Marana Regional Landfill

Air Dispersion Modeling Protocol

Prepared for:
DKL Holdings
Tucson, Arizona

November 2011

CORNERSTONE
Environmental Group, LLC

17 West Wetmore Road, Suite 310
Tucson, Arizona 85705

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AIR DISPERSION MODELING PROTOCOL

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Project No. 090250

TABLE OF CONTENTS

LIST OF TABLES, FIGURES AND DRAWINGS iii

EXECUTIVE SUMMARY

1 INTRODUCTION 1-1

1.1 FACILITY DESCRIPTION 1-1
1.2 PROPOSED PROJECT 1-1
1.3 APPLICABLE REGULATIONS FOR THE PROJECT 1-1
1.4 MODELED SOURCES 1-2
1.4.1 Phase I – Construction of Module 1A 1-2
1.4.2 Phase II – Landfill Operation 1-3
1.4.3 Phase III – Landfill Operation and Future Construction 1-3

2 MODELING PARAMETERS 2-1

2.1 MODELING STRATEGY 2-1
2.2 MODELING INPUTS 2-1
2.2.1 Model Selection 2-1
2.2.2 Land Classification 2-1
2.2.3 Dry Deposition Option 2-1
2.2.4 Meteorological Data 2-2
2.2.5 Building Downwash 2-2
2.2.6 Receptor Grid 2-2
2.2.7 Terrain Elevations 2-2
2.2.8 Source Characterization 2-2
2.2.8.1 Roads 2-3
2.2.8.2 Waste Material and Soil Handling 2-4
2.2.8.3 Diesel-Fired Water Pump 2-4
2.2.9 Source Emission Rates 2-4
2.2.10 Ambient Background Concentrations 2-6

LIMITATIONS 1

FIGURES 1

TABLES 2

APPENDIX A TSP EMISSION CALCULATIONS 3

LIST OF TABLES, FIGURES AND DRAWINGS

Tables

2-1 TSP Emissions

Figures

1-1 Facility Layout
1-2 Source Locations
2-1 Aerial Photo of Site Location
2-2 Receptor Locations

EXECUTIVE SUMMARY

This modeling protocol describes the proposed approach for an air dispersion modeling analysis for the new Marana Regional Landfill in Marana, Arizona. This document has been prepared in accordance with the Arizona Department of Environmental Quality (ADEQ) "Air Dispersion Modeling Guidelines for Arizona Air Quality Permits" (December 2004) and includes the following information:

- Project background and list of applicable regulations for the project
- Map and description of the local topography and areas surrounding the facility
- Description of the regional climatology and meteorology
- Detailed facility layout that includes source locations, fenceline boundaries, and locations of the nearest residences, schools and offsite workplaces.
- Emission data for each source referenced on the facility layout, including maximum short-term emission rates
- Operational limits (hours per day or per year assumed), if any
- Description of the source characterizations (volume source dimensions)
- Modeling approach (modeling options, land classification, receptor location and elevation, meteorological data selection)
- Ambient background concentrations

1 INTRODUCTION

1.1 Facility Description

The proposed Marana Regional Landfill will encompass a total area of approximately 591 acres, with a total final landfill footprint of approximately 415 acres. The landfill will accept municipal solid waste (MSW) consisting of non-hazardous residential, commercial, industrial, and inert waste. Primary stationary sources currently proposed to be operated at the site include the MSW landfill operation, facility roadways, material handling, and a water pump equipped with a diesel-fired stationary reciprocating internal combustion engine.

1.2 Proposed Project

The first phase of the landfill is identified on the facility layout as Module 1A, located in the southwest corner of the property (see Figure 1-1). This initial construction phase will have an estimated waste capacity of 2.9 million cubic yards. Construction of Module 1A will involve excavation of the soil and placement of a liner and leachate collection system and has been conservatively estimated to occur within the first year. When construction of Module 1A is completed, the facility will begin to accept municipal solid waste for placement in the landfill.

Waste will be delivered to the site by transfer trucks from transfer stations, commercial vehicles, and private vehicles and placed in Module 1A. During the landfill operations, waste will be evenly spread in layers and compacted. A layer of soil or approved alternate material (including but not limited to tarps, shredded/processed green wastes, bottom ash, shredded waste tires, petroleum contaminated soils (PCS), auto shredder fluff, and crushed glass) is then spread in a layer of at least 6 inches over the waste as daily cover. The refuse will be covered at the end of each operating day.

Additional cells/modules will be constructed after Module 1A. The Air Quality Permit Application submitted to the Pima County Department of Environmental Quality (PDEQ) was for the first five years of construction and operation of the Marana Regional Landfill.

1.3 Applicable Regulations for the Project

A Class I air quality permit application for the initial construction phase(s) of the landfill was submitted and received by the PDEQ on September 23, 2011. PDEQ assigned a permit number (Permit # 6133) to the project but has not yet issued the permit. The application was deemed incomplete in a letter sent by PDEQ on October 17, 2011

because the application did not include all requirements of the State Implementation Plan (SIP). Included in the incompleteness letter was the requirement for an air dispersion modeling analysis. Since the Marana Regional Landfill's potential emissions of total suspended particulates (TSP) exceeds the SIP major source threshold of 100 tons per year (as defined in Pima County SIP Rule 171 (C)(2)), Rule 504(c) requires that an "estimate of the concentration of a pollutant in the ambient air near a proposed new major source" be made. This estimate is determined by conducting air dispersion modeling of the facility's emissions to demonstrate compliance with the 24-hour total suspended particulate (TSP) ambient air quality standard of 150 micrograms per cubic meter ($\mu g/m^3$) found in Rule 342.

Other requirements applicable to the project are listed within the Class I Permit Application.

1.4 Modeled Sources

As in the air permit application, this modeling analysis includes construction and operation emissions during the first five years of construction and operation of the landfill. Construction of the Module 1A will involve excavating the soil from the landfill area, hauling the soil to a stockpile area onsite, and installation of a liner and leachate collection system. No waste will be placed in the landfill until construction of the landfill, liner, and leachate collection system for Module 1A is complete.

After construction of Module 1A is complete, waste disposal will begin. In the early stages of waste placement in Module 1A, there will be no additional construction activity. This will occur until such time when additional waste capacity is needed. At that time, construction will begin on future cells and modules, such as Module 1B. This future construction activity will require excavating smaller soil volumes than was required for Module 1A. Construction of Module 1B will take place concurrently with on-going waste disposal activities in Module 1A.

For modeling purposes, this project is therefore divided into three phases: Phase I – Construction of Module 1A, Phase II – Landfill Operation (of Module 1A), and Phase III – Landfill Operation and Future Cell Construction. A description of the emission sources associated with each phase is provided below.

1.4.1 Phase I – Construction of Module 1A

1) Construction/Excavated Soils Hauling Roads – Includes road dust from trucks that carry the excavated soils from the Module 1A construction area to the main soils stockpile north of the haul road. Construction trucks will travel approximately 0.3 miles on a dirt road in the landfill construction area and then approximately 1.1 miles along a road consisting of asphalt millings to the main

soil stockpile, before returning via the same route to the landfill construction area (see Figure 1-2).

2) Construction/Excavated Soils Handling – Soil that is excavated during construction of the landfill is dumped onto the main stockpile area north of the haul road.

1.4.2 Phase II – Landfill Operation

1) Waste Hauling Roads – Includes road dust from vehicles transporting waste into the facility and exiting the facility. Waste hauling trucks will enter through the front gate, travel approximately 0.3 miles on a paved road, approximately 0.7 miles on a road consisting of asphalt millings to the active portion of the landfill, approximately 0.3 miles on a dirt road within the active landfill, and back again along the same route.

2) Material Handling of the Waste – Emissions associated with dropping the waste into the active area of the landfill. Emissions from this process are considerably less than road dust created by vehicle traffic. The waste drop point will be conservatively located in the model near the southwest corner of the landfill, nearest to the fenceline.

3) Daily Cover Soil Hauling Roads – Road dust from trucks that carry the daily cover material (soil or alternate material) to the active area of the landfill. The daily cover stockpile will be located a short distance from the active landfill. Travel distances (one-way) for trucks carrying daily cover material is approximately 0.2 miles on the asphalt millings surface and approximately 0.4 miles on dirt roads.

4) Daily Cover Soil Handling Operations – Placing of the soil or alternate material used for daily cover.

5) Perimeter and Access Roads – Infrequently traveled roads for inspections and well monitoring. These roads will be used by pick-up trucks or passenger vehicles only and generally not by waste or soil handling trucks.

6) Diesel-fired Stationary Reciprocating Internal Combustion Engine (RICE) – Engine used to power a water pump near the southern property boundary.

1.4.3 Phase III – Landfill Operation and Future Construction

1) Includes the same sources that are listed in Phase II for landfill operations. The landfill operations will occur concurrently with construction of a new module.

2) Construction/Excavated Soils Hauling Roads – As in Phase I, includes road dust from trucks that carry the excavated soils from the construction area to the main soils stockpile north of the haul road. The volume of soils excavated for construction of Module 1B is representative of future construction activities in other parts of the landfill. Also, the distance traveled by construction vehicles for Module 1B are the most conservative (furthest from the stockpile).

   As shown in Figure 1-1, Module 1B will be constructed adjacent to Module 1A (immediately to the east). It is assumed for this analysis that part of the road covered with asphalt millings during construction and operation of Module 1A will be changed to a dirt road. The distance traveled by construction trucks will be approximately 0.3 miles on the dirt road in the landfill construction area. The trucks will then travel approximately 1.0 miles along a road consisting of asphalt millings to the main soil stockpile, before returning via the same route to the landfill construction area.

2 MODELING PARAMETERS

2.1 Modeling Strategy

Modeling will be performed to demonstrate that ground level concentrations associated with the landfill construction and operations are below the TSP ambient air quality standard as identified within SIP Rule 342. The highest second-highest (HSH) predicted concentration will be added to a representative background concentration and compared to the TSP 24-hour ambient standard (150 $\mu g/m^3$) listed in the SIP.

If modeled impacts using the inputs specified in this protocol exceed or are well below the ambient standard, additional modeling analyses may be performed with revised inputs (e.g. control efficiencies, operating hours, etc.).

2.2 Modeling Inputs

2.2.1 Model Selection

The air quality model to be used is the latest version of AERMOD (version 11103). A windows-based software program called BEEST®, which incorporates AERMOD and associated pre-and post-processing programs in a graphic interface, will be used for this analysis.

2.2.2 Land Classification

As specified in the EPA's modeling guidance (40 CFR Part 51 Appendix W), to determine whether rural or urban dispersion parameters will be used, the predominant land use within a 3-kilometer radius of the site is determined. The area within 3 kilometers of the proposed landfill is primarily desert. Therefore, rural dispersion parameters will be used. An aerial photo showing the surrounding area is shown in Figure 2-1.

2.2.3 Dry Deposition Option

AERMOD includes in its regulatory default option a particle deposition algorithm that allows the user to input particle size distribution data for sources of TSP. Dry deposition is used to account for the settling of heavier, large diameter particles close to the source and is applied where the particle size distribution is known. Since a majority of the TSP emissions from this project consist of particles greater than 10 microns in diameter, the dry particle deposition option will be used. The particle size categories will be $PM_{2.5}$, PM_{10}, and PM_{30}. The "PM_{30}" category will include all particulate with a diameter larger than PM_{10}.

2.2.4 Meteorological Data

Pre-processed AERMOD-ready meteorological data was obtained from the ADEQ. The five year data set (June 1, 2000 to May 31, 2005) includes surface observations from a nearby Portland cement plant in Rillito, located about 8 miles east of the proposed Marana Regional Landfill site, and upper air data from the Tucson Airport.

PDEQ indicated that meteorological data is also available for two nearby PM_{10} monitoring stations, Tangerine and Coachline. However, these stations do not record key parameters such as cloud cover, Albedo, surface roughness and Bowen ratio that are needed when processing data for input to AERMOD. Also, the Tangerine and Coachline stations are more likely to be influenced by the nearby mountains than the Rillito site or the location of the Marana Regional Landfill. Therefore, the Rillito site was selected for this analysis to be most representative of the meteorological conditions at Marana Regional Landfill.

2.2.5 Building Downwash

No building data will be included in this analysis, as the modeled sources are not affected by building downwash.

2.2.6 Receptor Grid

Receptors will be placed every 25 meters along the fenceline. Discrete Cartesian receptors (see Figure 2-2) will be located outside the fenceline at the following distances:

- From the fenceline to 1 km, every 100 m;
- 1 km to 5 km, every 200 m; and
- 6 k to 10 km, every 500 m.

Also shown in Figure 2-2 are the locations of the nearest residence, school, and offsite workplace.

2.2.7 Terrain Elevations

The landfill will be located in the Avra Valley between Tucson and Phoenix, approximately 3.5 miles west of the Marana Regional Airport and 8 miles west of Interstate Highway 10. The Tucson Mountains are located to the southeast of the site. Terrain elevations above mean sea level will be considered for all sources and receptors and will be estimated using the AERMAP processor. Elevations will be determined using digital elevation data using the National Elevation Dataset (NED).

2.2.8 Source Characterization

The roads and material handling drop points will be modeled as volume sources, as described in the ADEQ Modeling Guidance. Dimensions of the volume sources will be calculated according to the 8-step process outlined in the guidance, as described below.

2.2.8.1 Roads

Step 1 – Determine adjusted width.

For roads, this will be calculated as the actual width of the road plus 6 meters.

Step 2 – Determine number of volume sources.

The length of the road will be divided by the adjusted width to determine the maximum number of volume sources available.

Step 3 – Determine the volume height.

The volume height is equal to twice the height of the vehicles generating the emissions.

Step 4 – Determine initial horizontal sigma for each volume.

The initial lateral dimension will be twice the adjusted width (road width plus 6 meters) divided by 2.15, where the road is represented by "alternating volume sources".

Step 5 – Determine the initial vertical dimension.

The initial vertical sigma will be set to the volume height divided by 2.15.

Step 6 – Determine the release height.

The release height will be set to half of the volume height.

Step 7 – Determine the emission rate for each volume source.

Emissions for each segment of the road (each individual volume source) will be based on the expected vehicle traffic.

Normal working hours at the landfill will be approximately 4:00 am to 5:00 pm Monday through Saturday. Special circumstances may require occasional operations outside of these normal hours of operation, which is authorized under the Town of Marana Development Agreement.

Preliminary modeling will assume that the landfill operates for 24 hours per day, 365 days per year. If modeled impacts exceed the ambient air standard, additional modeling may be performed assuming limited operating hours.

Step 8 – Determine the UTM coordinate for each source.

The volume source UTM coordinate will be based on the center of the base of the volume.

2.2.8.2 Waste Material and Soil Handling

Waste material and soil handling drop points will also be modeled as volume sources. For these sources, the adjusted width is the typical width of a dump truck. The waste handling (waste drop point) will conservatively be placed near the southwest corner of Module 1A (closest to the fenceline). In reality, as the landfill fills Module 1A the location of the drop point will move to different points within the Module 1A footprint. However, for this modeling analysis the waste drop point will remain in the southwest corner of Module 1A to represent "worst case" conditions. For excavation soils, the drop point will conservatively be modeled near the northeast corner of the main soil stockpile (closest to the fenceline).

2.2.8.3 Diesel-Fired Water Pump

The 110-horsepower diesel fired water pump will be modeled as a point source, located at the irrigation well near the southern boundary of the facility. It is assumed that the water pump engine will operate year-round (8,760 hours per year).

The location of the sources included in the model is shown in Figures 1-1 and 1-2.

2.2.9 Source Emission Rates

A summary of the TSP emission rates for each source are provided in Table 2-1. Detailed emission calculations are provided in Appendix A. Note that the emission calculations presented in this modeling protocol are broken down into more detail than those presented in the Class I air permit application for the project.

The modeling guidance specifies that emissions must be calculated assuming "worst-case" operating scenarios. It is important to note that the "worst-case" operating scenario for calculating modeled impacts is different than the "worst-case" scenario used in the permit application to calculate potential to emit. In the permit application, it was assumed that construction and operation of Module 1A occur simultaneously which results in a conservative over-prediction of annual emissions to represent potential to emit. Modeling such a scenario would over-predict air quality impacts, since the operation activities will not begin until after construction of Module 1A is complete. Therefore, construction and operation of Module 1A are modeled separately.

Other changes incorporated in the emission calculations for the modeling include the use of asphalt millings rather than gravel and a higher control efficiency for watering construction roads. These changes represent a more realistic "worst-case" scenario for ambient air quality impacts, as they reflect updated operational information from the facility.

Since this project is subject to the visibility limitation in Rule 343, road emissions will be controlled through watering and/or the application of chemical dust suppression. Therefore, controlled emission rates will be used for input in AERMOD.

Emission calculations used in the modeling represent a conservative estimate for determining air quality impacts from the project. Exact vehicle types, weights, and trips per day may differ slightly from what is provided below.

For construction activities:

- The maximum amount of soil excavated during construction of Module 1A is 10,726 tons per day (equates to 268 articulated trucks (large dump trucks) per 24-hour period). This assumes an aggressive schedule with construction of the landfill completed within one calendar year.
- The maximum amount of soil excavated during construction of Module 1B is 4,487 tons per day (equates to 112 articulated trucks (large dump trucks) per 24-hour period). This assumes an aggressive schedule with construction of the landfill completed within one calendar year.
- The construction contractor may build a new road for soil transport to the stockpile. However, since the exact location of that new road is not known at this time, it assumed that all construction trucks will travel approximately along the path marked in Figure 1-2.
- Extensive dust control measures (e.g. frequent watering or application of a chemical dust suppressant) will be applied to the road where the construction trucks will travel. Contractors will be required to employ these strict dust control measures to reduce offsite dust emissions.
- For the dirt and milled asphalt roads traveled by construction vehicles, a control efficiency of 75% will be used to account for the strict dust control requirements in place for the construction contractor.
- Construction vehicles will generally remain onsite. Emissions from these vehicles will be associated with round trip travel from the landfill to the stockpile area and back to the landfill.

For soil handling associated with application of daily cover:

- The maximum amount of soil placement for daily cover is approximately 691 tons/day.
- The maximum number of vehicle trips for daily cover is approximately 22 trips per day.
- The daily cover stockpile will contain sufficient soil and alternative cover material to supply the landfill with daily cover throughout the life of the landfill. No additional excavated soils should be needed from the main excavated soils stockpile.
- Heavy equipment will be used to transport daily cover material from the stockpile to the landfill.
- The control efficiency for watering the roads used for daily cover placement is 50%.

For waste hauling and handling:

- The maximum amount of waste received for disposal is 2,000 tons per day.
- Waste brought to the site will travel approximately 2.6 miles per round trip (to the southwest corner of the site). This conservatively assumes the maximum possible distance that waste hauling trucks will travel onsite.
- The drop point for the waste brought to the landfill will be at the southwest corner of the site.
- Control efficiency from watering the haul roads is 50%.

For perimeter and access roads:

- One pickup truck trip per day is conservatively assumed to travel along both the perimeter and access roads.
- A control efficiency of 50% is assumed for these roads as water application will be less frequent than the construction routes.

As described in Section 2.2.8, preliminary modeling will be performed assuming the landfill operates 24 hours per day and 365 days per year. If modeling shows exceedance of the 24-hour ambient air standard, additional modeling may be performed that varies the emission rate by hour of day.

2.2.10 Ambient Background Concentrations

Since local TSP concentrations have not been monitored since 1990, PDEQ recommends using PM_{10} concentrations from either the Tangerine or Coachline monitoring station. The Tangerine station monitors PM_{10} and Coachline monitors $PM_{2.5}$. For this analysis, the Tangerine PM_{10} data will be used. PDEQ has provided two years and 10 months of measured PM_{10} concentrations from the Tangerine monitor (January 2009 to October 2011).

The ADEQ modeling guidance requires that permit applicants select the average of the highest monitored values from the most recent three years of available data. For this analysis, the maximum 24-hour monitored concentration will be determined for each month. The average of the monthly maximum values will be used as the representative background concentration.

LIMITATIONS

The work product included in the attached was undertaken in full conformity with generally accepted professional consulting principles and practices and to the fullest extent as allowed by law we expressly disclaim all warranties, express or implied, including warranties of merchantability or fitness for a particular purpose. The work product was completed in full conformity with the contract with our client and this document is solely for the use and reliance of our client (unless previously agreed upon that a third party could rely on the work product) and any reliance on this work product by an unapproved outside party is at such party's risk.

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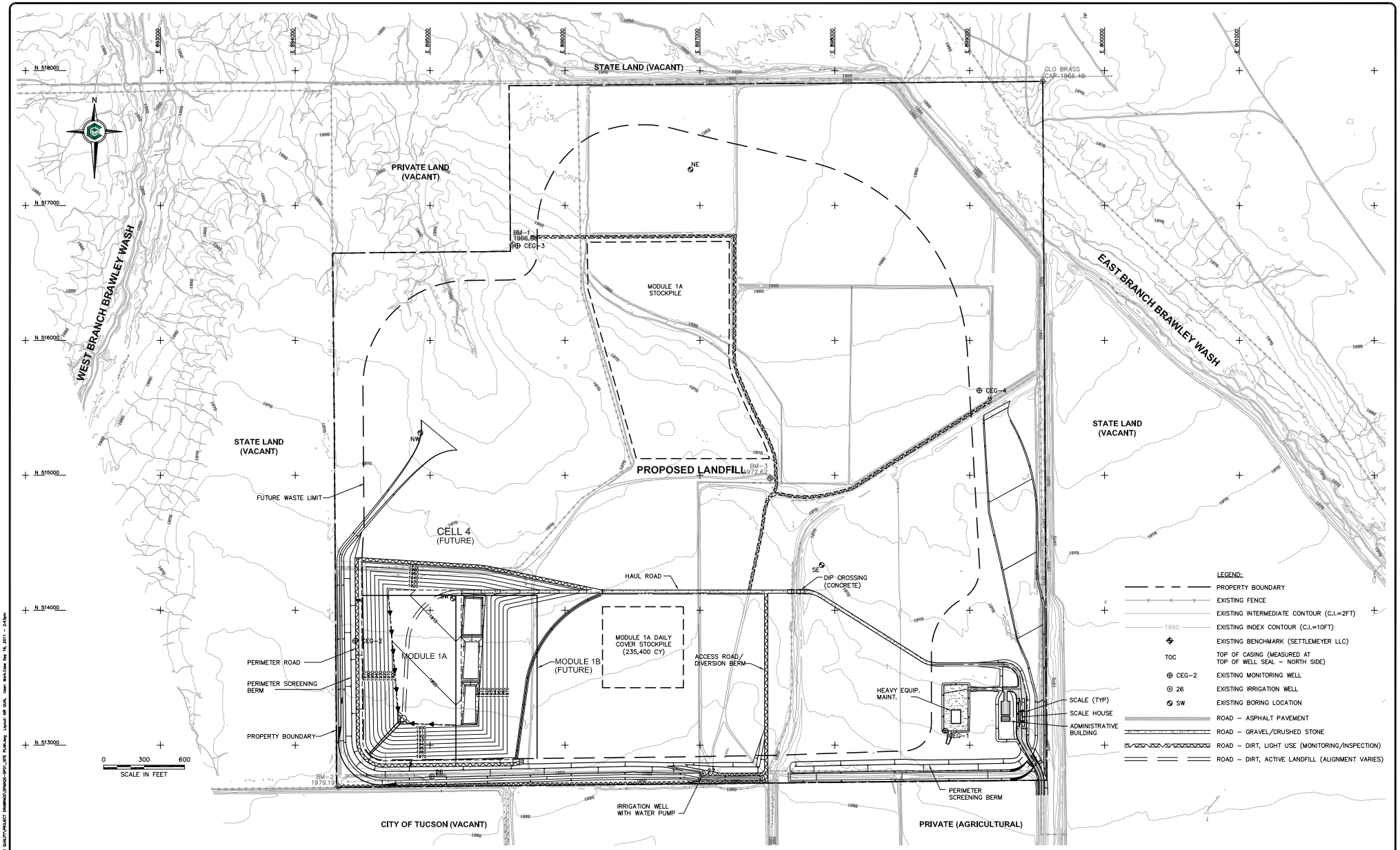
FIGURES



TOPOGRAPHY PREPARED BY COOPER AERIAL. THIS COMPUTER PLOTTED MAP WAS GENERATED FROM DATA COMPILED BY DIGITAL STEREO METHODS USING AERIAL PHOTOGRAPHY TAKEN ON APRIL 6, 2010.

GROUND CONTROL BY SETTLEMEYER LLC.

NOT FOR CONSTRUCTION

PRELIMINARY

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

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DKL HOLDINGS
MARANA REGIONAL LANDFILL
MARANA, ARIZONA
TITLE V PERMIT APPLICATION

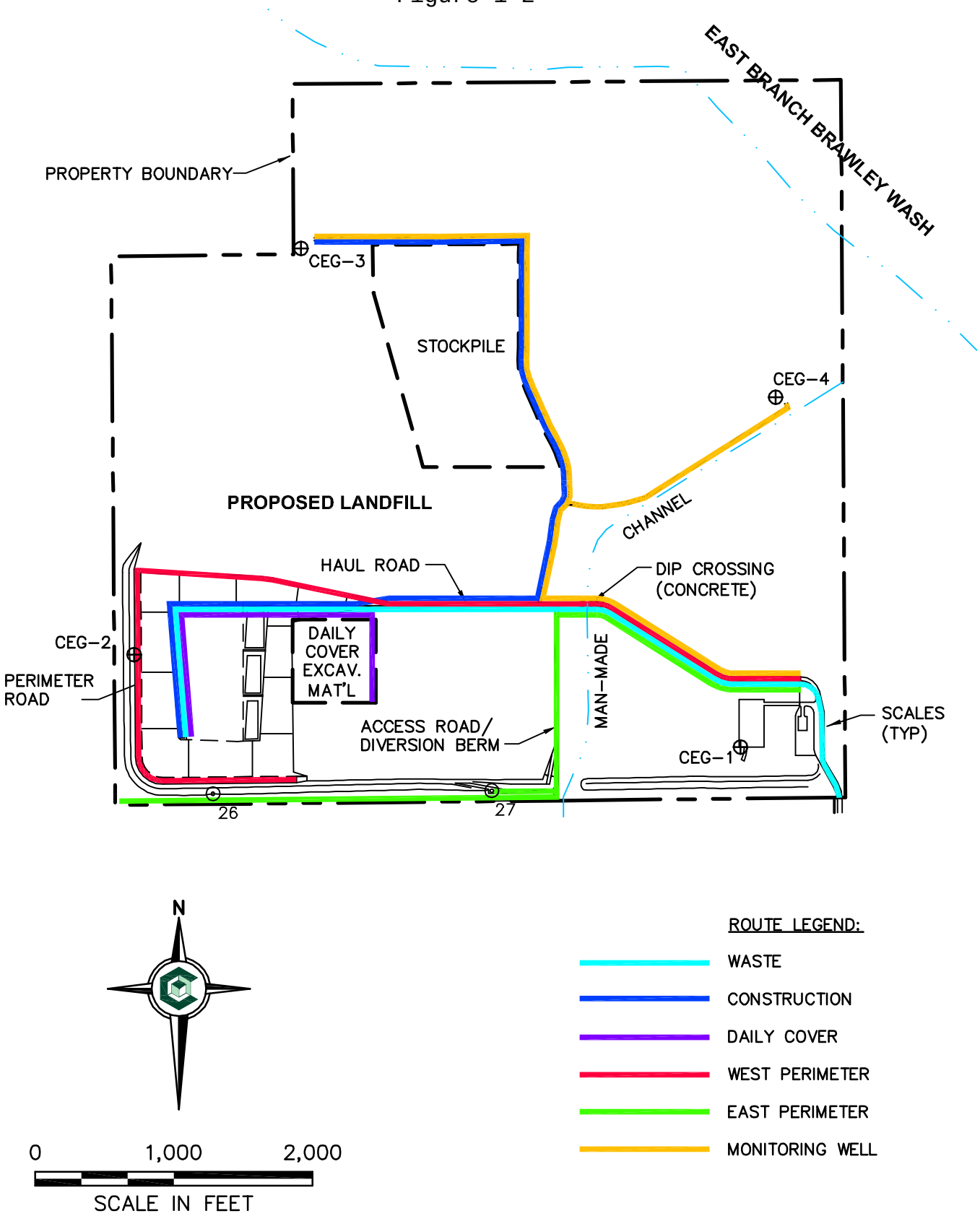
SITE PLAN

SHEET NO. 1

PROJECT NO. 090250.4

Figure 1-1

Figure 1-2



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ROADWAY ROUTING

FIGURE NO.
1

PROJECT NO.
090250.4

File: C:\PROJECTS\PROJECTS\MARANA\090250 - AIR QUALITY\PROJECT DRAWINGS\SPMAQS-FIG 01_PH1 ROAD MAP.dwg Layout: AIR QUAL LT User: Mark.Case Nov 21, 2011 - 8:56am

Figure 2-1 Aerial Photo of Site Location

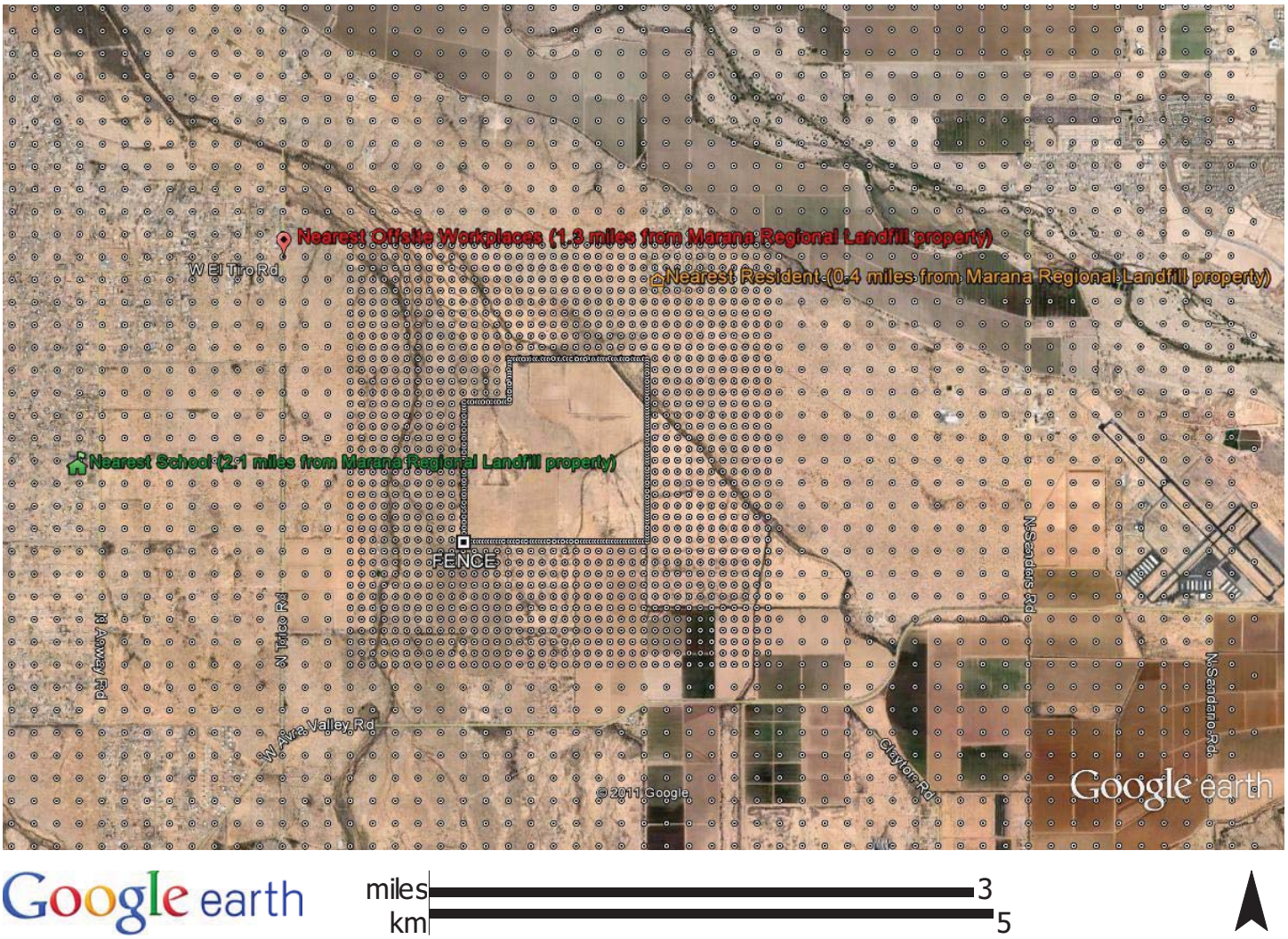

Figure 2-2
Receptors and Nearest Residence, School and Offsite Workplace

TABLES

Table 2-1
Emissions Summary

Emission Unit	Description	Calculated Emisisons		
		$PM_{2.5}$ (lb/hr)	PM_{10} (lb/hr)	PM_{30} (TSP) (lb/hr)
Construction - Module 1A				
--	Unpaved Dirt Road(s)	0.6	5.9	20.6
--	Unpaved Milled Asphalt Roads	0.71	7.1	26.2
--	Material Handling	0.0075	0.050	0.11
Waste				
--	Paved Road(s)	0.12	0.48	2.4
--	Unpaved Milled Asphalt Roads	0.17	1.74	6.5
--	Unpaved Dirt Road(s)	0.48	4.8	16.8
--	Waste/Storage Piles	0.0014	0.0093	0.020
Daily Cover				
--	Unpaved Dirt Road(s)	0.12	1.2	4.2
--	Unpaved Milled Asphalt Roads	0.0083	0.083	0.31
--	Material Handling	0.00046	0.0032	0.0068
Perimeter Roads				
--	West Perimeter Paved Road(s)	0.000026	0.00011	0.00053
--	West Perimeter Unpaved Milled Asphalt Road(s)	0.00091	0.0091	0.032
--	East Perimeter Paved Road(s)	0.000026	0.00011	0.00053
--	East Perimeter Unpaved Milled Asphalt Road(s)	0.00032	0.0032	0.012
--	East Perimeter Unpaved Dirt Road(s)	0.0016	0.016	0.057
--	Monitoring Well Paved Road(s)	0.000026	0.00011	0.00053
--	Monitoring Well Unpaved Milled Asphalt Road(s)	0.00054	0.0054	0.020
--	Monitoring Well Unpaved Dirt Road(s)	0.0015	0.015	0.052
Construction - Module 1B				
--	Unpaved Dirt Road(s)	0.25	2.5	8.6
--	Unpaved Milled Asphalt Roads	0.27	2.7	10.0
--	Material Handling	0.0032	0.021	0.044
Point Sources				
--	Water Pump	0.24	0.24	0.24

APPENDIX A
TSP EMISSION CALCULATIONS

Marana Landfill Fugitive PM Assumptions

Phase I - Construction of Module 1A

Construction Material - Module 1A:

Initial excavation soil volume

Excavation Volume	2,900,000	cy/yr	(assume excavation in one year)
Days of Construction per Year	365	days/yr	
Volume of Soil Excavated per Day	7,945	cy/day	
Soil density	100	lb/cf	(typical soil density)
Cubic feet per cubic yard	27	cf/cy	
Soil density	2,700	lb/cy	(conversion from lb/cf to lb/cy)
Weight of Soil Excavated per Day	10,726	tons/day	

Vehicle Information

Soil Hauling Capacity per Truck (Articulated Truck)	40	ton/truck	(per Caterpillar specifications)
Total Vehicles Needed Per Day	268	vehicles/day	

	Unloaded (tons)	Loaded (tons)	Average (tons)	Vehicles Per Day
Articulated Truck	36	36	51	268

Road lengths based on site drawing

Refer to dark blue roadways on site map

Dirt Roads	0.3	mile
Asphalt Milled Roads	1.1	mile

Asphalt Milled Surface Material Silt Content	6.40%	
Dirt Surface Material Silt Content	8.40%	
Soil Material Moisture Content	14.20%	
Assumed Dirt Road Control Efficiency	75%	*

* Construction contractors will be required to apply extensive dust control measures such as frequent watering or application of a chemical dust suppressant to construction roads.

Assumed Asphalt Milled Control Efficiency 90%

Phase II - Landfill Operation (also included in Phase III)

Waste:

2000 tons/day waste accepted (site provided)

Vehicle Information

	Unloaded (tons)	Loaded (tons)	Average (tons)	Vehicles Per Day
Transfer Trailer	17	40	29	60
Front Loader	20	30	25	10
Rear Loader	20	35	28	5
Rolloff	15	25	20	25
Pickup	2	4	3	100

Road lengths based on site drawing

Refer to light blue roadways on site map

Paved Roads	0.3	mile
Dirt Roads	0.3	mile
Asphalt Milled Roads	0.7	

Asphalt Milled Surface Material Silt Content	6.40%	
Dirt Surface Material Silt Content	8.40%	
Waste Material Moisture Content	14.20%	
Assumed Paved/Dirt Control Efficiency	50%	(based on watering as necessary)
Assumed Asphalt Milled Control Efficiency	90%	

Daily Cover Material:

Daily cover soil needs

Volume of Daily Soil	512	cy/day	(based on 2000 ton/day waste accepted, 1300 lb/CY waste density, and 5:1 waste:cover ratio)
Soil Density	100	lb/cf	
Cubic feet per cubic yard	27	cf/cy	
Soil Density	2700	lb/cy	conversion from lb/cf to lb/cy
Weight of Daily Soil	691.2	tons/day	

Vehicle Information

Soil Moving Capacity per Truck (Scraper)	31	ton/truck (per Caterpillar specifications)
Total Vehicles Needed Per Day	22	vehicles/day

	Unloaded (tons)	Loaded (tons)	Average (tons)	Vehicles Per Day
Scraper	20	20	25	22

Road lengths based on site drawing

Refer to purple roadways on site map

Unpaved Dirt Roads	0.4	mile
Asphalt Milled Roads	0.2	mile

Asphalt Milled Surface Material Silt Content	6.40%	
Dirt Surface Material Silt Content	8.40%	
Soil Material Moisture Content	14.20%	
Assumed Paved/Dirt Control Efficiency	50%	(based on watering as necessary)
Assumed Asphalt Milled Control Efficiency	90%	

Perimeter Roads:

Used for inspections and for monitoring wells

Vehicle Information

	Unloaded (tons)	Loaded (tons)	Average (tons)	Vehicles Per Day
Pickup	2	2	2	1

West Perimeter Road lengths based on site drawing

Refer to orange roadways on site map

Paved Roads	0.1	mile
Dirt Roads	0.0	mile
Asphalt Milled Roads	1.3	mile

Asphalt Milled Surface Material Silt Content	6.40%	
Dirt Surface Material Silt Content	8.40%	
Assumed Paved/Dirt Control Efficiency	50%	(based on watering as necessary)
Assumed Asphalt Milled Control Efficiency	90%	

East Perimeter Road Lengths based on site drawing

Refer to green roadways on site map

Paved Roads	0.1	mile
Dirt Roads	0.5	mile
Asphalt Milled Roads	0.6	mile

Asphalt Milled Surface Material Silt Content	6.40%	
Dirt Surface Material Silt Content	8.40%	
Assumed Paved/Dirt Control Efficiency	50%	(based on watering as necessary)
Assumed Asphalt Milled Control Efficiency	90%	

Monitoring Well Road lengths based on site drawing

Refer to yellow roadways on site map

Paved Roads	0.1	mile
Dirt Roads	0.4	mile
Asphalt Milled Roads	1.0	mile

Asphalt Milled Surface Material Silt Content	6.40%	
Dirt Surface Material Silt Content	8.40%	
Assumed Paved/Dirt Control Efficiency	50%	(based on watering as necessary)
Assumed Asphalt Milled Control Efficiency	90%	

Weather Data:

Weather information gathered for Marana Regional Airport Weather Station via weatherunderground.com.

Number of "wet" days	32 days
Mean Wind Speed	7 mph

Phase III - Landfill Operation and Future Construction
(includes Phase II landfill operation data as well)

Future Construction Material:

Initial excavation soil volume

Total Excavation Volume	1,400,000	cy/yr	(For construction of Module 1B, assumed representative of future construction projects)
Soils used for daily cover for Module 1A	512	cy/day	(using soil excavated from Module 1B as daily cover in Module 1A)
Excavated Soils in Module 1B going to stockpile	1,213,120	cy/yr	(= total excavated volume - (daily cover soils * 365 days/yr))
Days of Construction per Year	365	days/yr	
Volume of Soil Excavated per Day	3,324	cy/day	
Soil density	100	lb/cf	(typical soil density)
Cubic feet per cubic yard	27	cf/cy	
Soil density	2,700	lb/cy	(conversion from lb/cf to lb/cy)
Weight of Soil Excavated per Day	4,487	tons/day	

Vehicle Information

Soil Hauling Capacity per Truck (Articulated Truck)	40	ton/truck (per Caterpillar specifications)
Total Vehicles Needed Per Day	112	vehicles/day

	Unloaded (tons)	Loaded (tons)	Average (tons)	Vehicles Per Day
Articulated Truck	36	36	51	112

Road lengths (based on removal of 560 feet of asphalt millings and replacing with dirt road)
Refer to dark blue roadways on site map

Dirt Roads	0.3	mile
Asphalt Milled Roads	1.0	mile

Asphalt Milled Surface Material Silt Content	6.40%	
Dirt Surface Material Silt Content	8.40%	
Soil Material Moisture Content	14.20%	
Assumed Dirt Road Control Efficiency	75%	*

* Construction contractors will be required to apply extensive dust control measures such as frequent watering or application of a chemical dust suppressant to construction roads.

Assumed Asphalt Milled Control Efficiency	90%

Emissions Summary

Emission Unit	Description	Calculated Emisisons		
		$PM_{2.5}$ (tpy)	PM_{10} (tpy)	PM_{30} (TSP) (tpy)
--	Unpaved Dirt Road(s)	2.58	25.76	90.36
--	Asphalt Milled Road(s)	3.09	30.92	114.53
--	Material Handling	3.29E-02	2.18E-01	4.60E-01
	Total	**5.70**	**56.89**	**205.4**

Site Specific Information	Value	
Unpaved Dirt Road Length, 1-way (1)	0.3 mi	
No. of Hours of Operation Per Day (1)	24 hr/day	
No. of Days in Averaging Period, N (1)	365 day/yr	
No. of Hours of Operation Per Averaging Period	8760 hr/yr	
No. of "Wet" Days (i.e., at least 0.01 in. precip), P (2)	32 day	3
Silt Loading, sL (3)	7.4 g/m2	
Surface Material Silt Content, s (3)	8.4%	
Control Efficiency, CE (1,5)	75%	

Calculation of Mean Vehicle Weight

Vehicle Type	Vehicle Weight[1] Unloaded (ton)	Vehicle Weight[1] Loaded (ton)	Average (ton)	Vehicles Per Day[1]
Articulated Truck	36	76	56	268

Total Vehicle Count	268 per day
Mean Vehicle Weight, W	56.0 ton
Tons Hauled per truck	40.0 ton

Unpaved Road Emissions	Value	
Predictive Emission Factor Equation (4)	$[k*(s/12)^a*(W/3)^b]*[(365-P)/365)$	
Particle Size Multiplier - PM2.5, k	0.15	
Particle Size Multiplier - PM10, k	1.50	
Particle Size Multiplier2 - PM30, k	4.90	
Calculated Emission Factor - PM2.5, E	0.37 lb/VMT	
Calculated Emission Factor - PM10, E	3.71 lb/VMT	
Calculated Emission Factor - PM30, E	13.00 lb/VMT	
Total Miles Travelled - Unpaved Roads	55,611 VMT/yr	
Calculated Emissions - PM2.5	2.58 tpy	0.59 lb/hr
Calculated Emissions - PM10	25.76 tpy	5.88 lb/hr
Calculated Emissions - PM30	90.36 tpy	20.63 lb/hr

[1] See site drawing.
[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.
[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.1, Jan. 2011.
[4] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.2, Nov. 2006.
[5] Control efficiency based on watering of unpaved roadways during the construction process.

Site Specific Information	Value	
Asphalt Milled Road Length, 1-way (1).....	1.1 mi	
No. of Hours of Operation Per Day (1).....	24 hr/day	
No. of Days in Averaging Period, N (1).....	365 day/yr	
No. of Hours of Operation Per Averaging Period.....	8760 hr/yr	
No. of "Wet" Days (i.e., at least 0.01 in. precip), P (2).....	32 day	3
Silt Loading, sL (3).....	7.4 g/m2	
Surface Material Silt Content, s (3).....	6.4%	
Control Efficiency, CE (1,5).....	90%	

Calculation of Mean Vehicle Weight

	Vehicle Weight[1]			
Vehicle Type	Unloaded (ton)	Loaded (ton)	Average (ton)	Vehicles Per Day[1]
Articulated Truck.....	36	76	56	268

Total Vehicle Count..... 268 per day
Mean Vehicle Weight, W..... 56.0 ton
Tons Hauled per truck..... 40.0 ton

Unpaved Road Emissions	Value	
Predictive Emission Factor Equation (4).....	$[k*(s/12)^a*(W/3)^b]*[(365-P)/365)$	
Particle Size Multiplier - PM2.5, k.....	0.15	
Particle Size Multiplier - PM10, k.....	1.50	
Particle Size Multiplier2 - PM30, k.....	4.90	
Calculated Emission Factor - PM2.5, E.....	0.29 lb/VMT	
Calculated Emission Factor - PM10, E.....	2.90 lb/VMT	
Calculated Emission Factor - PM30, E.....	10.75 lb/VMT	
Total Miles Travelled - Unpaved Roads.....	213,174 VMT/yr	
Calculated Emissions - PM2.5.....	3.09 tpy	0.71 lb/hr
Calculated Emissions - PM10.....	30.92 tpy	7.06 lb/hr
Calculated Emissions - PM30.....	114.53 tpy	26.15 lb/hr

[1] See Site Drawing.
[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.
[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.1, Jan. 2011.
[4] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.2, Nov. 2006.
[5] Control efficiency based on placing asphalt millings on road surface to control dust.

Site Specific Information	Value	
Amount of Material Handled Per Day (1).....	10,726 ton/day	
No. of Hours of Operation Per Day (1).....	24 hr/day	
No. of Days in Averaging Period, N (1).....	365 day/yr	
No. of Hours of Operation Per Averaging Period.....	8760 hr/yr	
Mean Wind Speed, U (2).....	7 mph	2
Surface Material Moisture Content, M (3).....	14.2%	

Material Handling Emissions	Value	
Predictive Emission Factor Equation (3).....	$E = [k*0.0032]*[((U/5)^{1.3})/((M/2)^{1.4})]$	
Particle Size Multiplier - PM2.5, k.....	0.053	
Particle Size Multiplier - PM10, k.....	0.35	
Particle Size Multiplier2 - PM30, k.....	0.74	
Calculated Emission Factor - PM2.5, E.....	1.68E-05 lb/ton	
Calculated Emission Factor - PM10, E.....	1.11E-04 lb/ton	
Calculated Emission Factor - PM30, E.....	2.35E-04 lb/ton	
Calculated Emissions - PM2.5.....	3.29E-02 tpy	7.52E-03 lb/hr
Calculated Emissions - PM10.....	2.18E-01 tpy	4.97E-02 lb/hr
Calculated Emissions - PM30.....	4.60E-01 tpy	1.05E-01 lb/hr

[1] Site Specific - Specify Actual Source

[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.

[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.4, Nov. 2006.

Emissions Summary

Emission Unit	Description	Calculated Emisisons		
		$PM_{2.5}$ (tpy)	PM_{10} (tpy)	PM_{30} (TSP) (tpy)
--	Paved Road(s)	0.52	2.11	10.54
	Asphalt Milled Roads	0.76	7.64	28.30
--	Unpaved Dirt Road(s)	2.09	20.91	73.35
--	Waste/Storage Piles	6.14E-03	4.06E-02	8.58E-02
	Total	**3.38**	**30.70**	**112.3**

Site Specific Information	Value	
Paved Road Length, 1-way (1).....	0.3 mi	
No. of Hours of Operation Per Day (1).....	24 hr/day	
No. of Days in Averaging Period, N (1).....	365 day/yr	
No. of Hours of Operation Per Averaging Period.....	8760 hr/yr	
No. of "Wet" Days (i.e., at least 0.01 in. precip), P (3).....	32 day	3
Silt Loading, sL (3).....	7.4 g/m2	
Surface Material Silt Content, s (3).....	6.4%	
Control Efficiency, CE (1,5).....	50%	

Calculation of Mean Vehicle Weight

Vehicle Type	Vehicle Weight[1] Unloaded (ton)	Loaded (ton)	Average (ton)	Vehicles Per Day[1]
Transfer Trailer.....	17	40	29	60
Front Loader.....	20	30	25	10
Rear Loader.....	20	35	28	5
Roll Off	15	25	20	25
Pickup.....	2	4	3	100

Total Vehicle Count..... 200 per day
Mean Vehicle Weight, W..... 14.5 ton

Paved Road Emissions	Value	
Predictive Emission Factor Equation (3).....	$E = \{[k*(sL)^{0.91}*(W)^{1.02}]*(1-P/4N)\}*CE$	
Particle Size Multiplier - PM2.5, k.....	0.00054	
Particle Size Multiplier - PM10, k.....	0.0022	
Particle Size Multiplier2 - PM30, k.....	0.011	
Calculated Emission Factor - PM2.5, E.....	0.05 lb/VMT	
Calculated Emission Factor - PM10, E.....	0.20 lb/VMT	
Calculated Emission Factor - PM30, E.....	1.02 lb/VMT	
Total Miles Travelled - Paved Roads.....	41,477 VMT/yr	
Calculated Emissions - PM2.5.....	0.52 tpy	0.118 lb/hr
Calculated Emissions - PM10.....	2.11 tpy	0.481 lb/hr
Calculated Emissions - PM30.....	10.54 tpy	2.406 lb/hr

[1] See site drawing.
[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.
[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.1, Jan. 2011.
[4] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.2, Nov. 2006.
[5] Control efficiency based on watering of paved roadways when necessary.

Site Specific Information	Value	
Asphalt Milled Length, 1-way (1)	0.7 mi	
No. of Hours of Operation Per Day (1)	24 hr/day	
No. of Days in Averaging Period, N (1)	365 day/yr	
No. of Hours of Operation Per Averaging Period	8760 hr/yr	
No. of "Wet" Days (i.e., at least 0.01 in. precip), P (3)	32 day	3
Silt Loading, sL (3)	7.4 g/m2	
Surface Material Silt Content, s (3)	6.4%	
Control Efficiency, CE (1,5)	90%	

Calculation of Mean Vehicle Weight

Vehicle Type	Vehicle Weight[1] Unloaded (ton)	Vehicle Weight[1] Loaded (ton)	Average (ton)	Vehicles Per Day[1]
Transfer Trailer	17	40	29	60
Front Loader	20	30	25	10
Rear Loader	20	35	28	5
Roll Off	15	25	20	25
Pickup	2	4	3	100

Total Vehicle Count..... 200 per day
Mean Vehicle Weight, W..... 14.5 ton

Unpaved Road Emissions	Value	
Predictive Emission Factor Equation (4)	$[k*(s/12)^a*(W/3)^b]*[(365-P)/365)$	
Particle Size Multiplier - PM2.5, k	0.15	
Particle Size Multiplier - PM10, k	1.50	
Particle Size Multiplier2 - PM30, k	4.90	
Calculated Emission Factor - PM2.5, E	0.16 lb/VMT	
Calculated Emission Factor - PM10, E	1.58 lb/VMT	
Calculated Emission Factor - PM30, E	5.85 lb/VMT	
Total Miles Travelled - Unpaved Roads	96,780 VMT/yr	
Calculated Emissions - PM2.5	0.76 tpy	0.17 lb/hr
Calculated Emissions - PM10	7.64 tpy	1.74 lb/hr
Calculated Emissions - PM30	28.30 tpy	6.46 lb/hr

[1] See site drawing.
[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.
[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.1, Jan. 2011.
[4] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.2, Nov. 2006.
[5] Control efficiency based on placing asphalt millings on road surface to control dust.

Site Specific Information	Value	
Unpaved Dirt Length, 1-way (1)	0.3 mi	
No. of Hours of Operation Per Day (1)	24 hr/day	
No. of Days in Averaging Period, N (1)	365 day/yr	
No. of Hours of Operation Per Averaging Period	8760 hr/yr	
No. of "Wet" Days (i.e., at least 0.01 in. precip), P (3)	32 day	3
Silt Loading, sL (3)	7.4 g/m2	
Surface Material Silt Content, s (3)	8.4%	
Control Efficiency, CE (1,5)	50%	

Calculation of Mean Vehicle Weight

Vehicle Type	Vehicle Weight[1] Unloaded (ton)	Vehicle Weight[1] Loaded (ton)	Average (ton)	Vehicles Per Day[1]
Transfer Trailer	17	40	29	60
Front Loader	20	30	25	10
Rear Loader	20	35	28	5
Roll Off	15	25	20	25
Pickup	2	4	3	100

Total Vehicle Count..... 200 per day
Mean Vehicle Weight, W..... 14.5 ton

Unpaved Road Emissions	Value	
Predictive Emission Factor Equation (4)	$[k*(s/12)^a*(W/3)^b]*[(365-P)/365)$	
Particle Size Multiplier - PM2.5, k	0.15	
Particle Size Multiplier - PM10, k	1.50	
Particle Size Multiplier2 - PM30, k	4.90	
Calculated Emission Factor - PM2.5, E	0.20 lb/VMT	
Calculated Emission Factor - PM10, E	2.02 lb/VMT	
Calculated Emission Factor - PM30, E	7.07 lb/VMT	
Total Miles Travelled - Unpaved Roads	41,477 VMT/yr	
Calculated Emissions - PM2.5	2.09 tpy	0.48 lb/hr
Calculated Emissions - PM10	20.91 tpy	4.77 lb/hr
Calculated Emissions - PM30	73.35 tpy	16.75 lb/hr

[1] See site drawing.

[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.

[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.1, Jan. 2011.

[4] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.2, Nov. 2006.

[5] Control efficiency based on watering of unpaved roadways when necessary.

Site Specific Information	Value	
Amount of Waste Handled Per Day (1).....	2,000 ton/day	
No. of Hours of Operation Per Day (1).....	24 hr/day	
No. of Days in Averaging Period, N (1).....	365 day/yr	
No. of Hours of Operation Per Averaging Period.....	8760 hr/yr	
Mean Wind Speed, U (2).....	6.98 mph	2
Surface Material Moisture Content, M (3).....	14.2%	

Waste Handling Emissions	Value	
Predictive Emission Factor Equation (3).....	$E = [k*0.0032]*[((U/5)^{1.3})/((M/2)^{1.4})]$	
Particle Size Multiplier - PM2.5, k.....	0.053	
Particle Size Multiplier - PM10, k.....	0.35	
Particle Size Multiplier2 - PM30, k.....	0.74	
Calculated Emission Factor - PM2.5, E.....	1.68E-05 lb/ton	
Calculated Emission Factor - PM10, E.....	1.11E-04 lb/ton	
Calculated Emission Factor - PM30, E.....	2.35E-04 lb/ton	
Calculated Emissions - PM2.5.....	6.14E-03 tpy	1.40E-03 lb/hr
Calculated Emissions - PM10.....	4.06E-02 tpy	9.26E-03 lb/hr
Calculated Emissions - PM30.....	8.58E-02 tpy	1.96E-02 lb/hr

[1] Site provided daily waste acceptance, operational data based on worst-case scenario.
[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.
[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.4, Nov. 2006.

Emissions Summary

Emission Unit	Description	Calculated Emisisons		
		$PM_{2.5}$ (tpy)	PM_{10} (tpy)	PM_{30} (TSP) (tpy)
--	Unpaved Dirt Road(s)	0.52	5.23	18.36
--	Asphalt Milled Road(s)	0.04	0.36	1.35
--	Material Handling	2.12E-03	1.40E-02	2.96E-02
	Total	**0.56**	**5.61**	**19.7**

Site Specific Information	Value	
Unpaved Dirt Road Length, 1-way (1)	0.4 mi	
No. of Hours of Operation Per Day (1)	24 hr/day	
No. of Days in Averaging Period, N (1)	365 day/yr	
No. of Hours of Operation Per Averaging Period	8760 hr/yr	
No. of "Wet" Days (i.e., at least 0.01 in. precip), P (2)	32 day	3
Silt Loading, sL (3)	7.4 g/m2	
Surface Material Silt Content, s (3)	8.4%	
Control Efficiency, CE (1,5)	50%	

Calculation of Mean Vehicle Weight

Vehicle Type	Vehicle Weight[1] Unloaded (ton)	Vehicle Weight[1] Loaded (ton)	Average (ton)	Vehicles Per Day[1]
Scraper	20	51	36	22

Total Vehicle Count	22 per day
Mean Vehicle Weight, W	35.5 ton
Tons Hauled per truck	31.0 ton

Unpaved Road Emissions	Value	
Predictive Emission Factor Equation (4)	$[k*(s/12)^a*(W/3)^b]*[(365-P)/365)$	
Particle Size Multiplier - PM2.5, k	0.15	
Particle Size Multiplier - PM10, k	1.50	
Particle Size Multiplier2 - PM30, k	4.90	
Calculated Emission Factor - PM2.5, E	0.30 lb/VMT	
Calculated Emission Factor - PM10, E	3.02 lb/VMT	
Calculated Emission Factor - PM30, E	10.59 lb/VMT	
Total Miles Travelled - Unpaved Roads	6,936 VMT/yr	
Calculated Emissions - PM2.5	0.52 tpy	0.12 lb/hr
Calculated Emissions - PM10	5.23 tpy	1.19 lb/hr
Calculated Emissions - PM30	18.36 tpy	4.19 lb/hr

[1] See Site Drawing.
[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.
[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.1, Jan. 2011.
[4] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.2, Nov. 2006.
[5] Control efficiency based on watering of unpaved roadways when necessary.

Site Specific Information	Value	
Asphalt Milled Road Length, 1-way (1).....	0.2 mi	
No. of Hours of Operation Per Day (1).....	24 hr/day	
No. of Days in Averaging Period, N (1).....	365 day/yr	
No. of Hours of Operation Per Averaging Period.....	8760 hr/yr	
No. of "Wet" Days (i.e., at least 0.01 in. precip), P (2).....	32 day	3
Silt Loading, sL (3).....	7.4 g/m2	
Surface Material Silt Content, s (3).....	6.4%	
Control Efficiency, CE (1,5).....	90%	

Calculation of Mean Vehicle Weight

	Vehicle Weight[1]			
Vehicle Type	Unloaded (ton)	Loaded (ton)	Average (ton)	Vehicles Per Day[1]
Scraper.....	20	51	36	22

Total Vehicle Count..... 22 per day
Mean Vehicle Weight, W..... 35.5 ton
Tons Hauled per truck..... 31.0 ton

Unpaved Road Emissions	Value	
Predictive Emission Factor Equation (4).....	$[k*(s/12)^a*(W/3)^b]*[(365-P)/365)$	
Particle Size Multiplier - PM2.5, k.....	0.15	
Particle Size Multiplier - PM10, k.....	1.50	
Particle Size Multiplier2 - PM30, k.....	4.90	
Calculated Emission Factor - PM2.5, E.....	0.24 lb/VMT	
Calculated Emission Factor - PM10, E.....	2.36 lb/VMT	
Calculated Emission Factor - PM30, E.....	8.75 lb/VMT	
Total Miles Travelled - Unpaved Roads.....	3,083 VMT/yr	
Calculated Emissions - PM2.5.....	0.0364 tpy	0.0083 tpy
Calculated Emissions - PM10.....	0.3642 tpy	0.0832 tpy
Calculated Emissions - PM30.....	1.3491 tpy	0.3080 tpy

[1] See site drawing.
[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.
[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.1, Jan. 2011.
[4] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.2, Nov. 2006.
[5] Control efficiency based on placing asphalt millings on road surface to control dust.

Site Specific Information	Value	
Amount of Material Handled Per Day (1).....	691 ton/day	
No. of Hours of Operation Per Day (1).....	24 hr/day	
No. of Days in Averaging Period, N (1).....	365 day/yr	
No. of Hours of Operation Per Averaging Period.....	8760 hr/yr	
Mean Wind Speed, U (2).....	7 mph	2
Surface Material Moisture Content, M (3).....	14.2%	

Material Handling Emissions	Value	
Predictive Emission Factor Equation (3).....	$E = [k*0.0032]*[((U/5)^{1.3})/((M/2)^{1.4})]$	
Particle Size Multiplier - PM2.5, k.....	0.053	
Particle Size Multiplier - PM10, k.....	0.35	
Particle Size Multiplier2 - PM30, k.....	0.74	
Calculated Emission Factor - PM2.5, E.....	1.68E-05 lb/ton	
Calculated Emission Factor - PM10, E.....	1.11E-04 lb/ton	
Calculated Emission Factor - PM30, E.....	2.35E-04 lb/ton	
Calculated Emissions - PM2.5.....	2.12E-03 tpy	4.85E-04 lb/hr
Calculated Emissions - PM10.....	1.40E-02 tpy	3.20E-03 lb/hr
Calculated Emissions - PM30.....	2.96E-02 tpy	6.77E-03 lb/hr

[1] Site Specific - Specify Actual Source

[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.

[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.4, Nov. 2006.

Emissions Summary

Emission Unit	Description	Calculated Emisisons		
		$PM_{2.5}$ (tpy)	PM_{10} (tpy)	PM_{30} (TSP) (tpy)
--	West Perimeter Road(s)	0.00	0.04	0.14
--	East Perimeter Road(s)	0.01	0.09	0.25
--	Monitoring Well Road(s)	0.01	0.09	0.32
	Total	**0.02**	**0.21**	**0.7**

CORNERSTONE Environmental Group, LLC

Site Specific Information	Value	
Paved Road Length, 1-way (1)	0.1 mi	
No. of Hours of Operation Per Day (1)	24 hr/day	
No. of Days in Averaging Period, N (1)	365 day/yr	
No. of Hours of Operation Per Averaging Period	8760 hr/yr	
No. of "Wet" Days (i.e., at least 0.01 in. precip), P (2)	32 day	3
Silt Loading, sL (3)	7.4 g/m2	
Surface Material Silt Content, s (3)	6.4%	
Control Efficiency, CE (1,5)	50%	

Calculation of Mean Vehicle Weight

	Vehicle Weight[1]			
Vehicle Type	Unloaded (ton)	Loaded (ton)	Average (ton)	Vehicles Per Day[1]
Pickup Truck	2	2	2	1

Total Vehicle Count 1 per day
Mean Vehicle Weight, W 2.0 ton

Paved Road Emissions	Value	
Predictive Emission Factor Equation (3)	$E = \{[k*(sL)^{0.91}*(W)^{1.02}]*(1-P/4N)\}*CE$	
Particle Size Multiplier - PM2.5, k	0.00054	
Particle Size Multiplier - PM10, k	0.0022	
Particle Size Multiplier2 - PM30, k	0.011	
Calculated Emission Factor - PM2.5, E	0.01 lb/VMT	
Calculated Emission Factor - PM10, E	0.03 lb/VMT	
Calculated Emission Factor - PM30, E	0.13 lb/VMT	
Total Miles Travelled - Paved Roads	69 VMT/yr	
Calculated Emissions - PM2.5	0.00011 tpy	0.000026 lb/hr
Calculated Emissions - PM10	0.00047 tpy	0.00011 lb/hr
Calculated Emissions - PM30	0.00233 tpy	0.00053 lb/hr

[1] See Site Drawing.
[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.
[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.1, Jan. 2011.
[4] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.2, Nov. 2006.
[5] Control efficiency based on watering of paved roadways when necessary.

Site Specific Information	Value	
Asphalt Milled Road Length, 1-way (1).....	1.3 mi	(to perimeter roads to the west)
No. of Hours of Operation Per Day (1).....	24 hr/day	
No. of Days in Averaging Period, N (1).....	365 day/yr	
No. of Hours of Operation Per Averaging Period.....	8760 hr/yr	
No. of "Wet" Days (i.e., at least 0.01 in. precip), P (2).....	32 day	3
Silt Loading, sL (3).....	7.4 g/m2	
Surface Material Silt Content, s (3).....	8.4%	
Control Efficiency, CE (1,5).....	90%	

Calculation of Mean Vehicle Weight

	Vehicle Weight[1]			
Vehicle Type	Unloaded (ton)	Loaded (ton)	Average (ton)	Vehicles Per Day[1]
Pickup Truck.....	2	2	2	1

Total Vehicle Count..... 1 per day
Mean Vehicle Weight, W..... 2.0 ton

Unpaved Road Emissions	Value	
Predictive Emission Factor Equation (4).....	$[k*(s/12)^a*(W/3)^b]*[(365-P)/365]$	
Particle Size Multiplier - PM2.5, k.....	0.15	
Particle Size Multiplier - PM10, k.....	1.50	
Particle Size Multiplier2 - PM30, k.....	4.90	
Calculated Emission Factor - PM2.5, E.....	0.08 lb/VMT	
Calculated Emission Factor - PM10, E.....	0.83 lb/VMT	
Calculated Emission Factor - PM30, E.....	2.90 lb/VMT	
Total Miles Travelled - Unpaved Roads.....	968 VMT/yr	
Calculated Emissions - PM2.5.....	0.0040 tpy	0.00091 lb/hr
Calculated Emissions - PM10.....	0.0400 tpy	0.00914 lb/hr
Calculated Emissions - PM30.....	0.1404 tpy	0.03206 lb/hr

[1] See site drawing.
[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.
[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.1, Jan. 2011.
[4] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.2, Nov. 2006.
[5] Control efficiency based on placing asphalt millings on road surface to control dust.

Site Specific Information	Value	
Paved Road Length, 1-way (1)	0.1 mi	
No. of Hours of Operation Per Day (1)	24 hr/day	
No. of Days in Averaging Period, N (1)	365 day/yr	
No. of Hours of Operation Per Averaging Period	8760 hr/yr	
No. of "Wet" Days (i.e., at least 0.01 in. precip), P (2)	32 day	3
Silt Loading, sL (3)	7.4 g/m2	
Surface Material Silt Content, s (3)	6.4%	
Control Efficiency, CE (1,5)	50%	

Calculation of Mean Vehicle Weight

	Vehicle Weight[1]			
Vehicle Type	Unloaded (ton)	Loaded (ton)	Average (ton)	Vehicles Per Day[1]
Pickup Truck	2	2	2	1

Total Vehicle Count ..... 1 per day
Mean Vehicle Weight, W ..... 2.0 ton

Paved Road Emissions	Value	
Predictive Emission Factor Equation (3)	$E = \{[k*(sL)^{0.91}*(W)^{1.02}]*(1-P/4N)\}*CE$	
Particle Size Multiplier - PM2.5, k	0.00054	
Particle Size Multiplier - PM10, k	0.0022	
Particle Size Multiplier2 - PM30, k	0.011	
Calculated Emission Factor - PM2.5, E	0.01 lb/VMT	
Calculated Emission Factor - PM10, E	0.03 lb/VMT	
Calculated Emission Factor - PM30, E	0.13 lb/VMT	
Total Miles Travelled - Paved Roads	69 VMT/yr	
Calculated Emissions - PM2.5	0.000114 tpy	0.000026 lb/hr
Calculated Emissions - PM10	0.000466 tpy	0.000106 lb/hr
Calculated Emissions - PM30	0.002330 tpy	0.000532 lb/hr

[1] See Site Drawing.
[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.
[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.1, Jan. 2011.
[4] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.2, Nov. 2006.
[5] Control efficiency based on watering of paved roadways when necessary.

Site Specific Information	Value	
Unpaved Road Length, 1-way (1).....	0.6 mi	(to perimeter roads to the east)
No. of Hours of Operation Per Day (1).....	24 hr/day	
No. of Days in Averaging Period, N (1).....	365 day/yr	
No. of Hours of Operation Per Averaging Period.....	8760 hr/yr	
No. of "Wet" Days (i.e., at least 0.01 in. precip), P (2).....	32 day	3
Silt Loading, sL (3).....	7.4 g/m2	
Surface Material Silt Content, s (3).....	6.4%	
Control Efficiency, CE (1,5).....	90%	

Calculation of Mean Vehicle Weight

	Vehicle Weight[1]			
Vehicle Type	Unloaded (ton)	Loaded (ton)	Average (ton)	Vehicles Per Day[1]
Pickup Truck.....	2	2	2	1

Total Vehicle Count..... 1 per day
Mean Vehicle Weight, W..... 2.0 ton

Unpaved Road Emissions	Value	
Predictive Emission Factor Equation (4).....	$[k*(s/12)^a*(W/3)^b]*[(365-P)/365]$	
Particle Size Multiplier - PM2.5, k.....	0.15	
Particle Size Multiplier - PM10, k.....	1.50	
Particle Size Multiplier2 - PM30, k.....	4.90	
Calculated Emission Factor - PM2.5, E.....	0.06 lb/VMT	
Calculated Emission Factor - PM10, E.....	0.65 lb/VMT	
Calculated Emission Factor - PM30, E.....	2.40 lb/VMT	
Total Miles Travelled - Unpaved Roads.....	436 VMT/yr	
Calculated Emissions - PM2.5.....	0.00141 tpy	0.00032 lb/hr
Calculated Emissions - PM10.....	0.01410 tpy	0.00322 lb/hr
Calculated Emissions - PM30.....	0.05224 tpy	0.01193 lb/hr

[1] See site drawing.
[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.
[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.1, Jan. 2011.
[4] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.2, Nov. 2006.
[5] Control efficiency based on placing asphalt millings on road surface to control dust.

Site Specific Information	Value	
Unpaved Road Length, 1-way (1).....	0.5 mi	(to perimeter roads to the east)
No. of Hours of Operation Per Day (1).....	24 hr/day	
No. of Days in Averaging Period, N (1).....	365 day/yr	
No. of Hours of Operation Per Averaging Period.....	8760 hr/yr	
No. of "Wet" Days (i.e., at least 0.01 in. precip), P (2).....	32 day	3
Silt Loading, sL (3).....	7.4 g/m2	
Surface Material Silt Content, s (3).....	8.4%	
Control Efficiency, CE (1,5).....	50%	

Calculation of Mean Vehicle Weight

	Vehicle Weight[1]			
Vehicle Type	Unloaded (ton)	Loaded (ton)	Average (ton)	Vehicles Per Day[1]
Pickup Truck.....	2	2	2	1

Total Vehicle Count..... 1 per day
Mean Vehicle Weight, W..... 2.0 ton

Unpaved Road Emissions	Value	
Predictive Emission Factor Equation (4).....	$[k*(s/12)^a*(W/3)^b]*[(365-P)/365]$	
Particle Size Multiplier - PM2.5, k.....	0.15	
Particle Size Multiplier - PM10, k.....	1.50	
Particle Size Multiplier2 - PM30, k.....	4.90	
Calculated Emission Factor - PM2.5, E.....	0.08 lb/VMT	
Calculated Emission Factor - PM10, E.....	0.83 lb/VMT	
Calculated Emission Factor - PM30, E.....	2.90 lb/VMT	
Total Miles Travelled - Unpaved Roads.....	346 VMT/yr	
Calculated Emissions - PM2.5.....	0.00715 tpy	0.00163 lb/hr
Calculated Emissions - PM10.....	0.07148 tpy	0.01632 lb/hr
Calculated Emissions - PM30.....	0.25075 tpy	0.05725 lb/hr

[1] See Site Drawing.
[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.
[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.1, Jan. 2011.
[4] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.2, Nov. 2006.
[5] Control efficiency based on watering of unpaved roadways when necessary.

Site Specific Information	Value	
Paved Road Length, 1-way (1)	0.1 mi	
No. of Hours of Operation Per Day (1)	24 hr/day	
No. of Days in Averaging Period, N (1)	365 day/yr	
No. of Hours of Operation Per Averaging Period	8760 hr/yr	
No. of "Wet" Days (i.e., at least 0.01 in. precip), P (2)	32 day	3
Silt Loading, sL (3)	7.4 g/m2	
Surface Material Silt Content, s (3)	6.4%	
Control Efficiency, CE (1,5)	50%	

Calculation of Mean Vehicle Weight

	Vehicle Weight[1]			
Vehicle Type	Unloaded (ton)	Loaded (ton)	Average (ton)	Vehicles Per Day[1]
Pickup Truck	2	2	2	1

Total Vehicle Count ..... 1 per day
Mean Vehicle Weight, W ..... 2.0 ton

Paved Road Emissions	Value	
Predictive Emission Factor Equation (3)	$E = \{[k*(sL)^{0.91}*(W)^{1.02}]*(1-P/4N)\}*CE$	
Particle Size Multiplier - PM2.5, k	0.00054	
Particle Size Multiplier - PM10, k	0.0022	
Particle Size Multiplier2 - PM30, k	0.011	
Calculated Emission Factor - PM2.5, E	0.01 lb/VMT	
Calculated Emission Factor - PM10, E	0.03 lb/VMT	
Calculated Emission Factor - PM30, E	0.13 lb/VMT	
Total Miles Travelled - Paved Roads	69 VMT/yr	
Calculated Emissions - PM2.5	0.000114 tpy	0.000026 lb/hr
Calculated Emissions - PM10	0.000466 tpy	0.000106 lb/hr
Calculated Emissions - PM30	0.002330 tpy	0.000532 lb/hr

[1] See site drawing.
[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.
[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.1, Jan. 2011.
[4] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.2, Nov. 2006.
[5] Control efficiency based on watering of paved roadways when necessary.

Site Specific Information	Value	
Asphalt Milled Road Length, 1-way (1).....	1.0 mi	(to monitoring points on north side)
No. of Hours of Operation Per Day (1).....	24 hr/day	
No. of Days in Averaging Period, N (1).....	365 day/yr	
No. of Hours of Operation Per Averaging Period.....	8760 hr/yr	
No. of "Wet" Days (i.e., at least 0.01 in. precip), P (2).....	32 day	3
Silt Loading, sL (3).....	7.4 g/m2	
Surface Material Silt Content, s (3).....	6.4%	
Control Efficiency, CE (1,5).....	90%	

Calculation of Mean Vehicle Weight

	Vehicle Weight[1]			
Vehicle Type	Unloaded (ton)	Loaded (ton)	Average (ton)	Vehicles Per Day[1]
Pickup Truck.....	2	2	2	1

Total Vehicle Count..... 1 per day
Mean Vehicle Weight, W..... 2.0 ton

Unpaved Road Emissions	Value	
Predictive Emission Factor Equation (4).....	$[k*(s/12)^a*(W/3)^b]*[(365-P)/365]$	
Particle Size Multiplier - PM2.5, k.....	0.15	
Particle Size Multiplier - PM10, k.....	1.50	
Particle Size Multiplier2 - PM30, k.....	4.90	
Calculated Emission Factor - PM2.5, E.....	0.06 lb/VMT	
Calculated Emission Factor - PM10, E.....	0.65 lb/VMT	
Calculated Emission Factor - PM30, E.....	2.40 lb/VMT	
Total Miles Travelled - Unpaved Roads.....	726 VMT/yr	
Calculated Emissions - PM2.5.....	0.0024 tpy	0.00054 lb/hr
Calculated Emissions - PM10.....	0.0235 tpy	0.00537 lb/hr
Calculated Emissions - PM30.....	0.0871 tpy	0.01988 lb/hr

[1] See site drawing.
[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.
[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.1, Jan. 2011.
[4] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.2, Nov. 2006.
[5] Control efficiency based on placing asphalt millings on road surface to control dust.

Site Specific Information	Value	
Unpaved Road Length, 1-way (1).....	0.4 mi	(to monitoring points on north side)
No. of Hours of Operation Per Day (1).....	24 hr/day	
No. of Days in Averaging Period, N (1).....	365 day/yr	
No. of Hours of Operation Per Averaging Period.....	8760 hr/yr	
No. of "Wet" Days (i.e., at least 0.01 in. precip), P (2).....	32 day	3
Silt Loading, sL (3).....	7.4 g/m2	
Surface Material Silt Content, s (3).....	8.4%	
Control Efficiency, CE (1,5).....	50%	

Calculation of Mean Vehicle Weight

	Vehicle Weight[1]			
Vehicle Type	Unloaded (ton)	Loaded (ton)	Average (ton)	Vehicles Per Day[1]
Pickup Truck.....	2	2	2	1

Total Vehicle Count..... 1 per day
Mean Vehicle Weight, W..... 2.0 ton

Unpaved Road Emissions	Value	
Predictive Emission Factor Equation (4).....	$[k*(s/12)^a*(W/3)^b]*[(365-P)/365]$	
Particle Size Multiplier - PM2.5, k.....	0.15	
Particle Size Multiplier - PM10, k.....	1.50	
Particle Size Multiplier2 - PM30, k.....	4.90	
Calculated Emission Factor - PM2.5, E.....	0.08 lb/VMT	
Calculated Emission Factor - PM10, E.....	0.83 lb/VMT	
Calculated Emission Factor - PM30, E.....	2.90 lb/VMT	
Total Miles Travelled - Unpaved Roads.....	311 VMT/yr	
Calculated Emissions - PM2.5.....	0.00643 tpy	0.00147 lb/hr
Calculated Emissions - PM10.....	0.06433 tpy	0.01469 lb/hr
Calculated Emissions - PM30.....	0.22568 tpy	0.05152 lb/hr

[1] See site drawing.
[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.
[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.1, Jan. 2011.
[4] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.2, Nov. 2006.
[5] Control efficiency based on watering of unpaved roadways when necessary.

Emissions Summary

Emission Unit	Description	Calculated Emisisons		
		$PM_{2.5}$ (tpy)	PM_{10} (tpy)	PM_{30} (TSP) (tpy)
--	Unpaved Dirt Road(s)	1.08	10.77	37.80
--	Asphalt Milled Road(s)	1.19	11.88	44.00
--	Material Handling	1.38E-02	9.10E-02	1.92E-01
	Total	**2.28**	**22.74**	**82.0**

Site Specific Information	Value	
Unpaved Dirt Road Length, 1-way (1)	0.3 mi	
No. of Hours of Operation Per Day (1)	24 hr/day	
No. of Days in Averaging Period, N (1)	365 day/yr	
No. of Hours of Operation Per Averaging Period	8760 hr/yr	
No. of "Wet" Days (i.e., at least 0.01 in. precip), P (2)	32 day	3
Silt Loading, sL (3)	7.4 g/m2	
Surface Material Silt Content, s (3)	8.4%	
Control Efficiency, CE (1,5)	75%	

Calculation of Mean Vehicle Weight

Vehicle Type	Vehicle Weight[1] Unloaded (ton)	Loaded (ton)	Average (ton)	Vehicles Per Day[1]
Articulated Truck	36	76	56	112

Total Vehicle Count 112 per day
Mean Vehicle Weight, W 56.0 ton
Tons Hauled per truck 40.0 ton

Unpaved Road Emissions	Value	
Predictive Emission Factor Equation (4)	$[k*(s/12)^a*(W/3)^b]*[(365-P)/365)$	
Particle Size Multiplier - PM2.5, k	0.15	
Particle Size Multiplier - PM10, k	1.50	
Particle Size Multiplier2 - PM30, k	4.90	
Calculated Emission Factor - PM2.5, E	0.37 lb/VMT	
Calculated Emission Factor - PM10, E	3.71 lb/VMT	
Calculated Emission Factor - PM30, E	13.00 lb/VMT	
Total Miles Travelled - Unpaved Roads	23,264 VMT/yr	
Calculated Emissions - PM2.5	1.08 tpy	0.25 lb/hr
Calculated Emissions - PM10	10.77 tpy	2.46 lb/hr
Calculated Emissions - PM30	37.80 tpy	8.63 lb/hr

[1] See site drawing.
[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.
[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.1, Jan. 2011.
[4] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.2, Nov. 2006.
[5] Control efficiency based on watering of unpaved roadways during the construction process.

Site Specific Information	Value	
Asphalt Milled Road Length, 1-way (1).....	1.0 mi	
No. of Hours of Operation Per Day (1).....	24 hr/day	
No. of Days in Averaging Period, N (1).....	365 day/yr	
No. of Hours of Operation Per Averaging Period.....	8760 hr/yr	
No. of "Wet" Days (i.e., at least 0.01 in. precip), P (2).....	32 day	3
Silt Loading, sL (3).....	7.4 g/m2	
Surface Material Silt Content, s (3).....	6.4%	
Control Efficiency, CE (1,5).....	90%	

Calculation of Mean Vehicle Weight

Vehicle Type	Vehicle Weight[1] Unloaded (ton)	Vehicle Weight[1] Loaded (ton)	Average (ton)	Vehicles Per Day[1]
Articulated Truck.....	36	76	56	112

Total Vehicle Count..... 112 per day
Mean Vehicle Weight, W..... 56.0 ton
Tons Hauled per truck..... 40.0 ton

Unpaved Road Emissions	Value	
Predictive Emission Factor Equation (4).....	$[k*(s/12)^a*(W/3)^b]*[(365-P)/365)$	
Particle Size Multiplier - PM2.5, k.....	0.15	
Particle Size Multiplier - PM10, k.....	1.50	
Particle Size Multiplier2 - PM30, k.....	4.90	
Calculated Emission Factor - PM2.5, E.....	0.29 lb/VMT	
Calculated Emission Factor - PM10, E.....	2.90 lb/VMT	
Calculated Emission Factor - PM30, E.....	10.75 lb/VMT	
Total Miles Travelled - Unpaved Roads.....	81,888 VMT/yr	
Calculated Emissions - PM2.5.....	1.19 tpy	0.27 lb/hr
Calculated Emissions - PM10.....	11.88 tpy	2.71 lb/hr
Calculated Emissions - PM30.....	44.00 tpy	10.04 lb/hr

[1] See Site Drawing.
[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.
[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.1, Jan. 2011.
[4] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.2, Nov. 2006.
[5] Control efficiency based on placing asphalt millings on road surface to control dust.

Site Specific Information	Value	
Amount of Material Handled Per Day (1).....	4,487 ton/day	
No. of Hours of Operation Per Day (1).....	24 hr/day	
No. of Days in Averaging Period, N (1).....	365 day/yr	
No. of Hours of Operation Per Averaging Period.....	8760 hr/yr	
Mean Wind Speed, U (2).....	7 mph	2
Surface Material Moisture Content, M (3).....	14.2%	

Material Handling Emissions	Value	
Predictive Emission Factor Equation (3).....	$E = [k*0.0032]*[((U/5)^{1.3})/((M/2)^{1.4})]$	
Particle Size Multiplier - PM2.5, k.....	0.053	
Particle Size Multiplier - PM10, k.....	0.35	
Particle Size Multiplier2 - PM30, k.....	0.74	
Calculated Emission Factor - PM2.5, E.....	1.68E-05 lb/ton	
Calculated Emission Factor - PM10, E.....	1.11E-04 lb/ton	
Calculated Emission Factor - PM30, E.....	2.35E-04 lb/ton	
Calculated Emissions - PM2.5.....	1.38E-02 tpy	3.15E-03 lb/hr
Calculated Emissions - PM10.....	9.10E-02 tpy	2.08E-02 lb/hr
Calculated Emissions - PM30.....	1.92E-01 tpy	4.39E-02 lb/hr

[1] Site Specific - Specify Actual Source

[2] Actual weather data from www.wunderground.com for Marana Regional Airport Weather Station.

[3] EPA, "Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors," Section 13.2.4, Nov. 2006.