16.8	35.7	92 8	944.5	35.7	707.2
150 0	30	244	116	0.382	13.3	23.9	85.7	870.5	25.0	670.9
125 0	25	210	99	0.389	11.6	18.6	82 9	828.4	20.6	651.9
100 0	20	174	83	0.401	10.0	14.6	81 0	773.7	17.5	618.1
50.0	10	102	48	0.466	6 8	9.4	79.4	626.6	14.7	507.8

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP	WET INLET AIR VOL FLOW RATE	ENGINE OUTLET WET EXH GAS VOL FLOW RATE	WET INLET AIR MASS FLOW RATE	WET EXH GAS MASS FLOW RATE	WET EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)	DRY EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)
EKW	%	BHP	IN-HG	DEG F	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/M N
500 0	100	736	77	425 3	1,241.2	3,175.4	5,374.8	5,624.8	1,138 5	1,022.6
450 0	90	664	74	411 6	1,217.8	3,036 5	5,265.5	5,494.7	1,118 0	1,009.8
400 0	80	593	70	395 6	1,186.9	2,876 9	5,119.9	5,327.4	1,089.7	990.6
375 0	75	558	68	387.1	1,168.4	2,793 6	5,033.1	5,230.0	1,072 0	977.2
350 0	70	522	65	377.4	1,145.2	2,702 6	4,925.8	5,111.8	1,050.4	960.0
300 0	60	452	59	354 2	1,084.6	2,497 0	4,649.3	4,813.4	995 3	913.8
250 0	50	382	51	323.4	996.2	2,244.1	4,252.4	4,394.0	918.4	846.0
200 0	40	313	38	272 5	841.8	1,877 0	3,575.5	3,693.2	790 9	728.4
150 0	30	244	26	221.1	693.1	1,513 0	2,926.3	3,019.8	658 0	607.2
125 0	25	210	20	197.7	630.4	1,346 9	2,652.9	2,734.5	595 8	551.2
100 0	20	174	16	178 8	587.5	1,210 6	2,466.4	2,536.4	552 3	513.5
50.0	10	102	11	151 3	548.6	1,005 9	2,299.0	2,346.4	511 2	482.5

PERFORMANCE DATA[EM0177]

December 9, 2015

METHANOL	(CORR 15% O2)	PPM	0.21	0.11	0.13	0.15	0.41
TOTAL NOX (AS NO2)		G/HP-HR	2.68	2 22	1.82	2.54	4 37
TOTAL CO		G/HP-HR	0.38	0 28	0.37	1.00	2 25
TOTAL HC		G/HP-HR	0.03	0 04	0.08	0.16	0.43
PART MATTER		G/HP-HR	0.03	0 03	0.05	0.07	0.12
TOTAL NOX (AS NO2)		LB/HR	4.32	2.71	1.53	1.17	0 98
TOTAL CO		LB/HR	0.62	0 34	0.31	0.46	0 50
TOTAL HC		LB/HR	0.04	0 05	0.07	0.07	0.10
TOTAL CO2		LB/HR	787	617	448	252	145
PART MATTER		LB/HR	0.05	0 03	0.05	0.03	0 03
OXYGEN IN EXH		%	7.2	9 5	11 2	12.0	15.0
DRY SMOKE OPACITY		%	0.8	0.7	0.9	0.9	0 8
BOSCH SMOKE NUMBER			0.48	0 36	0.55	0.57	0.49

Regulatory Information

EPA TIER 4 INTERIM		2011 - 2014		
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCR BED IN EPA 40 CFR PART 1039 SUBPART F AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX L MITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS.				
Locality	**Agency**	**Regulation**	**Tier/Stage**	**Max Limits - G/BKW - HR**
U.S. (INCL CALIF)	EPA	NON-ROAD GENSET	TIER 4 NTERIM	CO: 3.5 NOx: 3.5 HC: 0.4 PM: 0.10

Altitude Derate Data

ALTITUDE CORRECTED POWER CAPABILITY (BHP)

AMBIENT OPERATING TEMP (F)	50	60	70	80	90	100	110	120	130	NORMAL
ALTITUDE (FT)										
0	779	779	779	779	778	774	775	777	764	779
1,000	779	779	779	777	774	772	772	761	741	779
2,000	779	779	776	772	770	770	756	680	594	776
3,000	779	775	771	768	760	735	679	614	558	772
4,000	774	770	763	725	684	638	595	543	486	768
5,000	764	749	705	646	597	544	486	478	478	746
6,000	753	717	649	587	536	488	478	478	478	730
7,000	742	691	626	573	529	495	480	479	479	732
8,000	652	630	602	576	556	544	542	541	523	652
9,000	602	590	575	560	546	538	534	524	505	604
10,000	582	575	566	556	543	533	522	504	488	585
11,000	580	574	566	553	536	518	501	486	478	585
12,000	575	562	546	528	514	497	483	478	477	583
13,000	555	536	518	504	492	480	478	477	477	578
14,000	522	504	489	483	478	478	477	477	477	570
15,000	479	478	478	478	478	477	477	477	477	549

Cross Reference

Engine Arrangement			
Arrangement Number	**Effective Serial Number**	**Engineering Model**	**Engineering Model Version**
3341000	JJF00001	GS533	-
3431944	JJF00001	PS045	-

Test Specification Data						
Test Spec	**Setting**	**Effective Serial Number**	**Engine Arrangement**	**Governor Type**	**Default Low Idle Speed**	**Default High Idle Speed**
0K9868	PP6870	JJF00001	3341000			

Performance Parameter Reference

Parameters Reference:TM5739-08
EPG PERFORMANCE DEFINITIONS

GEN SET - PACKAGED - D ESEL
TOLERANCES:
AMBIENT AIR CONDITIONS AND FUEL USED W LL AFFECT THESE VALUES.
EACH OF THE VALUES MAY VARY IN ACCORDANCE WITH THE FOLLOWING
TOLERANCES.

Power+/- 3%
Exhaust Stack Temperature+/- 8%
Generator Power+/- 5%
Inlet Airflow+/- 5%
Intake Manifold Pressure-gage +/- 10%
Exhaust Flow+/- 6%
Specific Fuel Consumption+/- 3%
Fuel Rate+/- 5%
Heat Rejection+/- 5%
Heat Rejection - Exhaust Only+/- 10%

April 10, 2020

Permitting Division
Air Quality Program
City of Albuquerque
PO Box 1293
Albuquerque, NM 87103

Carina Munoz-Dyer:

Subject: Vital Consulting Group, LLC – 20.2.41 NMAC – Vital Consulting Group Portable Concrete Batch Plant Permit Application

Attached please find two copies and 2 DVDs of the Part 41 revised permit application package for Vital Consulting Group Portable Concrete Batch Plant.

The exact location of the facility will be 701 Atrisco Vista Blvd at UTM coordinates Zone 13, UTM Easting 335,830, UTM Northing 3,883,170, NAD 83. The attached copy contains the original signed permit application form along with the permit application fee. The original application fee check was $2,469 and attached is an additional check for $33 to account for the increase in application fees from 2019 and 2020.

Please let me know if you have questions or need additional information. I can be reached at (505) 830-9680 ext 6. The Vital Consulting Group, LLC contact is Vince Martinez who can be reached at (505) 369-0623.

Sincerely,

Paul Wade

Paul Wade
Senior Engineer

Cc Vince Martinez

Montrose Air Quality Services, LLC
3500 Comanche Road NE Suite G
Albuquerque, NM 87107-4546

T 505.830.9680 ext. 6
F 505.830.9678
Pwade@montrose-env.com
www.montrose-env.com