TECHNICAL REVIEW AND EVALUATION
GENERAL PERMIT FOR HOT MIX ASPHALT PLANTS

I. INTRODUCTION

A. The Hot Mix Asphalt Plant (HMAP) General Permit is a permit for a facility class (hot mix asphalt plants) that contains 10 or more facilities that are similar in nature, have substantially similar emissions, and would be subject to the same or substantially similar requirements. The General Permit will last for 5 years from the date of its issuance. Equipment covered under this general permit will be required to have an "Authorization To Operate" (ATO) for each significant piece of equipment. The ATO will identify the piece of equipment by having the name of manufacturer, date of manufacture, maximum capacity, and serial number or equipment identification number along with the annual operating hour limitation, if any, depending on the equipment and the county of operation. This general permit allows for portable HMAP to move to other locations statewide. This general permit allows the Permittee to co-locate a HMAP with crushing and screening (C & S) plant and/or concrete batch plant (CBP) in the PM_{10} attainment areas of the State.

B. The Permittee shall use the myDEQ web portal to obtain authorizations to operate for each location at which the equipment will operate. The Permittee shall conduct all permitting services and transactions, including move notices, through the myDEQ online portal. In order to get authorization to operate under the general permit, the Permittee shall pay to the Department a flat permit processing fee of $500 and obtain the permit and the authorization to operate. The Permittee must also pay, for each calendar year, the applicable administrative or inspection fees as described in the Arizona Administrative Code Title 18, Chapter 2, Article 5, section 511 (A.A.C. R18-2-511).

C. Due the fact that this is a statewide general permit there is the potential that the Permittee may operate in a PM_{10} or $PM_{2.5}$ non-attainment area in the state of Arizona. The non-attainment areas are described in Table 1 below:

Table 1: Non-Attainment Areas- Summary and Classification

County	Townships
Maricopa	All
Pinal County and the Phoenix Planning Area	T1S, R8E; T2S, R8E; T3S, R7E; T3S, R8E; T4S, R8E (excluding all lands within the Gila River Indian Community); T5S, R4E (Only sections 12, 13, 24 and 25); T5S, R5E – R8E (excluding all lands within the Gila River Indian Community); T6S, R3E – R8E; T7S, R3E – R8E Sections 1-6. Phoenix Planning Area: T1N, R8E.
Santa Cruz	The Nogales area located in the southern part of Santa Cruz County. The portions of the following Townships which are within the State of Arizona and lie east of 111 degrees longitude: T23S, R13E, T23S, R14E, T24S, R13E, T24S, R14E.
Gila and Pinal	T1S, R13E (sections 7–36); T1S, R14E (sections 25–36);T2S, R13E; T2S, R14E; T2S, R15E; T3S, R13E; T3S, R14E; T3S, R15E; T3S, R16E (except that portion in the San Carlos Apache Indian Reservation); T4S, R13E; T4S, R14E; T4S, R15E; T4S, R16E; T5S, R13E; T5S, R14E; T5S, R15E; T5S, R16E; T6S, R13E;

County	Townships
	T6S, R14E; T6S, R15E; and T6S, R16E. Miami planning area T1N, R13E; T1N, R14E; T1N, R15E; T1S, R13E (sections 1–6); T1S, R14E (sections 1-24); T1S, R14 1/2E; and T1S, R15E.
Pima	The Rillito planning area which is located in the southern part of Pima County. The following townships are located in non-attainment areas: T11S-R9E, T11S-R10E, T11S-R11E, T11S-R12E, T12S-R8E, T12S-R9E, T12S-R10E, T12S-R11E and T12S-R12E. The Ajo planning area Township T12S, R6W, T12S, R5W (sections 6–8, 17-20, and 29-32).
Yuma	The Lower Colorado River Valley, in the southwestern part of Yuma County. The following townships are located in non-attainment areas: T7S-R21W, T7S-R22W, T8S-R21W, T8S-R22W, T8S-R23W, T8S-R24W, T9S-R21W, T9S-R22W, T9S-R23W, T9S-R24W, T9S-R25W, T10S-R21W, T10S-R22W, T10S-R23W, T10S-R24W, and T10S-R25W.
Cochise	The Douglas and Paul Spur areas; the following townships are located in non-attainment areas: T23S-R25E: T23S-R26E, T23S-R27E, T23S-R28E, T24S-R25E, T24S-R26E, T24S-R27E, and T24S-R28E.

Notes: No operations are permitted within the portion of Pinal County: T4S, R3E – R4E, T5S, R3E – R4E (excluding sections 12, 13, 24, and 25) identified as $PM_{2.5}$ non-attainment area.

II. POTENTIAL TO EMIT

Following tables 2, 3 and 4 show the potential to emit for PM_{10} attainment and non-attainment areas:

A. PM_{10} Attainment Areas

For HMAP collocated with C&S plant and CBP, emissions are based on modeling-based throughput limitation of 4200 tpd for HMAP, 3780 tpd for C&S and 1275 cubic yards per day of CBP. Generators HP is assumed to be 2000 HP non-certified.

Table 2: PTE for HMAP Collocated with C&S Plant and CBP in Attainment Areas

	HMA+	CS	CBP	Generators	Total		90 % of major source thresholds	*Annual Emissions
	Pounds per day				Pounds per day	Tons per year	Tons per year	Tons per year
PM	330.2	60.7	17.6	51.6	460.1	84.0	90	27.4
PM_{10}	154.7	26.8	8.4	51.6	241.4	44.1	90	14.4
$PM_{2.5}$	76.7	3.3	3.2	51.6	134.7	24.6	90	8.0
CO	550.9		8.6	278.2	837.6	152.9	90	49.9
NO_X	239.4		34.3	1236.0	1509.7	275.5	90	90.0
SO_2	243.7		0.4	0.6	244.6	44.6	90	14.6
VOC	163.2		0.6	55.0	218.8	39.9	90	13.0

+Includes fugitive emissions from HMAP, CS and CBP operations.

*Synthetic minor limitation to restrict facility emissions below the major source thresholds for all pollutants by limiting operating hours in the ATO.

For standalone HMAP plant, the emissions are based on modeling-based throughput limitation of 5280 tpd for HMAP with 1000 HP engine.

Table 3: PTE for Standalone HMAP Plant in Attainment Areas

	HMA+	Generator	Total		90 % of major source thresholds	*Annual Emissions
	Pounds per day		Pounds per day	Tons per year	Tons per year	Tons per year
PM	312.3	16.8	329.1	60.1	90	33.8
PM_{10}	168.2	16.8	185.0	33.8	90	19.0
$PM_{2.5}$	93.7	16.8	110.5	20.2	90	11.3
CO	692.6	132.0	824.6	150.5	90	84.6
NO_X	301.0	576.0	877.0	160.0	90	90.0
SO_2	306.4	0.0	306.4	55.9	90	31.4
VOC	205.1	16.9	222.0	40.5	90	22.8

+ Includes fugitive emissions from HMAP operations.

*Synthetic minor limitation to restrict facility emissions below the major source thresholds for all pollutants by limiting operating hours in the ATO.

B. PM_{10} Non-attainment Areas outside Maricopa County

Emissions are based on modeling-based throughput limitation of 3,150 tpd for HMAP. Generators HP is assumed to be 1000 HP non-certified.

Table 4: PTE for Standalone HMAP Plant in PM_{10} Non-attainment Areas outside Maricopa County

	HMA	Generator	Total		90 % of major source thresholds	*Annual Emissions
	Pounds per day		Pounds per day	Tons per year	Tons per year	Tons per year
PM	186.3	16.8	203.1	37.1	90	24.2
PM_{10}	100.4	16.8	117.2	21.4	90	14.0
$PM_{2.5}$	55.9	16.8	72.7	13.3	90	8.7
CO	413.2	132.0	545.2	99.5	90	64.9
NO_X	179.6	576.0	755.6	137.9	90	90.0
SO_2	182.8	0.0	182.8	33.4	90	21.8
VOC	122.4	16.9	139.3	25.4	90	16.6

* Synthetic minor limitation to restrict facility emissions below the major source thresholds for all pollutants by limiting operating hours in the ATO.

C. Maricopa County

Emissions are based on modeling-based throughput limitation of 3150 tpd for HMAP. Generators HP is assumed to be 700 HP non-certified.

Table 5: PTE for Standalone HMAP Plant in Maricopa County

	HMA	Generator	Total		90% of BACT Thresholds for Maricopa County	*Annual Emissions
	Pounds per day		Pounds per day	Tons per year	Tons per year	Tons per year
PM_{10}	100.4	11.8	112.1	20.5	13.5	6.9
$PM_{2.5}$	55.9	11.8	67.7	12.4	9	4.2
CO	413.2	92.4	505.6	92.3	90	31.2
NO_X	179.6	403.2	582.8	106.4	36	35.9
SO_2	182.8	0.0	182.8	33.4	36	11.3
VOC	122.4	11.8	134.2	24.5	36	8.3

*Synthetic minor limitation restrict facility emissions below the Maricopa County BACT thresholds for all pollutants by limiting operating hours in the ATO.

III. MINOR NEW SOURCE REVIEW

In accordance with R18-2-334, The Minor NSR program is applicable for any regulated minor NSR pollutants with the PTE equal to or greater than the permitting exemption thresholds defined at R18-2-101(99).

Table 6: Permit Exemption Thresholds

Pollutant	Permit Exemption Thresholds (tpy)
PM_{10}	7.5
$PM_{2.5}$	5.0
CO	50.0
NOx	20.0
SO2	20.0
VOC	20.0

Analysis of the applicability of the Minor NSR program was conducted for the HMAP General Permit.

As evident from the potential to emit calculations above, PTE for all minor NSR pollutants for the Hot Mix Asphalt plant with a collocated crushing & screening plant and a concrete batch plant, as well as standalone hot mix asphalt plants are greater than the permit exemption thresholds. Hence, the permit is subject to minor NSR review.

All sources subject to the Minor NSR program must comply with one of the following requirements:

A. Implement Reasonably Available Control Technology (RACT), or

B. Conduct ambient air quality assessment to demonstrate that emissions from the will not interfere with attainment or maintenance of a NAAQS.

Accordingly, a modeling analysis was done for the throughput limits established for various scenarios in the general permit to demonstrate compliance with the NAAQS. See Section VIII of this document a detailed discussion of the modeling analysis.

IV. OPERATING LIMITS

Based on the modeled results (refer to Section VIII for detailed modeling analysis), the production limitations for HMAP along with collocated C & S, and CBP have been established. Table 7 below summarizes such production limitations:

Table 7: Modeling- Based Production Limitations

Facility	Maximum Daily Production	
	PM_{10} Attainment Area	PM_{10} Non-attainment Area
Stand-alone HMAP	5,280 tons	3,150 tons
HMAP collocated with C & S and CBP	HMAP: 4,200 tons C&S: 3,780 tons CBP: 1,275 yd^3	Not authorized

Also, based on modeling to demonstrate compliance with 1-hr NO_2 standards, the non-certified generators in Maricopa County are limited to combined horsepower of 700 HP.

V. APPLICABLE REGULATIONS

The Department has identified the applicable regulations that apply to each unit under this General Permit. Tables 8-11 below summarize the findings of the Department with respect to the regulations that are applicable to each e/missions unit.

Table 8: Regulations Applicable Statewide

Unit ID	Control Equipment	Applicable Regulations	Verification
Hot Mix Asphalt Plant	Baghouse/ venturi scrubber for drum dryer	A.A.C. R18-2-708 40 CFR 60 Subpart I	Hot mix asphalt plant equipment constructed prior to June 11, 1973 are subject to A.A.C. R18-2-708. Hot mix asphalt plant equipment constructed after June 11, 1973 are subject to New Source Performance Standards (NSPS) under 40 CFR 60 Subpart I.
Asphalt heater and Rubber Mixing plants	N/A	A.A.C. R18-2-724	Standards of Performance for Fossil-fuel Fired Industrial and Commercial Equipment under A.A.C. R18-2-724 are applicable to boilers and heaters.
Crushing and Screening Plants	Baghouses, wet scrubbers, spray bars, wet suppressant, and enclosures	A.A.C. R18-2-722 40 CFR 60 Subpart OOO	Crushing and screening plants equipment constructed prior to August 31, 1983 are subject Standards of Performance for Existing or Crushed Stone Processing Plants under A.A.C. R18-2-722. Equipment constructed after August 31, 1983 are subject to NSPS under 40 CFR 60 Subpart OOO.
Concrete Batch Plant	Baghouses and wet suppressants	A.A.C. R18-2-702.B A.A.C. R18-2-723	Concrete batch plants are subject to Standards of Performance for Existing Concrete Batch Plants under A.A.C. R18-2-723. .
Boiler in Concrete Batch Plant		A.A.C. R18-2-724 NESHAP Subpart JJJJJJ	A.A.C. R18-2-719- Standards of Performance for Fossil-fuel fired industrial and commercial equipment is applicable to the boiler. National Emission Standards for Hazardous Air Pollutants (NESHAP) under 40 CFR 63 Subpart JJJJJJ are applicable to both existing and new boilers.
Direct fired fuel burning equipment in Concrete Batch Plant		A.A.C. R18-2-730	Standards of Performance for Unclassified sources is applicable to the direct fuel fired equipment.
Fugitive dust sources	Water and other reasonable precautions	A.A.C. R-18-2, Article 6, A.A.C. R18-2-702.B	These standards are applicable to all fugitive dust sources at the facility.

Unit ID	Control Equipment	Applicable Regulations	Verification
Mobile sources	Water Sprays/Water Truck for dust control	A.A.C. R-18-2, Article 8	These standards are applicable to off-road mobile sources, which either move while emitting air pollutants or are frequently moved during the course of their utilization.
Spray Painting	N/A	A.A.C. R-18-2-727	This standard is applicable to any spray painting operation at the facility.
Abrasive Blasting	Wet blasting, Dust collecting equipment or other approved methods	A.A.C. R-18-2-726	This standard is applicable to any abrasive blasting operation at the facility.
Demolition or Renovation Operations	N/A	A.A.C. R18-2-1101.A.8	This standard is applicable to any asbestos related demolition or renovation operations.
Internal Combustion Engines	None	A.A.C. R18-2-719	A.A.C. R18-2-719-Standards of Performance for Existing Stationary Rotating Machinery is applicable to existing engines.
		40 CFR 60 Subpart IIII	NSPS 40 CFR 60 Subpart IIII standards are applicable to compression ignition engines manufactured after April 1, 2006.
		40 CFR 60 Subpart JJJJ	NSPS 40 CFR 60 Subpart JJJJ standards are applicable to spark ignition engines manufactured after July 1, 2008.
		40 CFR 63 Subpart ZZZZ	National Emission Standards for Hazardous Air Pollutants (NESHAP) 40 CFR 63 Subpart ZZZZ standards are applicable to internal combustion engines. Engines subject to 40 CFR 60 Subpart IIII or JJJJ do not have any additional requirements to comply with 40 CFR 63 Subpart ZZZZ.

Table 9: Applicable Regulations for Maricopa County

Unit ID	Control Equipment	Applicable Regulations	Verification
Hot Mix Asphalt, Crushing and Screening and Concrete Batch Plants	Wet scrubbers, spray bars, wet suppressants and enclosures	Maricopa County Rule 316	Nonmetallic Mineral Processing located in Maricopa County
Facility Wide Requirements	None	Maricopa County Rule 100 Maricopa County Rule 200 Maricopa County Rule 220 Maricopa County Rule 230 Maricopa County Rule 300 Maricopa County Rule 310 Maricopa County Rule 312 Maricopa County Rule 315 Maricopa County Rule 320	General Provisions and Definitions Permit Requirements Non-Title V Permit Provisions General Permits Visible Emissions Fugitive Dust from Dust-Generating Operations Abrasive Blasting Spray Coating Operations Odors And Gaseous Air Contaminants
Internal Combustion Engines	None	Maricopa County Rule 324	Stationary Rotating Machinery subject to State rules located in Maricopa County.

Table 10: Applicable Regulations for Pima County

Unit ID	Control Equipment	Applicable Regulations	Verification
Hot Mix Asphalt Plant		P.C.C. §17.16.210	These regulations are applicable to Hot Mix Asphalt Plants located in Pima County.
Crushing and Screening plant	Spray Bars	P.C.C. §17.16.370	The regulations are applicable to Crushing and Screening Plants located in Pima County.
Concrete Batch Plant		P.C.C. §17.16.380	The regulations are applicable to Concrete Batch Plants located in Pinal County.

Unit ID	Control Equipment	Applicable Regulations	Verification
Fugitive Dust sources		P.C.C. §17.16.070, 80, 90, 100 and 110	The regulations are applicable to all the fugitive dust sources located in Pinal County

Table 11: Applicable Regulations for Pinal County

Unit ID	Control Equipment	Applicable Regulations	Verification
Facility wide Requirements		Pinal Code §5-24-1030.F Pinal Code §5-24-1030.G	The regulations listed are applicable to facility-wide in Pinal County.
Fugitive dust		Pinal Code §4-2-040 Pinal Code §4-2-050	The regulations listed are applicable to fugitive dust sources in Pinal County.

VI. MONITORING REQUIREMENTS

A. Facility wide General Requirements

1. The Permittee must maintain daily records of the operating hours of the equipment covered under the General Permit which are subject to an hourly restriction.

2. The Permittee must maintain records of the total daily throughput of material for the hot mix asphalt plant ((in tons per day), crushing & screening plant (in tons per day), and for the concrete batch plant (in cubic yards per day) covered under this General Permit.

3. The Permittee must keep on-site records of maintenance performed on all emission related equipment.

4. At the time the compliance certifications are submitted, the Permittee must submit reports of all monitoring, recordkeeping, and testing activities required by the permit.

5. The Permittee is required to conduct a visual survey on all process equipment, when in operation, and all fugitive dust sources. If the source appears to exceed the standard, the Permittee must conduct an EPA Reference Method 9 observation. The Permittee must keep records of all surveys and EPA Reference Method 9 observations performed. These records will include the emission point observed, location of observer, name of observer, date and time of observation, and the results of the observation. If the observation shows a Method 9 opacity reading in excess of the opacity standard, the Permittee will be required to initiate appropriate corrective action to reduce the opacity below the standard. The Permittee will keep a record of the corrective action performed. These logs must be maintained on-site and be available to ADEQ representative upon request.

6. The Permittee must burn only ultra-low sulfur fuel in the engines, heaters and boilers. The Permittee must keep records of fuel supplier certifications. The certification shall

contain information regarding the name of fuel supplier, lower heating value of the fuel and sulfur content.

B. Hot Mix Asphalt Plant

1. The Permittee shall conduct every six months, and within 15 days of any move, black light inspection on the bags contained in the drum dryer baghouse to detect broken or leaking bags. If broken or leaking bags are detected, the Permittee must repair or replace the bags. The Permittee must record the name of the inspector, the date, the time, and the results of the inspection and repairs.

2. If the facility is not operating, the black light inspection is not required to be performed for the duration of non-operation. Within 15 days of resumption of operation, the Permittee must perform the black light inspection. The Permittee shall document periods of non-operation.

3. The Permittee must maintain records of the production rate of hot mix asphalt and the percentage of recycled asphalt in the aggregate, if any.

VII. TESTING REQUIREMENTS

A. Within one year of issuance of the permit (within 180 days for NSPS dryer not tested earlier) the Permittee is required to conduct performance tests for particulate matter (PM) from the drum dryer to show compliance with the emission standards.

B. If emissions during a performance test, or in any subsequent performance test are below 75 percent of the applicable emission standards, no subsequent performance test is required in the permit term.

C. If the emissions during a performance test are more than 75 percent of the applicable emission standard, the Permittee must conduct a subsequent performance test between 10 and 14 months of the date of previous test.

D. If the Permittee is not operating, or is operating for a duration of less than 5 hours in a day, on a consistent basis, that the Permittee cannot complete the 3 runs required for a performance test, the Permittee may delay the performance test. The Permittee must notify the Department at least 30 days prior to the due date if the performance test is likely to be delayed along with the reasons for delay. The Permittee is required to reschedule the test in consultation with ADEQ.

VIII. MODELING ANALYSIS

A. Changes Made To Previous General Permit (GP) Modeling

Compared to the previous modeling efforts for the HMAP GP (dated April 23, 2012), this modeling analysis has added modeling for one-hour standards for nitrogen dioxide (NO_2) and sulfur dioxide (SO_2). Moreover, ADEQ has updated the meteorological data sets for modeling by incorporating AERMINUTE data and the ADJ_U* option in the AERMET meteorological data processing.

B. Modeling Scenarios

Table 12 presents the modeling scenarios used for this modeling analysis. These scenarios were identical to those used in the previous HMAP GP modeling (dated April 23, 2012) with an exception that a generator rated 700 horsepower (hp) rather than 1000 hp was modeled in Maricopa County.

Table 12 Modeling Scenarios for Hot Mix Asphalt Plants

Facility	Modeling Scenario for Demonstrating the Compliance of NAAQS	
	PM_{10} Attainment Area	**PM_{10} Non-attainment Area**
Hot mix asphalt plant (HMAP) alone	5,280 tons per day One large generator rated 1000 hp	3,150 tons per day One large generator rated 700 hp for Maricopa County and 1000 hp for other non-attainment areas
Collocation of hot mix asphalt plant (HMAP), crushing and screening plant (C&S), and concrete batch plant (CBP)	HMAP: 4,200 tons per day C&S: 3,780 tons per day CBP: 1,275 yd^3 per day One large generator and one small generator, total 2000 hp	N/A

C. Model Selection

ADEQ used the most recent version of the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD, version 16216r) for this modeling analysis. AERMOD is the EPA's preferred near-field dispersion modeling system for a wide range of regulatory applications. The AERMOD modeling system includes four regulatory component

- AERMOD: the dispersion model
- AERMAP: the terrain processor for AERMOD
- AERMET: the meteorological data processor for AERMOD
- BRIPPRIME: the building input processor

ADEQ did not use the terrain processor (AERMAP) and the building input processor (BRIPPRIME) for this modeling analysis because both of them require site-specific information. Moreover, ADEQ determined that an assumption of "Flat Terrain" was reasonable, since the emission sources of a HMAP are mainly ground level sources or near ground sources and the worst-case impacts are expected to occur in or near the ambient area boundary.

ADEQ used AERMET (version 16216) to process the meteorological data collected from 11 Automated Surface Observing Stations (ASOS) across the State of Arizona. For details, please see Section E.

D. Source Inputs

1. Emission Rates

The most significant emission source in a HMAP is the rotary drum dryer. Emissions from the drum consist of Particulate Matter (PM), CO, SO_2, and NO_x. Other emission sources in a HMAP include storage piles, batch drop/material transfer points, unpaved roads, asphalt heater, and internal combustion engines (generator). PM is the primary pollutant emitted from a C&S and a CBP, which may be co-located with a HMAP.

a. Emission Rate Factor

In general, the emissions were estimated according to latest AP-42 emission factors for rotary drum dryer, concrete batching, crushing & screening, internal combustion engines, boilers, wind erosion, and unpaved roads. In particular, a consistent approach was developed for estimating $PM_{2.5}$ and PM_{10} emissions for batch drop operations and material transfer operations. This approach was based on AP-42 Section 13.2.4 Equation 1:

$$E = k(0.032)\frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}$$

E = emission factor (lb/ton)

k = particle size multiplier (dimensionless), 0.35 for PM_{10} and 0.053 for $PM_{2.5}$

U = mean wind speed (miles per hour)

M = material moisture content (%)

State-wide meteorological data sets were reviewed and a mean wind speed of 7.5 miles per hour was determined. Due to very limited data available for the parameter M, the moisture content was arbitrary set as 5% for controlled emissions.

b. Emission Inventory

ADEQ has developed an emission inventory for a HMAP with an operating capacity of 350 tons per hour (tph), a C&S with an operating capacity of 325 tph, and a CBP with an operating capacity of 1275 yd^3 per day, respectively (Tables 13, 14 and 15). Note that these operating capacities were used for the convenience of emission estimation only, and they were not the throughput limits for a HMAP GP. Besides the sources above, fugitive emissions from unpaved roads and emissions from internal combustion engines (generators) were also modeled. For a HMAP that is co-located with a C&S and a CBP, two generators were modeled, one large generator rated 1500 hp and one small generator rated 500 hp. For a HMAP alone, one large generator rated 700 hp for Maricopa County and one large generator rated 1000 hp for other areas were modeled. The emission rates of pollutants from these sources are summarized in Table 16.

c. Modeled Emission Rates

24-hour $PM_{2.5}$ and PM_{10} standards

As indicated above, ADEQ estimated maximum hourly emission rates for HMAP sources based on an operating capacity of 350 tons per hour. If a HMAP was modeled to run at a specific capacity (tons/day), the modeled hourly emission rates for applicable sources were adjusted by using Emission Rate Flag HROFDY in AERMOD:

$$HROFY = \frac{\text{modeled operating capacity (tons per day)}}{\text{350 tons per hour} \times \text{24 hours}}$$

Many batch drop and material transfer operations in hot mix asphalt plants are not continuous and the emission sources are typically characterized as intermittent sources. The Emission Rate Flag approach substitutes an intermittent source with a continuous source that emits an identical amount of PM_{10} or $PM_{2.5}$ over a 24-hour time period. Such treatment should provide a reasonable approximation of 24-hour average impact.

Short-term standards for gaseous pollutants

A daily throughput limit may not necessarily protect the short-term standards for gaseous pollutants because a HMAP could be operated at a very high hourly throughput even if the daily throughput limit is met. Based on the available HMAP operating data, ADEQ determined that the maximum hourly throughput for a HMAP is equal to or less than 500 tph. Therefore, ADEQ estimated maximum hourly emission rates for gaseous pollutants based on an operating capacity of 500 tph and then modeled these maximum hourly emission rates for comparisons to the short-term air quality standards of gaseous pollutants, specifically 1-hour standard for NO_2, 1-hour and 3-hour standards for SO_2, and 1-hour and 8-hour standards for CO. If the compliance with these standards can be demonstrated based on an operating capacity of 500 tph, it would be unnecessary to establish hourly throughput limits for the HMAP GP.

Annual standards

For the HMAP GP, ADEQ requires that the annual plant-wide emissions for any criterial pollutants shall be less than 90 tons per year (tpy). For each modeling scenario, ADEQ initially estimated the maximum annual emissions for any criterial pollutants based on daily throughput limits and 365 days per year. If the maximum annual emissions obtained were greater than 90 tpy, ADEQ took the threshold of 90 tpy into account and used Emission Rate Flag HROFDY to make adjustments on modeled annual average emission rates.

2. Sources Layout

The layout of hot mix asphalt plants generally differs from one site to another. To simplify the modeling analysis, ADEQ developed a generic site plan for a HMAP, alone or co-located with a C&S and a CBP, as shown in Figure 1 and Figure 2, respectively. ADEQ determined the layout of sources according to the site plans of several existing plants with necessary simplifications for modeling purposes.

3. Source Release Parameters

The emission sources, categorized by source type (release characteristics), are as follows:

Point Sources: drum dyer baghouse, asphalt heater, cement silo, boiler, and generator; Point Sources;

Area Sources: aggregate storage pile wind erosion, sand storage pile wind erosion, combined transfer points in crushing & screening plants;

Volume Sources: crushing & screening operations, batch drop operations, material transfer operations, truck/front-end loaders traveling on unpaved roads.

Tables 17-20 summarize the source release parameters used in the modeling analysis. ADEQ determined these parameters following the ADEQ air modeling guidelines as well as the methodology for modeling fugitive dust sources developed by National Stone, Sand & Gravel Association. The representative physical dimensions for stacks, crushers, screens, storage piles, hoppers, bins, silos, trucks, and front-end loaders were determined on the basis of actual measurements or testing data from three facilities in Maricopa County.

Table 13: Maximum Hourly Emission Rates for Hot Mix Asphalt Plant (HMAP)[1]

Point Source						
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*	*NOx (g/s)*	*SO_2 (g/s)*	*CO (g/s)*
HMA_LSIL	Lime Silo	1.50E-04	1.50E-04	-	-	-
HMA_ASIL	Asphalt Silo	2.24E-02	1.93E-02	-	-	3.58E-02
HMA_HTR	Asphalt Heater	1.26E-02	1.26E-02	1.26E-01	1.34E-03	7.58E-03
HMA_BGHS	Baghouse	7.01E-01	1.02E+00	3.47E+00	3.66E+00	8.21E+00
Area Source						
Source ID	*Source Description*		*$PM_{2.5}$ (g/s)*		*PM_{10} (g/s)*	
HMA_WEAS	Aggregate Storage Pile		1.16E-05		1.16E-05	
Volume Sources						
Source ID	*Source Description*		*$PM_{2.5}$ (g/s)*		*PM_{10} (g/s)*	
HMA_ADGS	Aggregate Delivery to Ground Storage		3.27E-03		2.16E-02	
HMA_TAFH	Aggregate Transfer to Feed Hopper		2.62E-03		1.73E-02	
HMA_TAMC	Aggregate Transfer to Metering Conveyor		2.62E-03		1.73E-02	
HMA_TAIC	Aggregate Transfer to Inclined Conveyor		4.27E-04		1.51E-03	
HMA_TRFH	Transfer to RAP Feed Hopper		6.55E-04		4.32E-03	

[1] Emission rates were estimated based on an operating capacity of 350 tons per hour.

HMA_TRFC	RAP Transfer from Feed Hopper to Conveyor	6.55E-04	4.32E-03
HMA_TASS	Aggregate Transfer to Scalping Screen	2.62E-03	1.73E-02
HMA_ASCR	Aggregate Scalping Screen	1.64E-03	2.43E-02
HMA_TASC	Aggregate Transfer from Screen to Conveyor	2.62E-03	1.73E-02
HMA_TADD	Aggregate Transfer to Drum Dryer	2.62E-03	1.73E-02
HMA_TRSS	RAP Transfer to Scalping Screen	6.55E-04	4.32E-03
HMA_RSCR	RAP Scalping Screen	4.11E-04	6.08E-03
HMA_TRC1	RAP Transfer from Screen to Conveyor #1	6.55E-04	4.32E-03
HMA_TRC2	RAP Transfer from Conveyor #1 to #2	1.07E-04	3.78E-04
HMA_TRUC	Asphalt Drop into Truck	1.43E-02	1.43E-02
HMALT01	HMAP Loader Traffic	1.92E-03	1.92E-02
HMALT02	HMAP Loader Traffic	1.92E-03	1.92E-02
HMALT03	HMAP Loader Traffic	1.92E-03	1.92E-02

Table 14: Maximum Hourly Emission Rates for Crushing & Screening Plant[2]

Area Source			
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*
CS_WEAS	Aggregate Storage Pile	1.16E-05	1.16E-05
CS_WEFS	Fines Storage Pile	2.61E-05	2.61E-05
CS_TRANS	Transfer Points	1.51E-02	7.34E-02
Volume Sources			
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*
CS_PCRSH	Primary Crusher-Jaw	4.10E-03	2.22E-02
CS_SCR1	Screen #1	2.05E-03	3.03E-02
CS_SCR2	Screen #2	2.05E-03	3.03E-02
CS_FSCR	Fine Screen	4.55E-03	9.03E-02
CS_SCRSH	Secondary Crusher -Core	4.10E-03	2.22E-02
CS_TCRSH	Tertiary Crusher	4.10E-03	2.22E-02
CSLT01	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT02	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT03	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT04	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT05	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT06	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT07	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT08	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT09	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT10	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT11	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT12	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT13	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT14	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT15	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT16	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT17	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT18	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT19	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT20	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT21	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT22	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT23	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT24	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT25	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT26	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT27	C&S Loader Traffic	1.91E-04	1.91E-03
CSLT28	C&S Loader Traffic	1.91E-04	1.91E-03

[2] Emission rates were estimated based on an operating capacity of 325 tons per hour

Table 15: Maximum Hourly Emission Rates for Concrete Batch Plant[3]

Point Sources						
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*	*NOx (g/s)*	*SO_2 (g/s)*	*CO (g/s)*
CBP_CSTS	Cement Supplement Transfer to Cement Silo	1.80E-04	1.20E-03	-	-	-
CBP_CTCS	Cement Transfer to Cement Silo	8.40E-05	5.60E-04	-	-	-
CBP_BOIL	Boiler	1.17E-02	1.17E-02	1.80E-01	1.92E-03	4.51E-02
Area Sources						
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*			
CBP_WEAS	Aggregate Storage Pile	1.16E-05	1.16E-05			
CBP_WESS	Sand Storage Pile	6.53E-06	6.53E-06			
Volume Sources						
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*			
CBP_ADGS	Aggregate Delivery to Ground Storage	4.98E-04	3.29E-03			
CBP_SDGS	Sand Delivery to Ground Storage	3.81E-04	2.52E-03			
CBP_ATC	Aggregate Transfer to Conveyor	4.98E-04	3.29E-03			
CBP_STC	Sand Transfer to Conveyor	3.81E-04	2.52E-03			
CBP_ATEB	Aggregate Transfer to Elevation Bins	4.98E-04	3.29E-03			
CBP_STEB	Sand Transfer to Elevation Bins	3.81E-04	2.52E-03			
CBP_WHL	Weigh Hopper Loading	3.98E-04	2.65E-03			
CBP_TML	Truck Mix Loading (controlled)	1.56E-03	1.04E-02			
CBPLT01	CBP Loader Traffic	5.86E-04	5.86E-03			
CBPLT02	CBP Loader Traffic	5.86E-04	5.86E-03			
CBPLT03	CBP Loader Traffic	5.86E-04	5.86E-03			

[3] Emission rates were estimated based on an operating capacity of 1275 yd^3 per day.

Table 16: Emission Rates for Other Sources

Point Sources

Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*	*NOx (g/s)*	*SO_2 (g/s)*	*CO (g/s)*
GEN_LAR (1500 hp)	Generator >= 600 hp	1.33E-01	1.33E-01	4.55E+00	2.30E-03	1.04E+00
GEN_LAR (1000 hp)	Generator >= 600 hp	8.84E-02	8.84E-02	3.03E+00	1.53E-03	6.93E-01
GEN_LAR (700 hp)	Generator >= 600 hp	6.19E-02	6.19E-02	2.12E+00	1.07E-03	4.85E-01
GEN_SML (500 hp)	Generator < 600 hp	1.39E-01	1.39E-01	1.96E+00	7.65E-04	4.22E-01

Volume Sources

Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*
TRUCK01	Truck Traffic	5.08E-04	5.08E-03
TRUCK02	Truck Traffic	5.08E-04	5.08E-03
TRUCK03	Truck Traffic	5.08E-04	5.08E-03
TRUCK04	Truck Traffic	5.08E-04	5.08E-03
TRUCK05	Truck Traffic	5.08E-04	5.08E-03
TRUCK06	Truck Traffic	5.08E-04	5.08E-03
TRUCK07	Truck Traffic	5.08E-04	5.08E-03
TRUCK08	Truck Traffic	5.08E-04	5.08E-03
TRUCK09	Truck Traffic	5.08E-04	5.08E-03
TRUCK10	Truck Traffic	5.08E-04	5.08E-03
TRUCK11	Truck Traffic	5.08E-04	5.08E-03
TRUCK12	Truck Traffic	5.08E-04	5.08E-03
TRUCK13	Truck Traffic	5.08E-04	5.08E-03
TRUCK14	Truck Traffic	5.08E-04	5.08E-03
TRUCK15	Truck Traffic	5.08E-04	5.08E-03
TRUCK16	Truck Traffic	5.08E-04	5.08E-03
TRUCK17	Truck Traffic	5.08E-04	5.08E-03
TRUCK18	Truck Traffic	5.08E-04	5.08E-03
TRUCK19	Truck Traffic	5.08E-04	5.08E-03
TRUCK20	Truck Traffic	5.08E-04	5.08E-03
TRUCK21	Truck Traffic	5.08E-04	5.08E-03
TRUCK22	Truck Traffic	5.08E-04	5.08E-03
TRUCK23	Truck Traffic	5.08E-04	5.08E-03
TRUCK24	Truck Traffic	5.08E-04	5.08E-03
TRUCK25	Truck Traffic	5.08E-04	5.08E-03
TRUCK26	Truck Traffic	5.08E-04	5.08E-03
TRUCK27	Truck Traffic	5.08E-04	5.08E-03
TRUCK28	Truck Traffic	5.08E-04	5.08E-03
TRUCK29	Truck Traffic	5.08E-04	5.08E-03
TRUCK30	Truck Traffic	5.08E-04	5.08E-03
TRUCK31	Truck Traffic	5.08E-04	5.08E-03
TRUCK32	Truck Traffic	5.08E-04	5.08E-03
TRUCK33	Truck Traffic	5.08E-04	5.08E-03
TRUCK34	Truck Traffic	5.08E-04	5.08E-03
TRUCK35	Truck Traffic	5.08E-04	5.08E-03
TRUCK36	Truck Traffic	5.08E-04	5.08E-03
TRUCK37	Truck Traffic	5.08E-04	5.08E-03
TRUCK38	Truck Traffic	5.08E-04	5.08E-03
TRUCK39	Truck Traffic	5.08E-04	5.08E-03
TRUCK40	Truck Traffic	5.08E-04	5.08E-03

TRUCK41	Truck Traffic	5.08E-04	5.08E-03
TRUCK42	Truck Traffic	5.08E-04	5.08E-03
TRUCK43	Truck Traffic	5.08E-04	5.08E-03
TRUCK44	Truck Traffic	5.08E-04	5.08E-03
TRUCK45	Truck Traffic	5.08E-04	5.08E-03
TRUCK46	Truck Traffic	5.08E-04	5.08E-03
TRUCK47	Truck Traffic	5.08E-04	5.08E-03
TRUCK48	Truck Traffic	5.08E-04	5.08E-03
TRUCK49	Truck Traffic	5.08E-04	5.08E-03
TRUCK50	Truck Traffic	5.08E-04	5.08E-03
TRUCK51	Truck Traffic	5.08E-04	5.08E-03
TRUCK52	Truck Traffic	5.08E-04	5.08E-03
TRUCK53	Truck Traffic	5.08E-04	5.08E-03
TRUCK54	Truck Traffic	5.08E-04	5.08E-03
TRUCK55	Truck Traffic	5.08E-04	5.08E-03
TRUCK56	Truck Traffic	5.08E-04	5.08E-03
TRUCK57	Truck Traffic	5.08E-04	5.08E-03
TRUCK58	Truck Traffic	5.08E-04	5.08E-03
TRUCK59	Truck Traffic	5.08E-04	5.08E-03

Figure 1: Sources Layout of a Generic Hot Mix Asphalt Plant

(Refer to Table 9 and Table 12 for detailed source descriptions)

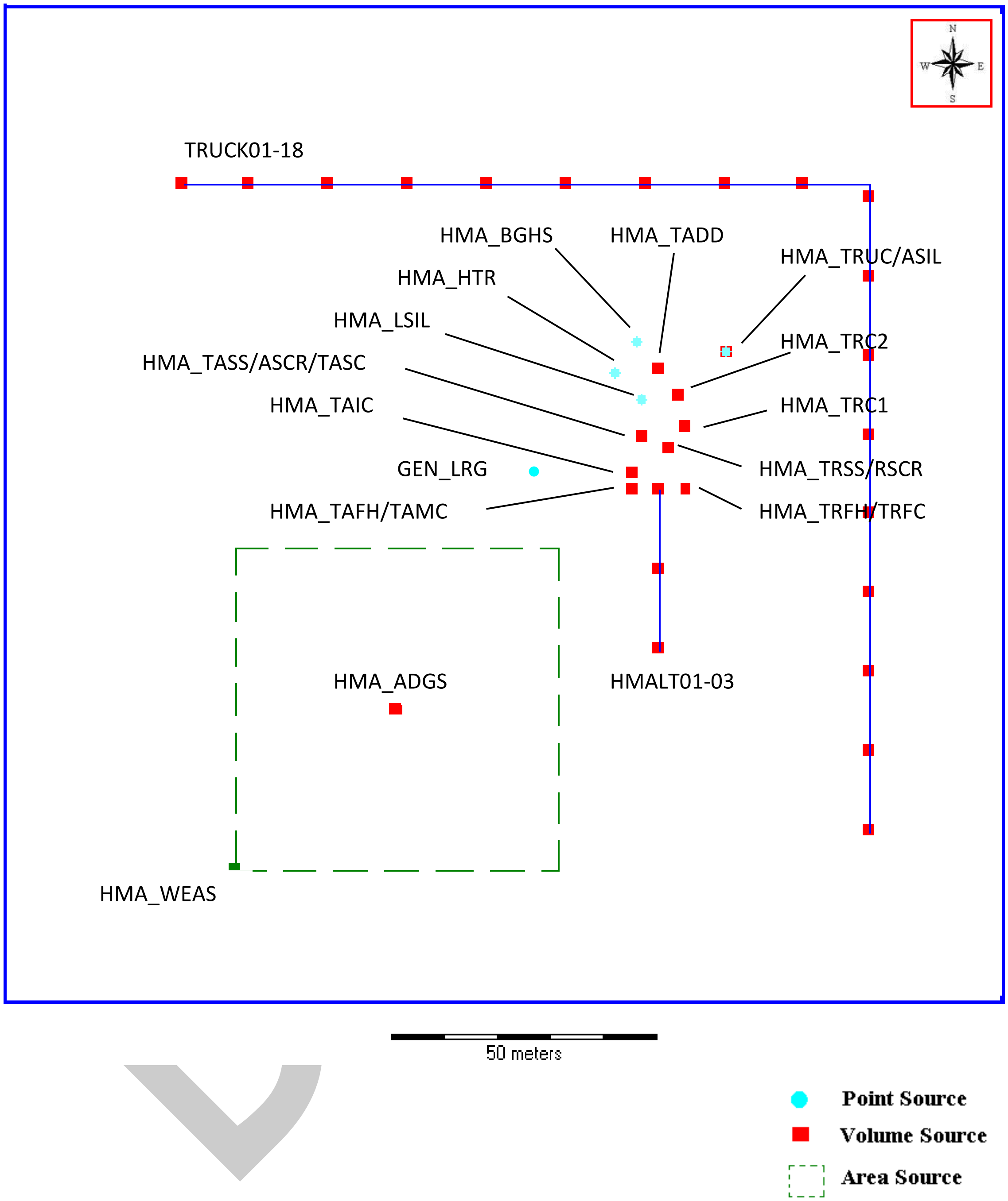


Figure 2: Sources Layout of a Generic Hot Mix Asphalt Plant Co-located with a Crushing and Screening Plant and a Concrete Batch Plant

(Refer to Tables 9-12 for detailed source descriptions)

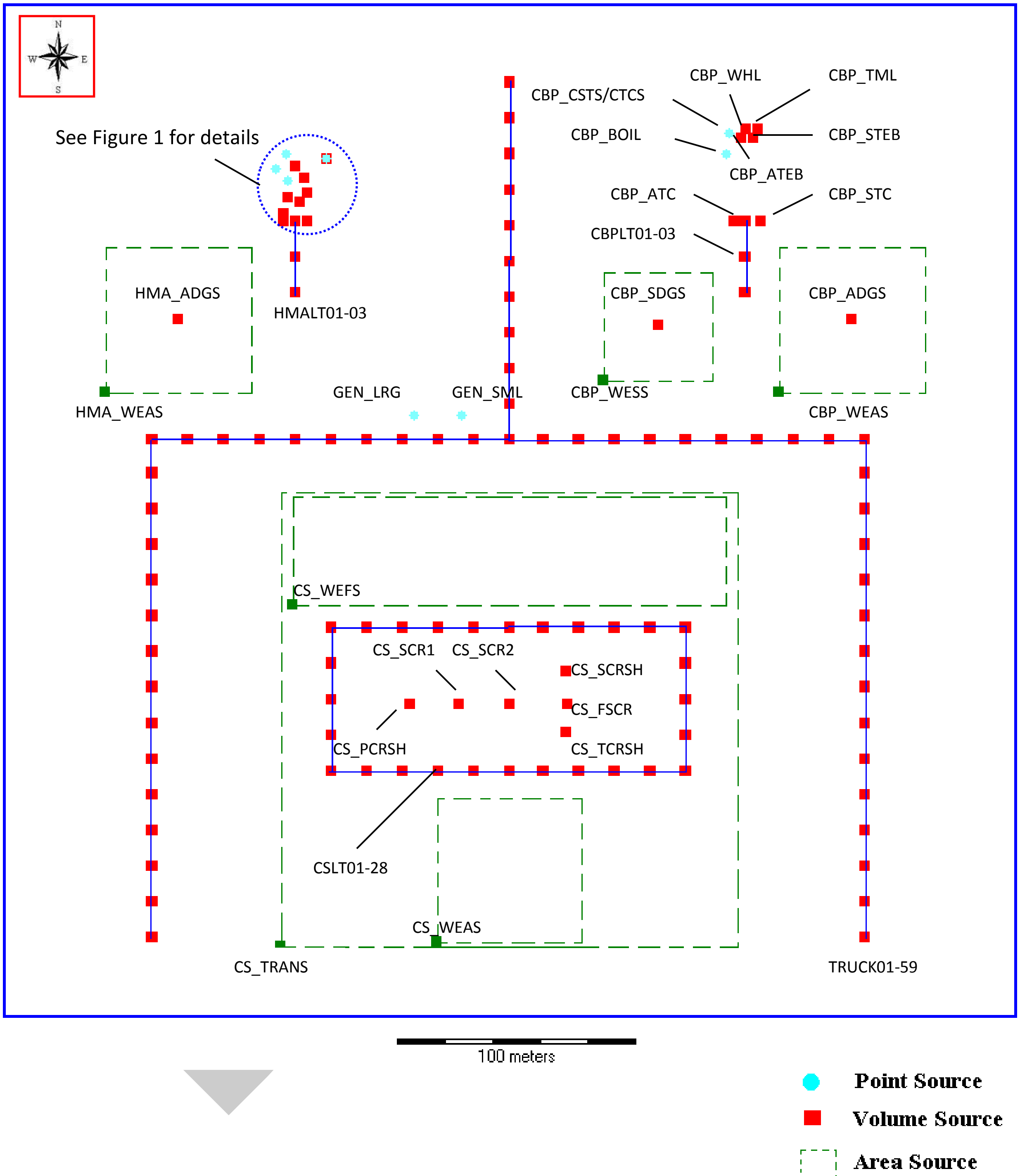


Table 17: Modeling Source Parameters for Hot Mix Asphalt Plant (HMAP)

Point Sources

Source ID	*Source Description*	*Release Height (m)*	*Stack Temperature (K)*	*Stack Velocity (m/s)*	*Stack Diameter (m)*
HMA_LSIL	Lime Silo	24.38	0.00	0.001	0.001
HMA_ASIL	Asphalt Silo	19.51	435.93	0.001	0.30
HMA_HTR	Asphalt Heater	3.66	448.98	90.73	0.25
HMA_BGHS	Baghouse	11.23	367.12	36.63	1.44

Area Source

Source ID	*Source Description*	*Release Height (m)*	X-Length (m)	Y-Length (m)	Angel (degree)
HMA_WEAS	Aggregate Storage Pile	1.83	60.96	60.96	0.00

Volume Sources

Source ID	*Source Description*	*Release Height (m)*	Initial Horizontal Dimensions (m)	Initial Vertical Dimensions (m)
HMA_ADGS	Aggregate Delivery to Ground Storage	6.17	1.60	2.20
HMA_TAFH	Aggregate Transfer to Feed Hopper	4.57	1.01	2.13
HMA_TAMC	Aggregate Transfer to Metering Conveyor	1.52	0.06	0.70
HMA_TAIC	Aggregate Transfer to Inclined Conveyor	1.52	0.06	0.70
HMA_TRFH	Transfer to RAP Feed Hopper	4.57	1.01	2.13
HMA_TRFC	RAP Transfer from Feed Hopper to Conveyor	1.52	0.06	0.70
HMA_TASS	Aggregate Transfer to Scalping Screen	6.71	0.15	3.11
HMA_ASCR	Aggregate Scalping Screen	5.79	0.40	2.68
HMA_TASC	Aggregate Transfer from Screen to Conveyor	5.79	0.15	0.06
HMA_TADD	Aggregate Transfer to Drum Dryer	7.32	0.15	3.41
HMA_TRSS	RAP Transfer to Scalping Screen	5.49	0.15	2.56
HMA_RSCR	RAP Scalping Screen	4.88	0.55	2.26
HMA_TRC1	RAP Transfer from Screen to Conveyor #1	5.49	0.15	2.56
HMA_TRC2	RAP Transfer from Conveyor #1 to #2	5.49	0.15	0.06
HMA_TRUC	Asphalt Drop into Truck	6.10	0.27	1.43
HMALT01	HMAP Loader Traffic	3.00	7.00	2.80
HMALT02	HMAP Loader Traffic	3.00	7.00	2.80
HMALT03	HMAP Loader Traffic	3.00	7.00	2.80

Table 18: Modeling Source Parameters for Crushing and Screening Plant

Area Source					
Source ID	*Source Description*	*Release Height (m)*	X-Length (m)	Y-Length (m)	Angel (degree)
CS_WEAS	Aggregate Storage Pile	1.83	60.96	60.96	0.00
CS_WEFS	Fines Storage Pile	1.83	182.88	45.72	0.00
CS_TRANS	Transfer Points	1.52	192.02	192.02	0.00

Volume Sources				
Source ID	*Source Description*	*Release Height (m)*	Initial Horizontal Dimensions (m)	Initial Vertical Dimensions (m)
CS_PCRSH	Primary Crusher-Jaw	5.18	0.43	2.41
CS_SCR1	Screen #1	7.62	0.85	3.54
CS_SCR2	Screen #2	7.62	0.85	3.54
CS_FSCR	Fine Screen	7.62	0.85	3.54
CS_SCRSH	Secondary Crusher -Core	7.62	0.37	3.54
CS_TCRSH	Tertiary Crusher	6.10	0.27	2.83
CSLT01	C&S Loader Traffic	3.00	7.00	2.80
CSLT02	C&S Loader Traffic	3.00	7.00	2.80
CSLT03	C&S Loader Traffic	3.00	7.00	2.80
CSLT04	C&S Loader Traffic	3.00	7.00	2.80
CSLT05	C&S Loader Traffic	3.00	7.00	2.80
CSLT06	C&S Loader Traffic	3.00	7.00	2.80
CSLT07	C&S Loader Traffic	3.00	7.00	2.80
CSLT08	C&S Loader Traffic	3.00	7.00	2.80
CSLT09	C&S Loader Traffic	3.00	7.00	2.80
CSLT10	C&S Loader Traffic	3.00	7.00	2.80
CSLT11	C&S Loader Traffic	3.00	7.00	2.80
CSLT12	C&S Loader Traffic	3.00	7.00	2.80
CSLT13	C&S Loader Traffic	3.00	7.00	2.80
CSLT14	C&S Loader Traffic	3.00	7.00	2.80
CSLT15	C&S Loader Traffic	3.00	7.00	2.80
CSLT16	C&S Loader Traffic	3.00	7.00	2.80
CSLT17	C&S Loader Traffic	3.00	7.00	2.80
CSLT18	C&S Loader Traffic	3.00	7.00	2.80
CSLT19	C&S Loader Traffic	3.00	7.00	2.80
CSLT20	C&S Loader Traffic	3.00	7.00	2.80
CSLT21	C&S Loader Traffic	3.00	7.00	2.80
CSLT22	C&S Loader Traffic	3.00	7.00	2.80
CSLT23	C&S Loader Traffic	3.00	7.00	2.80
CSLT24	C&S Loader Traffic	3.00	7.00	2.80
CSLT25	C&S Loader Traffic	3.00	7.00	2.80
CSLT26	C&S Loader Traffic	3.00	7.00	2.80
CSLT27	C&S Loader Traffic	3.00	7.00	2.80
CSLT28	C&S Loader Traffic	3.00	7.00	2.80

Table 19: Modeling Source Parameters for Concrete Batch Plant (CBP)

Point Sources					
Source ID	*Source Description*	*Release Height (m)*	*Stack Temperature (K)*	*Stack Velocity (m/s)*	*Stack Diameter (m)*
CBP_CSTS	Cement Supplement Transfer to Cement Silo	12.20	408.00	4.00	0.32
CBP_CTCS	Cement Transfer to Cement Silo	12.20	408.00	4.00	0.32
CBP_BOIL	Boiler	12.19	533.00	7.62	0.30
Area Sources					
Source ID	*Source Description*	*Release Height (m)*	*X-length*	*Y-length*	*Angel (degree)*
CBP_WEAS	Aggregate Storage Pile	1.83	60.96	60.96	0.00
CBP_WESS	Sand Storage Pile	1.83	45.72	45.72	0.00
Volume Sources					
Source ID	*Source Description*	*Release Height (m)*	*Initial Horizontal Dimensions (m)*	*Initial Vertical Dimensions (m)*	
CBP_ADGS	Aggregate Delivery to Ground Storage	6.17	1.60	2.20	
CBP_SDGS	Sand Delivery to Ground Storage	6.17	1.60	2.20	
CBP_ATC	Aggregate Transfer to Conveyor	3.51	0.85	0.43	
CBP_STC	Sand Transfer to Conveyor	3.51	0.85	0.43	
CBP_ATEB	Aggregate Transfer to Elevation Bins	8.08	0.71	0.43	
CBP_STEB	Sand Transfer to Elevation Bins	8.08	0.71	0.43	
CBP_WHL	Weigh Hopper Loading	4.72	0.85	0.14	
CBP_TML	Truck Mix Loading (controlled)	3.05	0.25	0.50	
CBPLT01	CBP Loader Traffic	3.00	7.00	2.80	
CBPLT02	CBP Loader Traffic	3.00	7.00	2.80	
CBPLT03	CBP Loader Traffic	3.00	7.00	2.80	

Table 20: Modeling Source Parameters for Other Sources

Point Sources

Source ID	*Source Description*	*Release Height (m)*	*Stack Temperature (K)*	*Stack Velocity (m/s)*	*Stack Diameter (m)*
GEN_LAR	Generator >= 600 hp	6.71	783.00	30.50	0.20
GEN_SML	Generator < 600 hp	3.36	774.62	84.32	0.15

Volume Sources

Source ID	*Source Description*	*Release Height (m)*	Initial Horizontal Dimensions (m)	Initial Vertical Dimensions (m)
TRUCK01	Truck Traffic	3.00	7.00	2.80
TRUCK02	Truck Traffic	3.00	7.00	2.80
TRUCK03	Truck Traffic	3.00	7.00	2.80
TRUCK04	Truck Traffic	3.00	7.00	2.80
TRUCK05	Truck Traffic	3.00	7.00	2.80
TRUCK06	Truck Traffic	3.00	7.00	2.80
TRUCK07	Truck Traffic	3.00	7.00	2.80
TRUCK08	Truck Traffic	3.00	7.00	2.80
TRUCK09	Truck Traffic	3.00	7.00	2.80
TRUCK10	Truck Traffic	3.00	7.00	2.80
TRUCK11	Truck Traffic	3.00	7.00	2.80
TRUCK12	Truck Traffic	3.00	7.00	2.80
TRUCK13	Truck Traffic	3.00	7.00	2.80
TRUCK14	Truck Traffic	3.00	7.00	2.80
TRUCK15	Truck Traffic	3.00	7.00	2.80
TRUCK16	Truck Traffic	3.00	7.00	2.80
TRUCK17	Truck Traffic	3.00	7.00	2.80
TRUCK18	Truck Traffic	3.00	7.00	2.80
TRUCK19	Truck Traffic	3.00	7.00	2.80
TRUCK20	Truck Traffic	3.00	7.00	2.80
TRUCK21	Truck Traffic	3.00	7.00	2.80
TRUCK22	Truck Traffic	3.00	7.00	2.80
TRUCK23	Truck Traffic	3.00	7.00	2.80
TRUCK24	Truck Traffic	3.00	7.00	2.80
TRUCK25	Truck Traffic	3.00	7.00	2.80
TRUCK26	Truck Traffic	3.00	7.00	2.80
TRUCK27	Truck Traffic	3.00	7.00	2.80
TRUCK28	Truck Traffic	3.00	7.00	2.80
TRUCK29	Truck Traffic	3.00	7.00	2.80
TRUCK30	Truck Traffic	3.00	7.00	2.80
TRUCK31	Truck Traffic	3.00	7.00	2.80
TRUCK32	Truck Traffic	3.00	7.00	2.80
TRUCK33	Truck Traffic	3.00	7.00	2.80
TRUCK34	Truck Traffic	3.00	7.00	2.80
TRUCK35	Truck Traffic	3.00	7.00	2.80
TRUCK36	Truck Traffic	3.00	7.00	2.80
TRUCK37	Truck Traffic	3.00	7.00	2.80

TRUCK38	Truck Traffic	3.00	7.00	2.80
TRUCK39	Truck Traffic	3.00	7.00	2.80
TRUCK40	Truck Traffic	3.00	7.00	2.80
TRUCK41	Truck Traffic	3.00	7.00	2.80
TRUCK42	Truck Traffic	3.00	7.00	2.80
TRUCK43	Truck Traffic	3.00	7.00	2.80
TRUCK44	Truck Traffic	3.00	7.00	2.80
TRUCK45	Truck Traffic	3.00	7.00	2.80
TRUCK46	Truck Traffic	3.00	7.00	2.80
TRUCK47	Truck Traffic	3.00	7.00	2.80
TRUCK48	Truck Traffic	3.00	7.00	2.80
TRUCK49	Truck Traffic	3.00	7.00	2.80
TRUCK50	Truck Traffic	3.00	7.00	2.80
TRUCK51	Truck Traffic	3.00	7.00	2.80
TRUCK52	Truck Traffic	3.00	7.00	2.80
TRUCK53	Truck Traffic	3.00	7.00	2.80
TRUCK54	Truck Traffic	3.00	7.00	2.80
TRUCK55	Truck Traffic	3.00	7.00	2.80
TRUCK56	Truck Traffic	3.00	7.00	2.80
TRUCK57	Truck Traffic	3.00	7.00	2.80
TRUCK58	Truck Traffic	3.00	7.00	2.80
TRUCK59	Truck Traffic	3.00	7.00	2.80

E. Meteorological Data

ADEQ obtained meteorological data through the Automated Surface Observing System (ASOS) network. The ASOS station can utilize AERMINUTE to significantly reduce calm or missing hours, which is critical for modeling one-hour standards. As shown in Table 21, eight meteorological data sets were used to represent the meteorological conditions for PM_{10} attainment areas and three meteorological data sets for PM_{10} non-attainment areas, respectively. All meteorological data were processed by AERMET (version 16216) along with AERSURFACE and AERMINUTE. Based on EPA's recommendations, a minimum wind speed threshold of 0.5 m/s was used to treat winds below the threshold as calms.

On December 20, 2016, EPA finalized the revisions to the Guideline on Air Quality Models and released AERMOD and AERMET Models Version 16216, in which the ADJ_U* option when site-specific turbulence data (sigma-theta and/or sigma-w) are not included is no longer flagged as a beta option. As stated in the Final Rule, using the ADJ_U* option is appropriate when standard National Weather Service (NWS) airport meteorological data, site-specific meteorological data without turbulence parameters, or prognostic meteorological input data are used for the regulatory application. Since standard NWS airport meteorological data were used for this modeling analysis, ADEQ has incorporated the ADJ_U* option in the meteorological data processing.

Table 21: Meteorological Data Sets used for AERMOD Modeling Analysis

Data Name	Surface Data	Upper Air Data	Data Period	County	For PM_{10} attainment areas or non-attainment areas?
Flagstaff	Flagstaff Pulliam Airport	Flagstaff (KFGZ)	01/01/2009-12/31/2013	Coconino	Attainment
Kingman	Kingman Airport	Reno (KREV) /Las Vegas (KVEF)	01/01/2009-12/31/2013	Mohave	Attainment
Nogales	Nogales International Airport	Tucson (KTUS)	01/01/2009-12/31/2013	Santa Cruz	Non-attainment
Tucson	Tucson International Airport	Tucson (KTUS)	01/01/2009-12/31/2013	Pima	Attainment
Page	Page Municipal Airport	Flagstaff (KFGZ)	01/01/2009-12/31/2013	Coconino	Attainment
Phoenix	Phoenix Sky Harbor International Airport	Tucson(KTUS)	01/01/2009-12/31/2013	Maricopa	Non-attainment
Prescott	Prescott Municipal Airport	Flagstaff (KFGZ)	01/01/2009-12/31/2013	Yavapai	Attainment
Safford	Safford Regional Airport	Tucson (KTUS)	01/01/2009-12/31/2013	Graham	Attainment
St Johns	St. Johns Industrial Air Park	Albuquerque (KABQ)	01/01/2009-12/31/2013	Apache	Attainment
Winslow	Winslow–Lindbergh Regional Airport	Albuquerque (KABQ)	01/01/2009-12/31/2013	Navajo	Attainment
Yuma	Yuma Marine Corps Air Station	Tucson (KTUS)	01/01/2009-12/31/2013	Yuma	Non-attainment

F. Receptor Grid

Receptors were spaced 25 meters along ambient air boundary (AAB) and 50 meters from AAB to 500 meters. Since the emission sources modeled are mainly ground level sources or near ground sources, the receptor network beginning at AAB and extending outward to 500 m is sufficiently large to identify the maximum impacts.

G. Background Concentrations

1. Background Concentration for PM_{10}

ADEQ has historically estimated the background concertation for PM_{10} by calculating the average of the highest yearly values for most recent 3 years. This is a very conservative approach that ensures that the NAAQS for PM_{10} is protected. However, ADEQ has also considered less conservative approaches to more realistically define background concentrations for PM_{10}.

In the previous modeling for the HAMP GP, ADEQ estimated the background concentrations for 24-hour average PM_{10} based on language in Paragraph 8.2.2(b) of 40 CFR Part 51 Appendix W (November 2005). Specifically, ADEQ determined the meteorological conditions accompanying the concentration of concern (wind over 15 miles per hour, sustained for 3 or more hours) and averaged all 24-hour average PM_{10} concentrations over the course of the last 3 years for days that were over that wind speed. Based on this approach, the background concentration that used for modeling for PM_{10} nonattainment areas was 58 micrograms per cubic meter (μg/m^3). For PM_{10}

attainment areas the concentration was 26 µg/m^3. Using these concentrations allowed facilities covered under the HMAP GP to operate statewide, including in Maricopa County.

On January 17, 2017, EPA published a final rule that revises 40 CFR Part 51 Appendix W. The final rule removed the language of averaging concentrations for meteorological conditions of concern when determining the background concentrations for shorter averaging periods. Although the effective date of the final rule has been deferred to March 21, 2017, ADEQ reexamined the background concentrations for 24-hour PM_{10} to ensure that the background determinations for the HAMP GP modeling are consistent with Federal regulation.

ADEQ selected a time period of 2011-2013 to estimate the PM_{10} background concentration for Maricopa County because the natural and exceptional events (NEE) during these three years in Arizona were well documented (http://legacy.azdeq.gov/environ/air/plan/nee.html). Due to the arid nature of the state, Arizona is susceptible to both windblown dust events and smoke events from forest fire, both of which may qualify as exceptional events. Air quality monitoring data due to the NEE must be excluded for the background determinations.

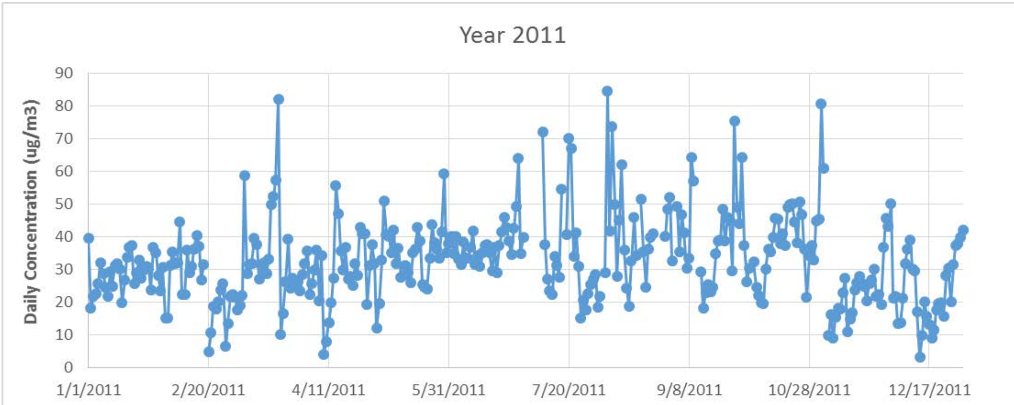
ADEQ calculated the 24-hour average monitoring concentration for each day by averaging the daily concentrations for all monitoring stations across Maricopa County (Phoenix-Mesa-Scottsdale CBSA). ADEQ then removed the 24-hour average concentrations for days associated with the NEE. Figure 3 shows the 24-hour average concentrations excluding the NEE monitoring data. The highest 24-hour concentrations in 2011, 2012, and 2013 were determined as 84.5µg/m^3, 82.1µg/m^3, and 107.8µg/m^3, respectively. In general, the concentration of 58 µg/m^3 used in the previous GP modeling represented 95-98 percentile of the 24-hour concentrations for each year.

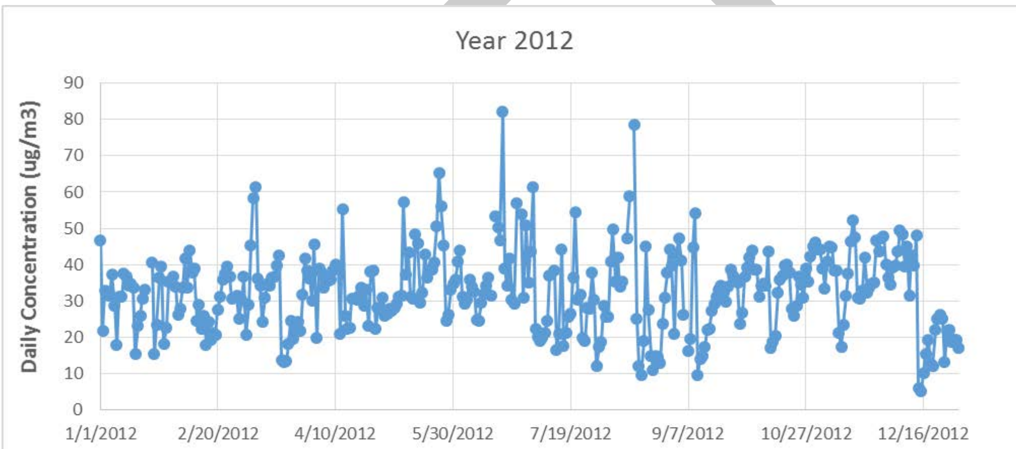
ADEQ further applied AERMOD to model a generic HMAP by using the 2011-2013 NWS meteorological data collected from Phoenix Sky Harbor Airport. For 24-hour average PM_{10}, ADEQ calculated the maximum modeled concentration for each day and plotted these concentrations against their concurrent monitoring data (Figure 4). As demonstrated in Figure 4, it was very unlikely that highest monitoring concentrations and highest modeled concentrations would occur simultaneously. Indeed, for days with highest modeled concentrations, the corresponding monitored concentrations were relatively low.

ADEQ finally combined modeled concentrations with monitored background concentrations on a day-by-day basis. Figure 5 summaries the paired values. The second highest paired concentration for 2011, 2012, and 2013 was 112 µg/m^3, 110 µg/m^3 and 104 µg/m^3, respectively. Comparatively, when combining highest second highest (H2H) modeled concentration and a background concentration of 58 µg/m^3, the total concentration for 2011, 2012, and 2013 was 121 µg/m^3, 137 µg/m^3 and 125µg/m^3, respectively. It was apparent that using the background concentration of 58 µg/m^3 would provide a defensible approach to demonstrate the compliance with the 24-hour standard for PM_{10}.

For the reasons above, ADEQ retained the background concentration of 58 µg/m^3 for nonattainment areas and 26 µg/m^3 for attainment areas for this GP modeling.

Figure 3: 24-hour Average PM10 Concentrations in Phoenix-Mesa-Scottsdale CBSA for Years 2011, 2012 and 2013 (Excluding the Monitored Data due to Natural and Exceptional Events)





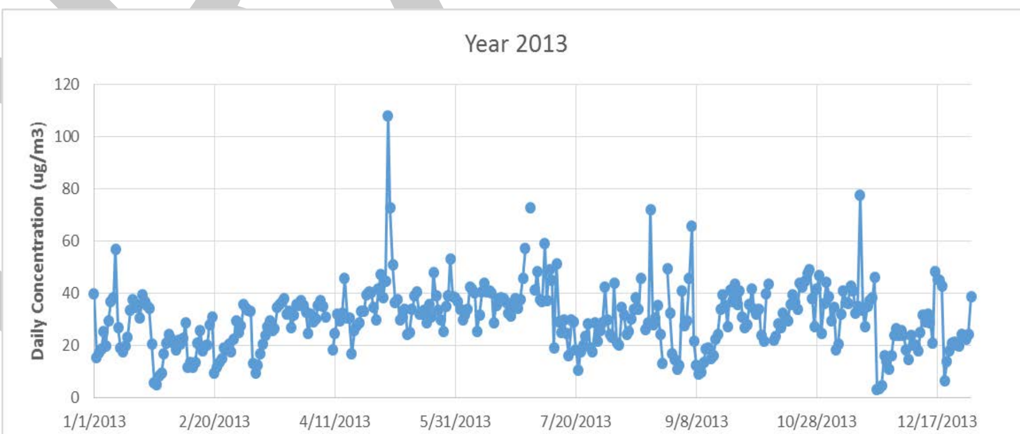
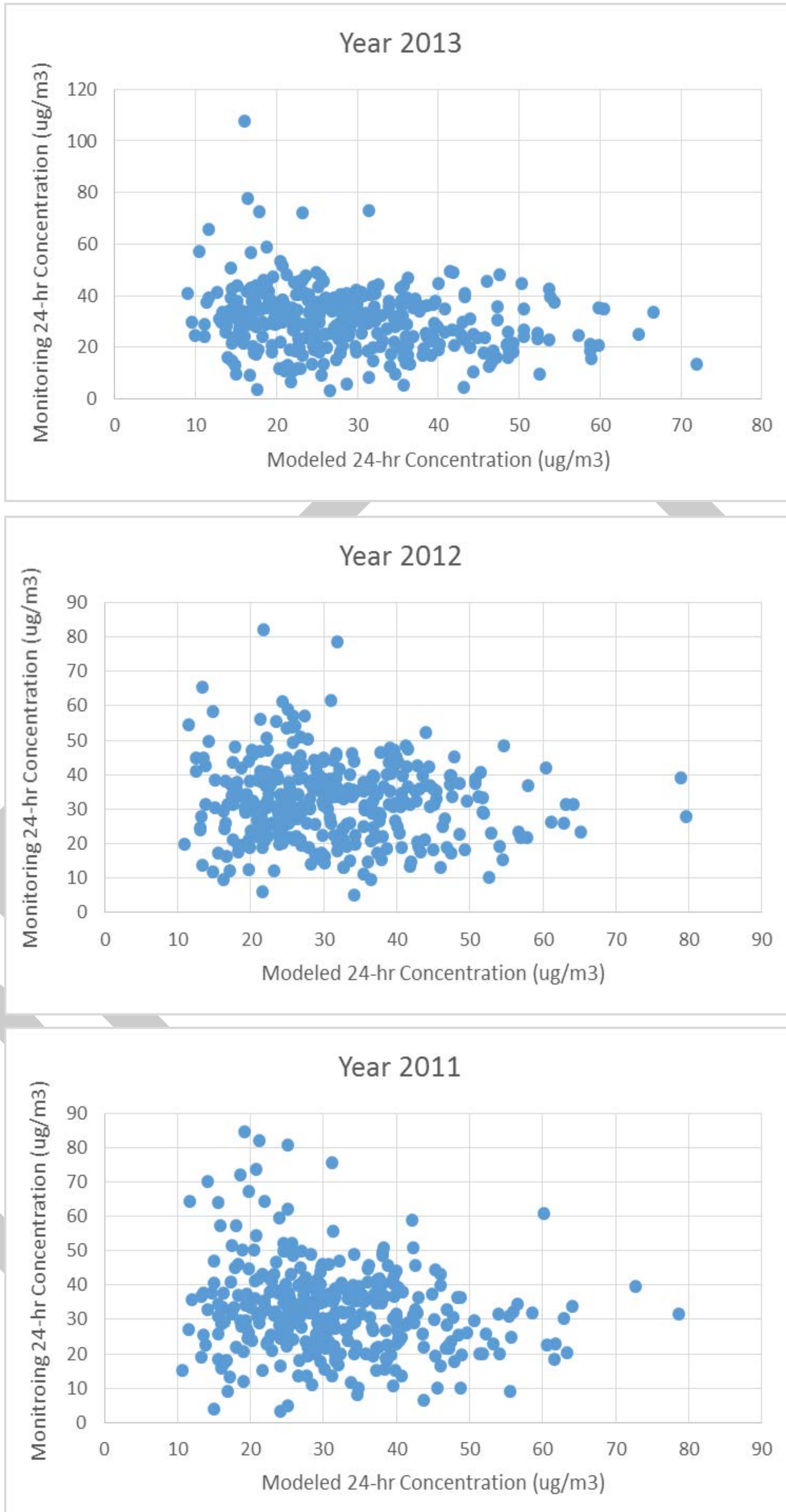
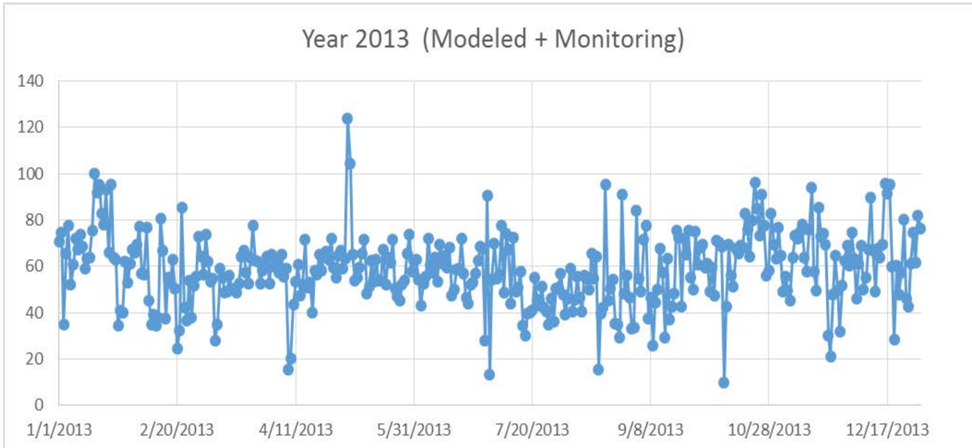
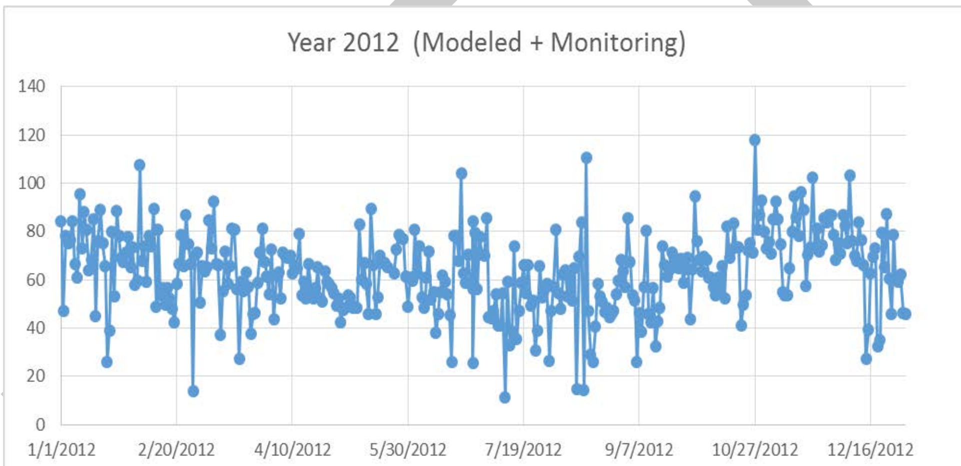


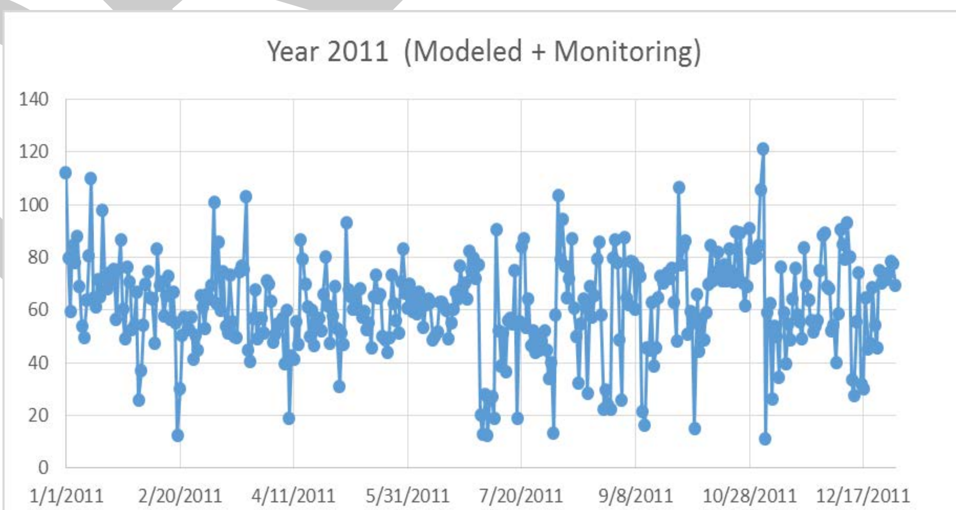
Figure 4: Modeled 24-hour Average PM_{10} Concentrations vs. Monitoring 24-hour Average PM_{10} Concentrations for Years 2011, 2012 and 2013



5: Daily Paired Sum Concentrations for 24-hour Average PM_{10} for Years 2011, 2012 and 2013







2. Background Concentration for $PM_{2.5}$

Based on the 2013-2015 monitoring data and attainment/non-attainment classification, ADEQ classified the state into three different zones.

a. West Central Pinal $PM_{2.5}$ non-attainment area (NAA)

Historically a portion of the West Central Pinal $PM_{2.5}$ NAA has been banned from the HMAP GP because the monitoring data collected from the Cowtown monitor showed significant violation for $PM_{2.5}$ NAAQS, both annual and 24-hour standards. In 2016, Pinal County Air Quality Control District (PCAQCD) moved the Cowtown monitor to a new location at Stanfield, Arizona. Since the data collected from the new monitor were insufficient, ADEQ excluded this monitor for the background determination at this stage and will take this monitor into account when renewing the GP in the next permitting period. Although the Cowtown monitor is no longer exist, the ambient air quality data in the prohibition area in the previous GP are unlikely changed. Therefore, ADEQ decided to retain this prohibition area in this GP.

b. Maricopa County - Pinal County (excluding the West Central Pinal $PM_{2.5}$ NAA) - Santa Cruz County - Yuma County

Parts of the four counties are currently non-attainment areas for PM_{10}. While the 2013-2015 monitoring data in these areas show the compliance with the NAAQS for $PM_{2.5}$, the $PM_{2.5}$ concentrations in these areas are significantly higher than other areas in the state. ADEQ estimated the $PM_{2.5}$ background concentration for these areas by averaging the monitoring concentrations obtained from all monitors in Maricopa County, the Casa Grande monitor in Pinal County, the Nogales monitor in Santa Cruz, and the Yuma monitor in Yuma County.

c. Remaining areas

For the remaining areas, ADEQ estimated the background concentrations for $PM_{2.5}$ by averaging the monitoring concentrations obtained from the monitors in Tucson (Pima County), Flagstaff (Coconino County), Douglas (Cochise County), Wenden (La Paz County), and Prescott (Yavapai County).

Table 22 summarizes the $PM_{2.5}$ background concentrations used in the HMAP modeling analysis.

Table 22: Background Concentrations for $PM_{2.5}$

Areas	Averaging Period	Background Concentration (µg/m^3)	Source of Data	Note
West Central Pinal $PM_{2.5}$ NAA	--	--	--	Prohibited
Maricopa County - Pinal County (excluding the West Central Pinal $PM_{2.5}$ NAA) - Santa Cruz County -Yuma County	24-hour	21	https://www.epa.gov/outdoor-air-quality-data Monitors including: all monitors in Maricopa; Case Grande (Pinal County); Nogales monitor (Santa Cruz County); and Yuma Supersite Monitor (Yuma County)	Average of the 98th percentile 24-hour values over 2013-2015
	Annual	8.1		Average of the annual values over 2013-2015
Other Areas	24-hour	12	https://www.epa.gov/outdoor-air-quality-data Monitors including: all monitors in Tucson (Pima County); Flagstaff (Coconino County); Douglas (Cochise County); Wenden (La Paz County); and Prescott (Yavapai County)	Average of the 98th percentile 24-hour values over 2013-2015
	Annual	5.2		Average of the annual values over 2013-2015

3. Background Concentration for One-hour NO_2

There are very limited NO_2 monitoring sites in Arizona and nearly all monitoring sites are located in the Phoenix and Tucson metropolitan areas. To determine representative background concentrations for 1-hour NO_2, the modeling analysis has classified the state of Arizona into three areas: the Phoenix metropolitan area; the Tucson metropolitan area; and the remaining areas. Based on this classification, background concentrations were determined for the three areas separately. The monitoring data collected from Greenwood, Central Phoenix, JLG Supersite, West Phoenix and Buckeye during 2011-2013 were used to determine the background concentrations for the Phoenix metropolitan area. The monitoring data collected from Children's Park and 22nd and Craycroft were used to determine the background concentrations for the Tucson metropolitan area. The monitoring data collected from Deming, New Mexico were used for the background concentrations for the remaining areas, considering that the data should provide a representative or conservative estimate.

The modeling analysis used hour-of-day monitored background concentrations, which were determined as follows:

- For each of the three years (2011-2013) under review, compiled all of the NO_2 concentrations by hour of day (1AM, 2AM, 3AM, etc) and calculated the 98 percentile of NO_2 concentrations for each hour of the day;

- Calculated the background concentrations as the 3 year average of the 98 percentile of concentrations for each hour of the day.

Table 23 provides the background concentrations for modeling 1-hour NO_2.

Table 23: 1-Hour NO_2 Background Concentrations (μg/m^3)

	Phoenix Metropolitan Area	Tucson Metropolitan Area	Remaining Areas
HOUR 1	82.3	60.4	35.4
HOUR 2	77.6	53.7	31.8
HOUR 3	73.8	51.1	32.0
HOUR 4	70.6	50.0	32.0
HOUR 5	70.0	48.9	34.4
HOUR 6	71.4	52.6	36.3
HOUR 7	73.3	59.5	36.8
HOUR 8	78.5	62.9	35.1
HOUR 9	82.3	60.7	33.2
HOUR 10	79.6	56.5	25.1
HOUR 11	69.2	48.3	12.0
HOUR 12	62.3	39.6	7.6
HOUR 13	55.5	32.2	6.3
HOUR 14	49.3	25.1	5.0
HOUR 15	46.2	22.8	5.0
HOUR 16	48.0	26.6	4.5
HOUR 17	54.8	36.0	5.7
HOUR 18	76.5	59.4	15.7
HOUR 19	92.2	72.3	34.7
HOUR 20	94.8	76.0	46.9
HOUR 21	95.3	76.1	48.3
HOUR 22	94.1	76.2	47.6
HOUR 23	91.2	74.2	45.4
HOUR 24	87.1	66.5	40.0

4. Background Concentration for SO_2, CO and Annual NO_2

ADEQ selected the JLG Supersite Monitor in Maricopa County for determining the state-wide background concentrations for SO_2, CO and annual NO_2 (Table 24), considering that the data should provide a representative or conservative estimate.

Table 24: Background Concentrations for SO_2, CO and Annual NO_2

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)	Source of Data	Note
SO_2	3-hour	20	https://www.epa.gov/outdoor-air-quality-data JLG Supersite Monitor	Highest concentration during 2013-2015
	1-hour	14		99th percentile of the annual distribution of daily maximum 1-hours values averaged across 2013-2015
NO_2	Annual	32	https://www.epa.gov/outdoor-air-quality-data JLG Supersite Monitor	Highest annual concentration during 2013-2015
CO	8-hour	2,500	https://www.epa.gov/outdoor-air-quality-data JLG Supersite Monitor	Highest concentration during 2013-2015
	1-hour	3,650		Highest concentration during 2013-2015

H. NO_2 Modeling Methodology

The recent EPA's guidance recommends three-tiered screening approach for modeling NO_2:

- Tier 1 Total Conversion – assuming full conversion of NO to NO_2 without any additional justification.

- Tier 2 Ambient Ratio Method (ARM) – multiply Tier 1 result by empirically-derived NO_2/NOx ratio, with 0.8 as default ambient ratio for the 1-hour NO_2 standard and 0.75 for annual NO_2 standard. The Ambient Ratio Method 2 (ARM2), which is based on an evaluation of the ratios of NO_2/NO_X from the EPA's Air Quality System (AQS) record of ambient air quality data, may also be used under certain circumstances.

- Tier 3 - Plume Volume Molar Ratio Method (PVMRM)/Ozone Limiting Method (OLM) – both methods account for ambient conversion of NO to NO_2 in the presence of ozone, namely the ozone titration mechanism. Two key model inputs are needed, namely in-stack ratios of NO_2/NO_X emissions and background ozone concentrations.

ADEQ employed the PVMRM approach for modeling NO_2:

- Limited information is available on in-stack NO_2/NOx ratios for dryers. The California Air Pollution Control Officers Association (CAPCOA) recommends using a ratio of 6.88% for dyers. In this HMAP GP, ADEQ used a conservative ratio of 10% to model the dryer. The in-stack ratios of NO_2/NOx for other sources (heaters, generators and boilers) were also assumed to be 10%.

- Hourly background ozone concentrations from the Central Phoenix monitor were used across the State, considering that the Phoenix ozone data should provide conservative estimate for areas other than the Phoenix metropolitan Area.

- The Urban Dispersion option was used for modeling the Phoenix metropolitan areas while the Rural Dispersion option for other areas. Considering part of the urban area that will contribute to the urban heat island plume affecting the sources, ADEQ determined a population of 3,000,000 for input to AERMOD.

NO_2 background concentrations as listed in Table 23 were directly input to the model with the HROFDY option.

I. Modeled Results

1. Collocation of HMAP, C&S, and CBP

Tables 25-29 summarize the modeled results for the co-location of a HMAP (4200 tons per day), a C&S (3780 tons per day) and a CBP (1275 yd^3 per day). Representative background concentrations were added to modeled impacts and the total concentrations were then compared to the NAAQS. As shown in the tables, emissions from a HMAP co-located with a C&S and a CBP will not cause or contribute to a violation of the NAAQS as long as the operation limits and conditions as proposed in Table 12 are met.

The AERMOD modeling analysis also revealed that the modeled impacts from hot mix asphalt plants were limited to near-field areas. All modeled maximum concentrations for all pollutants under varied meteorological conditions occurred in ambient area boundary.

Table 25: Modeled Results for $PM_{2.5}$ for Collocation of HMAP, C&S and CBP

Meteorological data sets	Modeled concentration (μg/m³)		Background concentration (μg/m³)		Total concentration (μg/m³)		NAAQS (μg/m³)
	24-hour	Annual	24-hour	Annual	24-hour	Annual	
Flagstaff	4.5	1.9	12	5.2	16.5	7.1	24-hour: 35 Annual: 12
Kingman	9.8	2.7	12	5.2	21.8	7.9	
Page	9.7	3.1	12	5.2	21.7	8.3	
Prescott	13.2	3.9	12	5.2	25.2	9.1	
Safford	9	2.1	12	5.2	21	7.3	
St Johns	12.5	3.4	12	5.2	24.5	8.6	
Tucson	9.1	2.9	12	5.2	21.1	8.1	
Winslow	9	2.8	12	5.2	21	8	

Table 26: Modeled Results for 24-hour PM_{10} for Collocation of HMAP, C&S and CBP

Meteorological data sets	Modeled concentration (µg/m³)	Background concentration (µg/m³)	Total concentration (µg/m³)	NAAQS (µg/m³)
Flagstaff	28	26	54	150
Kingman	79	26	105	
Page	81	26	107	
Prescott	92	26	118	
Safford	56	26	82	
St Johns	86	26	112	
Tucson	58	26	84	
Winslow	74	26	100	

Table 27: Modeled Results for NO_2 for Collocation of HMAP, C&S and CBP

Meteorological data sets	Modeled concentration (µg/m³)		Background concentration (µg/m³)		Total concentration (µg/m³)		NAAQS (µg/m³)
	1-hour[4]	Annual	1-hour[5]	Annual	1-hour	Annual	
Flagstaff	146	9.1	-	32	146	41.1	1-hour: 189 Annual: 100
Kingman	177	11.6	-	32	177	43.6	
Page	161	3.7	-	32	161	35.7	
Prescott	163	10.9	-	32	163	42.9	
Safford	171	8.9	-	32	171	40.9	
St Johns	167	7.2	-	32	167	39.2	
Tucson	186	7.1	-	32	186	39.1	
Winslow	181	8.6	-	32	181	40.6	

Table 28: Modeled Results for SO_2 for Collocation of HMAP, C&S and CBP

Meteorological data sets	Modeled concentration (µg/m³)		Background concentration (µg/m³)		Total concentration (µg/m³)		NAAQS (µg/m³)
	1-hour	3-hour	1-hour	3-hour	1-hour	3-hour	
Flagstaff	109	91	14	20	123	111	1-hour:196 3-hour: 1,300
Kingman	105	98	14	20	119	118	
Page	86	70	14	20	100	90	
Prescott	105	95	14	20	119	115	
Safford	99	67	14	20	113	87	
St Johns	111	87	14	20	125	107	
Tucson	112	85	14	20	126	105	
Winslow	100	87	14	20	114	107	

[4] Background concentrations have been included in the model runs. Therefore, the reported concentrations reflect the total concentrations of modeled concentrations plus background concentrations.
[5] See Table 23

Table 29: Modeled Results for CO for Collocation of HMAP, C&S and CBP

Meteorological data sets	Modeled concentration (µg/m³)		Background concentration (µg/m³)		Total concentration (µg/m³)		NAAQS (µg/m³)
	1-hour	8-hour	1-hour	8-hour	1-hour	8-hour	
Flagstaff	255	161	3,650	2,500	3,905	2,661	1-hour: 40,000 8-hour: 10,000
Kingman	270	185	3,650	2,500	3,920	2,685	
Page	219	108	3,650	2,500	3,869	2,608	
Prescott	264	179	3,650	2,500	3,914	2,679	
Safford	241	105	3,650	2,500	3,891	2,605	
St Johns	258	144	3,650	2,500	3,908	2,644	
Tucson	279	158	3,650	2,500	3,929	2,658	
Winslow	262	163	3,650	2,500	3,912	2,663	

2. HMAP Alone

Tables 30-34 summarize the modeled results for a HMAP (3,150 tons per day) located in a PM_{10} non-attainment area and a HMAP (5,280 tons per day) in an attainment area. As shown in the tables, emissions from a HMAP will not cause or contribute to a violation of the NAAQS as long as under the operation limits and conditions as proposed in Table 10 are met.

The AERMOD modeling analysis also revealed that the modeled impacts from hot mix asphalt plants were limited to near-field areas. All modeled maximum concentrations for all pollutants under varied meteorological conditions occurred in ambient area boundary.

Table 30: Modeled Results for $PM_{2.5}$ for a HMAP Alone

Meteorological data sets	Modeled concentration (µg/m³)		Background concentration (µg/m³)		Total concentration (µg/m³)		NAAQS (µg/m³)
	24-hour	Annual	24-hour	Annual	24-hour	Annual	
Flagstaff	9.4	3.4	12	5.2	21.4	8.6	24-hour: 35 Annual: 12
Kingman	10.4	2.7	12	5.2	22.4	7.9	
Page	15.4	4.4	12	5.2	27.4	9.6	
Prescott	16.1	5.5	12	5.2	28.1	10.7	
Safford	8.5	2.6	12	5.2	20.5	7.8	
St Johns	14.0	4.0	12	5.2	26	9.2	
Tucson	9.3	3.1	12	5.2	21.3	8.3	
Winslow	12.3	3.0	12	5.2	24.3	8.2	
Nogales	5.2	2.5	21	8.1	26.2	10.6	
Phoenix	7.6	3.2	21	8.1	28.6	11.3	
Yuma	6.9	2.7	21	8.1	27.9	10.8	

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Table 31: Modeled Results for 24-hour PM_{10} for a HMAP Alone

Meteorological data sets	Modeled concentration (µg/m³)	Background concentration (µg/m³)	Total concentration (µg/m³)	NAAQS (µg/m³)
Flagstaff	60	26	86	150
Kingman	77	26	103	
Page	111	26	137	
Prescott	107	26	133	
Safford	56	26	82	
St Johns	90	26	116	
Tucson	62	26	88	
Winslow	97	26	123	
Nogales	41	58	99	
Phoenix	58	58	116	
Yuma	47	58	105	

Table 32: Modeled Results for NO_2 for a HMAP Alone

Meteorological data sets	Modeled concentration (µg/m³)		Background concentration (µg/m³)		Total concentration (µg/m³)		NAAQS (µg/m³)
	1-hour[6]	Annual	1-hour[7]	Annual	1-hour	Annual	
Flagstaff	139	6.7	-	32	139	38.7	1-hour: 189 Annual: 100
Kingman	180	8.5	-	32	180	40.5	
Page	150	2.2	-	32	150	34.2	
Prescott	152	5.1	-	32	152	37.1	
Safford	178	8.3	-	32	178	40.3	
St Johns	179	6.6	-	32	179	38.6	
Tucson	182	3.1	-	32	182	35.1	
Winslow	186	5.8	-	32	186	37.8	
Nogales	149	4.8	-	32	149	36.8	
Phoenix	185	2.6	-	32	185	34.6	
Yuma	164	3.5	-	32	164	35.5	

[6] Background concentrations have been included in the model runs. Therefore, the reported concentrations reflect the total concentrations of modeled concentrations plus background concentrations.
[7] See Table 23

Table 33: Modeled Results for SO_2 for a HMAP Alone

Meteorological data sets	Modeled concentration (µg/m³)		Background concentration (µg/m³)		Total concentration (µg/m³)		NAAQS (µg/m³)
	1-hour	3-hour	1-hour	3-hour	1-hour	3-hour	
Flagstaff	131	127	14	20	145	147	1-hour:196 3-hour: 1,300
Kingman	105	98	14	20	119	118	
Page	86	70	14	20	100	90	
Prescott	105	95	14	20	119	115	
Safford	106	93	14	20	120	113	
St Johns	108	87	14	20	122	107	
Tucson	113	85	14	20	127	105	
Winslow	100	87	14	20	114	107	
Nogales	122	118	14	20	136	138	
Phoenix	84	55	14	20	98	75	
Yuma	104	94	14	20	118	114	

Table 34: Modeled Results for CO for a HMAP Alone

Meteorological data sets	Modeled concentration (µg/m³)		Background concentration (µg/m³)		Total concentration (µg/m³)		NAAQS (µg/m³)
	1-hour	8-hour	1-hour	8-hour	1-hour	8-hour	
Flagstaff	315	198	3,650	2,500	3,965	2,698	1-hour: 40,000 8-hour: 10,000
Kingman	268	189	3,650	2,500	3,918	2,689	
Page	220	115	3,650	2,500	3,870	2,615	
Prescott	273	188	3,650	2,500	3,923	2,688	
Safford	309	161	3,650	2,500	3,959	2,661	
St Johns	278	152	3,650	2,500	3,928	2,652	
Tucson	289	159	3,650	2,500	3,939	2,659	
Winslow	255	166	3,650	2,500	3,905	2,666	
Nogales	306	208	3,650	2,500	3,956	2,708	
Phoenix	231	87	3,650	2,500	3,881	2,587	
Yuma	260	151	3,650	2,500	3,910	2,651	

IX. LIST OF ABBREVIATIONS

A.A.C. .... Arizona Administrative Code
ADEQ .... Arizona Department of Environmental Quality
ADGS .... Aggregate Delivery to Ground Storage
AQD .... Air Quality Division
ATC .... Aggregate Transfer to Conveyor
ATEB .... Aggregate Transfer to Elevation Bins
ATO .... Authorization to Operate
AZ .... Arizona
CFR .... Code of Federal Regulations

CO .... Carbon Monoxide
CSTS .... Cement Supplement Transfer to Cement Silo
CTCS .... Cement Transfer to Cement Silo
EPA .... Environmental Protection Agency
g .... Gram
GEN .... Generator
HAP .... Hazardous Air Pollutant
ID .... Identification
K .... Kelvin
lb/hr .... Pound per Hour
LPG .... Liquefied Petroleum Gas
m .... Meter
Met .... Meteorological Data
MMBtu/hr .... Million British Thermal Units per Cubic Foot
NAAQS .... National Ambient Air Quality Standards
NOV .... Notice of Violation
NO_x .... Nitrogen Oxides
NSPS .... New Source Performance Standards
NWS .... National Weather Service
PAB .... Process Area Boundary
P.C.C. .... Pima County Code
PM .... Particulate Matter
PM_{10} .... Particulate Matter Nominally less than 10 Micrometers
PTE .... Permanent Total Enclosure
s .... Second
SDGS .... Sand Delivery to Ground Storage
SIP .... State Implantation Plan
SO_2 .... Sulfur Dioxide
STC .... Sand Transfer to Conveyor
STEB .... Sand Transfer to Elevated Bins
TML .... Truck Mix Loading
tph .... Ton per Hour
UR .... Unpaved Road
UTM .... Universal Transverse Mercator
VOC .... Volatile Organic Compound
WEAS .... Wind Erosion from Aggregate Storage Piles
WESS .... Wind Erosion from Sand Storage Piles
WHL .... Weigh Hopper Loading
yd^3 .... Cubic Yards
µ .... Micro
.... Number
% .... Percentage