Arizona Department of Transportation
Environmental Planning

Project Level Particulate Matter (PM10) Consultation Document

El Mirage Road
SR 303L – Jomax Road

FHWA Project No. PEO-0(231)T
ADOT Project No. 0000 MA PEO T0428 01D

April 14, 2025

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by ADOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated June 25, 2024, and executed by FHWA and ADOT.

T0428 Project Level PM Quantitative Hot-Spot Analysis – Project of Air Quality Concern Questionnaire

Project Setting and Description

The City of Peoria and the Arizona Department of Transportation (ADOT), in cooperation with other local and state agencies, are preparing a Design Concept Report (DCR) and an Environmental Assessment (EA) to evaluate a potential new segment of El Mirage Road between State Route Loop 303 (SR303L) and Jomax Road (see study area map on page 2). This new segment of roadway would accommodate current and projected traffic needs in response to increased development in areas along the State SR303L and near roadways and traffic interchange (TI) locations in the northwest Valley.

The DCR and EA will evaluate roadway improvements such as lane configuration, pedestrian and bicycle use, drainage improvements, right of way impacts, traffic impacts, and other considerations. They will also evaluate the potential environmental effects that could result from future implementation of the new roadway segment, as well as potential impacts if no action is taken (that is, no changes are made to El Mirage Road in the study area). Environmental topics to be addressed include but are not limited to biological resources, cultural resources, water resources, hazardous materials, traffic noise, and air quality. The Draft DCR and EA are currently scheduled to be available for public review and comment in spring 2025 and be completed in summer 2025.

These projects are within the Phoenix PM10 nonattainment area. The proposed project is included in the *Maricopa Association of Governments (MAG) Regional Transportation Plan (RTP) MOMENTUM 2050*. In addition, the combined project is included in the *FY 2022-2025 MAG Transportation Improvement Program*.

Figure 1. Project Vincinity Map

Project Assessment

The following questionnaire is used to compare the proposed project to a list of project types in 40 CFR 93.123(b) requiring a quantitative analysis of local particulate emissions (Hot-spots) in nonattainment or maintenance areas, which include:

i) New highway projects that have a significant number of diesel vehicles, and expanded highway projects that have a significant increase in the number of diesel vehicles;
ii) Projects affecting intersections that are at Level-of-Service D, E, or F with a significant number of diesel vehicles, or those that will change to Level-of-Service D, E, or F because of an increase in traffic volumes from a significant number of diesel vehicles related to the project;
iii) New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;
iv) Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and
v) Projects in or affecting locations, areas, or categories of sites which are identified in the PM_{10} or $PM_{2.5}$ applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

If the project matches one of the listed project types in 40 CFR 123(b)(1) above, it is considered a project of local air quality concern and the hot-spot demonstration must be based on quantitative analysis methods in accordance to 40 CFR 93.116(a) and the consultation requirements of 40 CFR 93.105(c)(1)(i). If the project does not require a PM hot- spot analysis, a qualitative assessment will be developed that demonstrates that the project will not contribute to any new localized violations, increase the frequency of severity of any existing violations, or delay the timely attainment of any NAAQS or any required emission reductions or milestones in any nonattainment or maintenance area.

On March 10, 2006, EPA published *PM2.5 and PM10 Hot-Spot Analyses in Project-Level Transportation Conformity Determinations for the New PM2.5 and Existing PM10 National Ambient Air Quality Standards; Final Rule* describing the types of projects that would be considered a project of air quality concern and that require a hot-spot analysis (71 FR 12468- 12511). Specifically on page 12491, EPA provides the following clarification: "Some examples of *projects of air quality concern* that would be covered by § 93.123(b)(1)(i) and (ii) are: A project on a new highway or expressway that serves a significant volume of diesel truck traffic, such as facilities with greater than 125,000 annual average daily traffic (AADT) and 8% or more of such AADT is diesel truck traffic;" .." Expansion of an existing highway or other facility that affects a congested intersection (operated at Level-of-Service D, E, or F) that has a significant increase in the number of diesel trucks;" These examples will be used as the baseline for determining if the project is a project of air quality concern.

New Highway Capacity

Is this a new highway project that has a significant number of diesel vehicles? *Example: total traffic volumes ≥125,000 annual average daily traffic (AADT) and truck volumes ≥10,000 diesel trucks per day (8% of total traffic).*

YES – This project is a new highway project that has a significant number of diesel vehicles. The ADT and truck percentage for the Build alternative were compared to the No Build alternative on roadway segments and intersections along the project corridor for El Mirage Road project, as summarized in Tables 1 and 2 below. As can be seen in Table 1, total truck ADT on El Mirage Road segments would be 3,080 to 14,030 in 2050 Build alternative, and truck ADT would increase 1,820 to 6,800 vehicles in 2050 Build alternative, compared to the No-Build alternative. As shown in Table 2, total truck ADT at intersections would be 3,350 to 12,310 vehicles in 2050 Build alternative, and truck ADT would increase 2,700 to 8,900 vehicles at 5 intersections. Only one intersection shows decreased truck ADT.

Table 1 – Roadway Average Daily Traffic and Truck Volumes

Segment	2023 Existing				2050 No-Build Alternative				2050 Build Alternative				Total Truck ADT Difference (Build - No-Build)
	ADT	Total Truck ADT	MT ADT	HT ADT	ADT	Total Truck ADT	MT ADT	HT ADT	ADT	Total Truck ADT	MT ADT	HT ADT	
Vistancia Boulevard to Blue Sky Drive	3,230	130	100	30	9,680	1,260	1,020	240	22,150	3,080	2,300	780	1,820
Blue Sky Drive to Jomax Road	3,170	120	90	30	9,620	1,250	1,010	240	23,400	3,080	2,300	780	1,830
Jomax Road to Happy Valley Road	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18,510	3,070	2,220	850	3,070
Happy Valley Road to SR 303L Westbound Ramp	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19,300	4,170	3,090	1,080	4,170
SR 303L Westbound Ramp to SR 303L Eastbound Ramp	12,000	1,720	1,320	400	28,800	4,120	2,050	2,070	40,400	10,920	7,210	3,710	6,800
South of SR 303L Eastbound Ramp	16,000	2,290	1,760	530	55,900	7,870	3,850	4,020	58,300	14,030	10,270	3,760	6,160

Notes: ADT – Average daily traffic
MT – Medium Trucks (vehicles with 2 axles & 6 wheels; gross vehicle weight – 10,000 to 26,400 pounds).
HT – Heavy Trucks (vehicles with 3 or more axles; gross vehicle weight greater than 26,400 pounds).

Source: Traffic data provided by Burgess & Niple. Inc. on December 6, 2024.

Table 2 – El Mirage Road Intersection ADT & Truck Volumes

Intersection	Veh Class	2050 No-Build Alternative					2050 Build Alternative					Difference (Build - No-Build)
		EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	
El Mirage Road and Vistancia Boulevard	Total ADT	14,800	11,100	3,400	7,700	37,000	11,200	8,300	7,300	5,600	32,400	-4,600
	MT ADT	1,550	1,170	360	810	3,890	1,160	560	730	560	3,010	-880
	HT ADT	520	390	120	270	1,300	390	320	280	220	1,210	-90
El Mirage Road and Blue Sky Drive	Total ADT	2,000	N/A	1,600	1,700	5,300	2,600	N/A	10,300	9,800	22,700	17,400
	MT ADT	100	N/A	200	210	510	100	N/A	1,240	1,180	2,520	2,010
	HT ADT	0	N/A	70	70	140	0	N/A	430	400	830	690
El Mirage Road and Jomax Road	Total ADT	1,600	N/A	N/A	1,300	2,900	12,500	13,200	14,700	10,300	50,700	47,800
	MT ADT	80	N/A	N/A	160	240	1,590	1,680	1,870	1,310	6,450	**6,210**
	HT ADT	0	N/A	N/A	70	70	580	750	840	590	2,760	**2,690**
El Mirage Road and Happy Valley Road	Total ADT	14,400	12,200	N/A	400	27,000	11,000	14,500	14,500	13,600	53,600	26,600
	MT ADT	1,580	1,340	N/A	40	2,960	1,840	2,420	2,420	2,270	8,950	**5,990**
	HT ADT	820	690	N/A	0	1,510	630	830	830	780	3,070	**1,560**
El Mirage Road and SR 303L Westbound Ramp	Total ADT	N/A	4,500	6,200	4,500	15,200	N/A	7,000	19,600	10,400	37,000	21,800
	MT ADT	N/A	900	1,240	900	3,040	N/A	1,400	3,920	2,080	7,400	**4,360**
	HT ADT	N/A	310	420	310	1,040	N/A	50	1,330	710	2,090	**1,050**
El Mirage Road and SR 303L Eastbound Ramp	Total ADT	9,500	N/A	10,400	4,500	24,400	11,300	N/A	22,000	12,600	45,900	21,500
	MT ADT	1,900	N/A	3,800	900	6,600	2,260	N/A	4,400	2,520	9,180	2,580
	HT ADT	630	N/A	700	30	1,360	770	N/A	1,500	860	3,130	1,770

Notes: ADT – Average daily traffic on Approaching Movements
MT – Medium Trucks (vehicles with 2 axles & 6 wheels; gross vehicle weight – 10,000 to 26,400 pounds).
HT – Heavy Trucks (vehicles with 3 or more axles; gross vehicle weight greater than 26,400 pounds).

Source: Traffic data provided by Burgess & Niple. Inc. on December 6, 2024.

Expanded Highway Capacity

Is this an expanded highway projects that have a significant increase in the number of diesel vehicles? *Example: the build scenario of the expanded highway or expressway causes a significant increase in the number of diesel trucks compared with the no-build scenario, truck volumes > 8% of the total traffic.*

NO – This project is not an expanded highway project that has a significant number of diesel vehicles.

Projects with Congested Intersections

Is this a project that affects a congested intersection (LOS D or greater) that has a significant number of diesel trucks, OR will change LOS to D or greater because of an increase in traffic volumes from a significant number of diesel trucks related to the project?

YES. This project is a project that affects a congested intersection of LOS D or will change LOS to D or greater which has a significant number of diesel trucks, see Table 3. The intersection operation analysis shows 4 intersections have a LOS of D or E , with total truck ADT at intersections 3,350 to 12,310 vehicles in 2050 Build alternative, as shown in previous Table 2.

Table 3 – Intersections LOS and Peak-Hour Volumes

Intersection	Peak Hour	2050 No-Build Alternative				2050 Build Alternative				Total Truck Volume Difference (Build Alternative - No Build Alternative, vph)[1]
		LOS (delay, sec.)	Volumes (vph)	Medium Truck Volumes (vph)	Heavy Truck Volumes (vph)	LOS (delay, sec.)	Volumes (vph)	Medium Truck Volumes (vph)	Heavy Truck Volumes (vph)	
El Mirage Road and Vistancia Boulevard	AM	E (56.9)	4030	420	140	D (37.4)	4,250	440	150	30
	PM	D (49.7)	3700	390	130	D (37.4)	4,160	430	140	50
El Mirage Road and Blue Sky Drive	AM	A (4.7)	530	20	0	E (36.6)	2,260	250	80	310
	PM	A (4.7)	530	30	0	C (23.4)	2,270	250	70	290
El Mirage Road and Jomax Road	AM	A (0)	330	20	0	C (31.2)	4,580	580	230	790
	PM	A (0)	330	30	0	**D (44.6)**	5,080	650	250	870
El Mirage Road and Happy Valley Road	AM	A (3.7)	2990	330	170	**E (70.8)**	5,560	930	280	710
	PM	A (1.7)	2700	300	150	**D (45.7)**	5,370	900	260	710
El Mirage Road and SR 303L Westbound Ramp	AM	B (11.3)	1170	230	80	B (17.0)	3,650	730	180	600
	PM	A (6.0)	2440	490	80	C (20.7)	3,700	740	180	350
El Mirage Road and SR 303L Eastbound Ramp	AM	B (11.5)	1270	250	160	C (23.8)	4,470	890	220	700
	PM	A (5.8)	2740	550	190	C (28.4)	4,590	920	230	410

[1] Truck Volume Difference includes both MT and HT
Volumes (vph) at the intersection includes all approachhing movements

MT – Medium Trucks (vehicles with 2 axles & 6 wheels; gross vehicle weight – 10,000 to 26,400 pounds) HT – Heavy Trucks (vehicles with 3 or more axles; gross vehicle weight greater than 26,400 pounds).

Source: LOS data provided by Burgess & Niple. Inc. on December 6, 2024.

New Bus and Rail Terminals

Does the project involve construction of a new bus or intermodal terminal that accommodates a significant number of diesel vehicles?

NO – This project does not construct any new bus or rail terminals.

Expanded Bus and Rail Terminals

Does the project involve an existing bus or intermodal terminal that has a large vehicle fleet where the number of diesel buses (or trains) increases by 50% or more, as measured by arrivals?

NO – This project does not expand any bus or rail terminals.

Projects Affecting PM Sites of Violation or Possible Violation

Does the project affect locations, areas or categories of sites that are identified in the PM_{10} or $PM_{2.5}$ applicable plan or implementation plan submissions, as appropriate, as sites of violation or potential violation?

NO – The project location is not listed in MAG's 2012 SIP as a site of violation or potential violation.

POAQC Determination

El Mirage Road project is a new highway project that has a significant increase in the number of diesel vehicles on roadway segments and at intersections. Therefore, ADOT is recommending this project for interagency consultation in accordance with 40 CFR93.105 as a Project of Air Quality Concern and thereby will require a PM hot-spot analysis.

The top three TI/intersections ranked by volume are as follows:

- El Mirage Road and Jomax Road
- El Mirage Road and Happy Valley Road
- El Mirage Road and SR 303L TI with Westbound & Eastbound Ramps

And, the top three intersections ranked by LOS and delay are as follows:

- El Mirage Road and Happy Valley Road (AM Peak Hour)
- El Mirage Road and Happy Valley Road (PM Peak Hour)
- El Mirage Road and Jomax Road (PM Peak Hour)

Based on the top intersections ranked by volume and by LOS and delay, the intersection modeling analysis will be performed for the following three TI/intersections' peak hours of the days for El Mirage Road project:

- El Mirage Road and Jomax Road
- El Mirage Road and Happy Valley Road
- El Mirage Road and SR 303L TI with Westbound & Eastbound Ramps

All intersections within the project limits are selected for analysis. El Mirage Road and Happy Valley Road intersection is selected because it has the largest volumes in 2050 Build alternative and LOS E and D in AM and PM peak hours in the 2050 Build alternative. El Mirage Road and Jomax Road intersection is selected because it has 2nd largest volumes in 2050 Build alternative and LOS D in 2050 PM peak hour. El Mirage Road and SR 303L TI is selected because of 3rd largest volumes in 2050 Build alternative. El Mirage Road and Vistancia Blvd intersection and El Mirage Road and Blue Sky Drive intersection are not selected for analysis because these two intersections are outside of project limits, and volumes are lower than those of selected intersections.

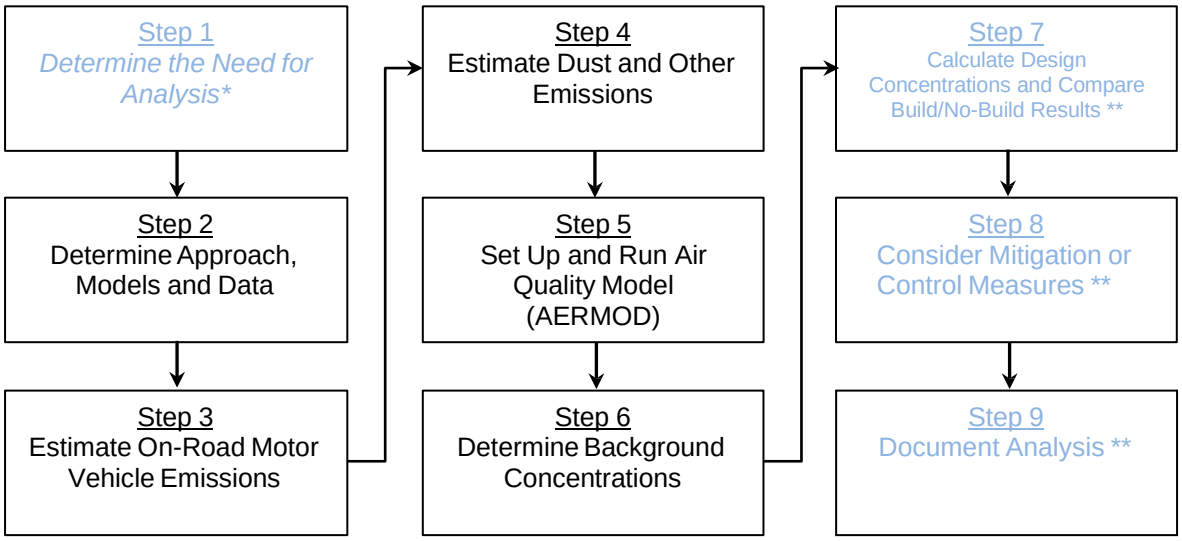
Section 3.3.2 of EPA's PM Hot Spot Guidance indicates the geographic area to be covered by a PM hot-spot analysis is to be determined on a case-by-case basis. The guidance states that it may be appropriate to focus the PM hot-spot analysis only on locations of highest air quality concentrations, and that if conformity requirements are met at such locations, then it can be assumed that conformity is met throughout the project area.

Based on the above reasons, we believe the three intersections selected for PM hotspot analysis in the consultation document are the locations that would result in highest air quality concentrations.

Project Level PM Quantitative Hot-Spot Analysis – Consultation Document for Project of Air Quality Concern

Completing a Particulate Matter (PM) Hot-Spot Analysis

The general steps required to complete a quantitative PM hot-spot analysis are outlined below and described in detail in the EPA Office of Transportation and Air Quality guidance document "Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas" EPA-420-B-21-037, October 2021.



- Described in the previous section (Air Quality Concern Questionnaire).
** These Steps will be described and documented in a final air quality analysis report.

Step 2: Determine the Approach, Models, and Data

- Describe the project area (area substantially affected by the project, 58 FR 62212) and emission sources.
- Determine general approach and analysis year(s) – year(s) of peak emissions during the time frame of the transportation plan (69 FR 40056).
- Determine National Ambient Air Quality Standards (NAAQS) and PM types to be evaluated.
- Select emissions and dispersion models and methods to be used.
- Obtain project-specific data (e.g., fleet mix, peak-hour volumes and average speed).

Step 3: Estimate On-Road Motor Vehicle Emissions

a. Estimate on-road motor vehicle emissions using MOVES.

Step 4: Estimate Dust and Other Emissions

□ Estimate road dust emissions using AP-42 Paved Roads.
□ Do emissions from other sources (e.g., locomotives) need to be considered?

Step 5: Set Up and Run Air Quality Model (AERMOD)

- Obtain and input required site data (e.g., meteorological).
- Input MOVES and AP-42 outputs (emission factors).
- Determine number and location of receptors, roadway links, and signal timing.
- Run air quality dispersion model and obtain concentration results.

Step 6: Determine Background Concentrations

a. Determine background concentrations from nearby and other emission sources excluding the emissions from the project itself.

Step 7: Calculate Design Concentrations and Compare Build/No-Build Results

* Add step 5 results to background concentrations to obtain values for the Build scenario.
* Determine if the design values allow the project to conform.

Step 8: Consider Mitigation or Control Measures

a. Consider measures to reduce emissions and redo the analysis. If mitigation measures are required for project conformity, they must be included in the applicable SIP and be enforceable.
b. Determine if the design values from allow the project to conform after implementing mitigation or control measures.

Step 9: Document Analysis

a. Determine if the project conforms or not based on the results of step 7 or step 8.

To support the conclusion that a project meets conformity under 40 CFR 93.116 and 93.123, at a minimum the documentation will include:

- *Description of proposed project, when it is expected to open, and projected travel activity data.*
- *Analysis year(s) examined and factors considering in determining year(s) of peak emissions.*
- *Emissions modeling data, model used with inputs and results, and how characterization of project links.*
- *Model inputs and results for road dust, construction emissions, and emissions from other source if needed.*
- *Air Quality modeling data, included model used, inputs and results and receptors.*
- *How background concentrations were determined.*
- *Any mitigation and control measures implemented, including public involvement or consultation if needed.*
- *How interagency and public participation requirements were met.*
- *Conclusion that the proposed project meets conformity requirements.*
- *Sources of data for modeling.*

Table 1. Proposed Inputs, Parameters and Data Sources

Estimate On-Road Motor Vehicle Emissions (Step 3)		
MOVES3.1	**Input**	**Data Source/Detail**
Scale	*Onroad, Project Scale and Inventory*	*MAG Regional Conformity Data (Fall, 2024)*
Time Spans	*2050, 16 runs* *PM_{10} emission factors were developed for an analysis year of 2050, which represents the year peak emissions from the project are expected. Vehicle emissions of PM10 are a combination of vehicle exhaust, brakewear, tirewear, and road dust. Road dust is the largest contributor to the overall emissions. Because road dust is highly dependent on vehicle volumes, the analysis year of 2050 was selected as the year of peak emissions because it was the year with the greatest vehicle volumes. This has been reflected in the 2021 MAG Conformity Analysis budget test, which resulted in highest PM10 emissions in 2050 due to largest VMT and the most surrounding PM emissions.*	*4 seasons (Jan, Apr, July & Oct) x 4 weekday time periods (6-9AM, 9AM-4PM, 4-7PM & 7PM-6AM)*
Geographic Bounds	*Maricopa County*	*EPA Hot Spot Guidance Section 4.4.4*
Onroad Vehicles	*All Fuels and Source Use Types*	*EPA Hot Spot Guidance Section 4.4.5*
Road Type	*Urban Restricted and Urban Unrestricted access*	*EPA Hot Spot Guidance Section 4.4.6*
Pollutants and Processes	*Primary Exhaust PM10-Total(for Running Exhaust and Crankcase Running Exhaust), Break Wear Particulate, Tire Wear Particulate*	*EPA Hot Spot Guidance Sections 2.5, 4.4.7*
General Output and Output Emissions Detail	*Output Database TBD*	*EPA Hot Spot Guidance Section 4.4.8, 4.4.9 & 4.6*
Create Input Database	*Input database will be created and modified for Project level using required Regional Inputs from latest Regional Conformity Analysis.*	*MAG Regional Conformity Data (Fall, 2024)*
Project Data Manager	*Database will be created and MOVES3.1 templates will be created to include local project data and information provided by MAG, e.g., Fuel, Age Distribution, Meteorology Data, to be consistent with the regional model. Links and Link Source Type will be specific to project as provided by the traffic study, any missing information will use default MOVES3.1 data.*	*EPA Hot Spot Guidance Sections 4.5 &Appendix D*
Meteorology	*Calculated from current ADEQ Phoenix AERMET data based on 4 seasons and 4 weekday time periods from year 2017 to 2021.*	*16 meteorology data set, 4 seasons (Jan, Apr, July & Oct) x 4 weekday time periods*
Age Distribution	*MAG local specific data (sourceTypeID: 11 – 62, yearID: 2050, ageID: 0 -30)*	*MAG Regional Conformity Data (Fall, 2024)*
Fuel	*MOVES default*	*EPA Hot Spot Guidance Section 4.5.3*

I/M Programs	*Not used. Check the box labeled "No I/M Program" in MOVES*	*MAG Regional Conformity Data (Fall, 2024)*
Retrofit Data	*Not used*	
Links	*Please see attached the link maps.*	
Link Source Types	*Option 2 in the EPA's PM Hot- spot Guidance Section 4.5.7 will be used.*	*MAG Regional Conformity Data (Fall, 2024)*
Link Drive Schedules, Operating Mode Distribution	*Options 1 in the EPA's PM Hot-spot Guidance Section 4.5.8 will be used. Average speeds and road types through the Links Importer will be used. Detailed information through the Link Drive Schedules of Option 2 and Op-Mode Distribution Importers of Option 3 is not available by MAG. MAG provided travel demand model (TDM) supplied traffic data for PM hotspot analysis. This detailed information is normally used/generated by traffic micro-simulations, which is not the intent for this exercise.*	
Off-Network, Hoteling	*Not used*	
Estimate Dust and Other Emissions (Step 4)		
AP-42, Fifth Edition, 2011	**Parameter**	**Data Source/Detail**
Average Weight Vehicles	*Freeways 3.95 tons in 2025, 4.00 tons in 2030, 4.12 tons in 2040, and 4.27 tons in 2050. Arterials 2.65 tons in 2025, 2.65 tons in 2030, 2.65 tons in 2040, and 2.65 tons in 2050*	*MAG Regional Conformity Data (Fall, 2024)*
Silt Loading	*Section 13.2.1 Paved Roads from AP 42 will be used, consistent with the Regional analysis from MAG. Emission factors for road and construction dust should be added to the emission factors generated for each link by MOVES. Ex. Silt loading – Freeways .02 g/m^2, Arterials >10,000 ADT .067g/m^2, Low traffic roads <10,000 ADT .23g/m^2.*	*EPA Hot Spot Guidance Section 6, When estimating emissions of re-entrained road dust from paved roads, site-specific silt loading data must be consistent with the data used for the project's county in the regional emissions analysis (40 CFR 93.123(c)(3)).*
Construction Dust	*Construction Emissions will not be addressed because the construction of this project is not expected to last longer than 5 years. There are no other sources (e.g., locomotives) that need to be considered for most projects.*	EPA Hot Spot Guidance Section 6.5
Precipitation	*In 2008-2012 SIP/Regional Conformity used average of 32 days with at least .01 inch of precipitation County.*	*The MAG 2012 Five Percent Plan for PM-10 (used for the Conformity Analysis for the FY 2022-2025 MAG TIP and the Momentum 2050 RTP, dated December, 2021).*
Set Up and Run Air Quality Model (AERMOD) (Step 5)		
AERMOD v.24142	**Parameter**	**Data Source/Detail**
Model Setup (CO Pathway)		*EPA Hot Spot Guidance Section 7.1, 7.2 & Appendix J, AERMOD User's Guide Section 2.3.2 & 3.2*

TITLEONE	*TBD*	
MODELOPT	*CONC FLAT. Initial modeling will be done with all sources and receptors at grade.*	*Modeling Concentrations and Flat Terrain*
AVERTIME	*24*	*Average across each 24-hour period from the available met data*
URBANOPT	*1,650,070*	*Population of Phoenix, AZ https://www.census.gov/quickfacts/fact/table/phoenixcityarizona/PST045222*
FLAGPOLE	*Receptor height in meter, 1.8*	
POLLUTID	*PM10*	
Source Types and Characters (SO Pathway)		
LOCATION	*Srcid Srctyp (VOLUME)*	
SRCPARAM	*Srcid Vlemis Relhgt Syinit Szinit*	*VOLUME Source parameters See EPA Hot Spot Guidance Appendix*
URBANSRC	*ALL*	*All urban source*
EMISFACT	*Emission rate=1, Use SEASHR (season by hour-of-day)* *As directed by the PM Hot Spot Guidance, emissions were input in a manner to reflect changes in emission factors and vehicle volumes throughout the day. This was represented in AERMOD by specifying an emission rate of 1 g/s/m² with the variable emission rate option to specify the emission rate of 96 emission factors (4 seasons/24 hours per day) for each emission source. Excel files that outline this process are included with MOVES and AERMOD modeling files for agency review.*	*Total 16 MOVES run=4 seasons x 4 time periods to 96 factors (4 seasons/24 hours)* *See PM hot-spot training slides (FHWA, 2022)*
SRCGROUP	*ALL*	
Meteorological Data (ME Pathway)		
SURFFILE	*Phoenix2017-2021.sfc* *ADOT followed up with ADEQ on the AERMET files- the Phoenix Sky Harbor Airport dataset. ADEQ provided a document detailing the AERMET data completeness, their representativeness of meteorology of the project area, and QA/QC.*	*ADEQ Phoenix AERMET files*
PROFFILE	*Phoenix2017-2021.pfl* *ADOT followed up with ADEQ on the AERMET files- the Phoenix Sky Harbor Airport dataset. ADEQ provided a document detailing the AERMET data completeness, their representativeness of meteorology of the project area, and QA/QC.*	*ADEQ Phoenix AERMET files*
SURFDATA	*23183 2017*	*ADEQ Phoenix AERMET files*
UAIRDATA	*23160 2017*	*ADEQ Phoenix AERMET files*

PROFBASE	*0*	*ADEQ Phoenix AERMET files*
Run Met Pre-Processor	*Not used*	
Urban or Rural Sources	*Specifications for URBANSRC (SO Pathway). The emission sources are SR 303L and El Mirage Road mainlines, ramps, and cross streets. No nearby emission sources other than the roadway links included in the model run would be affected by the project. All emission sources used URBANOPT to specify urban dispersion coefficients. The PM Hot-spot Guidance recommends "in urban areas, sources should generally be treated as urban." Appendix W recommends multiple procedures to identify an area as urban. Using the Auer land use procedure described in Section 7.2.1.1(b)(i). Based on aerial maps, this project is in the urban fringe of Phoenix that is partially developed. Currently, residential takes 26% of the land use, open space takes 21%, and vacant land takes 34%, other minor land use includes industrial and commercial. Therefore, the use of urban dispersion coefficients is appropriate for the project area.*	*EPA Hot Spot Guidance Section 7.5.5 & Appendix J.4, AERMOD Implementation Guide, Section 7.2.3 of Appendix W to 40 CFR Part 51*
Receptors (RE Pathway)	*Please see attached receptor maps on pages 15 to 17. El Mirage Road and Jomax Road intersection, El Mirage Road and Happy Valley Road intersection, and El Mirage Road and SR 303L Westbound & Eastbound Ramps intersections were selected for PM hotspot analysis that were ranked by ADT volumes on mainline and at intersections, and LOS and delay at intersections. The receptor placement is consistent with the guidance. Receptors were placed 5 meter or less when on sidewalk from the edge of the roadway. Receptors were placed at 25 meters spacing. (total 1080 receptors for El Mirage Road and Jomax Road intersection, 1086 receptors for El Mirage Road and Happy Valley Road intersection, and 1154 receptors for El Mirage Road and SR 303L WB&EB Ramp intersections). the highest PM concentration would normally occur at receptors near the roadway sources. the PM concentrations would decrease further away from the roadway sources, and receptor placements further away from the source would not affect the highest PM concentration design value for the intersection and analysis results.*	*EPA Hot Spot Guidance Section 7.6, AERMOD User's Guide Section 2.3.4 & 3.4, Section 7.2.2 of Appendix W to 40 CFR Part 51, See PM hot-spot training slides*
DISCCART	*X Y (Z)*	*Z is optional if FLAGPOLE is already defined in CO Pathway.*

GRIDCART	*Not used*	
Output (OU Pathway)		
RECTABLE	*24 6th*	*Since PM should be one or less exceedance per year, with 5 years of met data, the 6th highest concentration at each receptor*
PLOTFILE	*Not used*	
POSTFILE	*Not used*	
Model Runs		
Determine Background Concentrations (Step 6)		
Source Type	**Description**	**Data Source/Detail**
Nearby Sources	*No nearby sources*	
Other Sources (Ambient Monitoring Data)	*Please see the selected monitor's location map and monitoring data with wind rose information. Zuni Hills (ZH) monitor was selected as PM background monitor. The background concentration data of Zuni Hills (ZH) monitor is representative for the project area.* 1. *Similar characteristics between the monitor location and project area including density, mix of emission sources, land use, terrain, etc.* 2. *Distance of monitor from the project area. ZH monitor is closest monitor to the project and have concentration most similar to the project area.* 3. *Wind patterns between the monitor and the project area. ZH monitor does not show significant upwind patterns.* *Draft Atypical Events Report was prepared. See Atypical Events Report for detailed monitor data, calculations, and resulting recommended background concentrations when ready.* Dysart site was also evaluated, but its distance to the project area is further than Zuni Hills site, so it was eliminated for consideration. *For the design concentration, the highest sixth-highest value among all receptors should be added to the fourth highest background monitor value (Section 9.3.4 of PM Hot-spot Guidance). The design concentration will then be compared to NAAQS threshold for conformity determination.*	*EPA Hot Spot Guidance Section 8.3, PM hot-spot training slides Module 5 & 6*

References

PM Hot-spot guidance, EPA-420-B-21-037, October 2021.

User's Guide for the AMS/EPA Regulatory Model (AERMOD), EPA-454/B-21-001, April 2021.

AERMOD Implementation Guide, EPA-454/B-21-006, July 2021.

User's Guide for the AERMOD Meteorological Preprocessor (AERMET), EPA-454/B-22-006, June 2022.

Completing Quantitative PM Hot-spot Analyses: 3-Day Course, FHWA, October 2022.

Figure 1. PM Links and Receptors Placement for Air Quality Modeling
(El Mirage Road and Jomax Road)

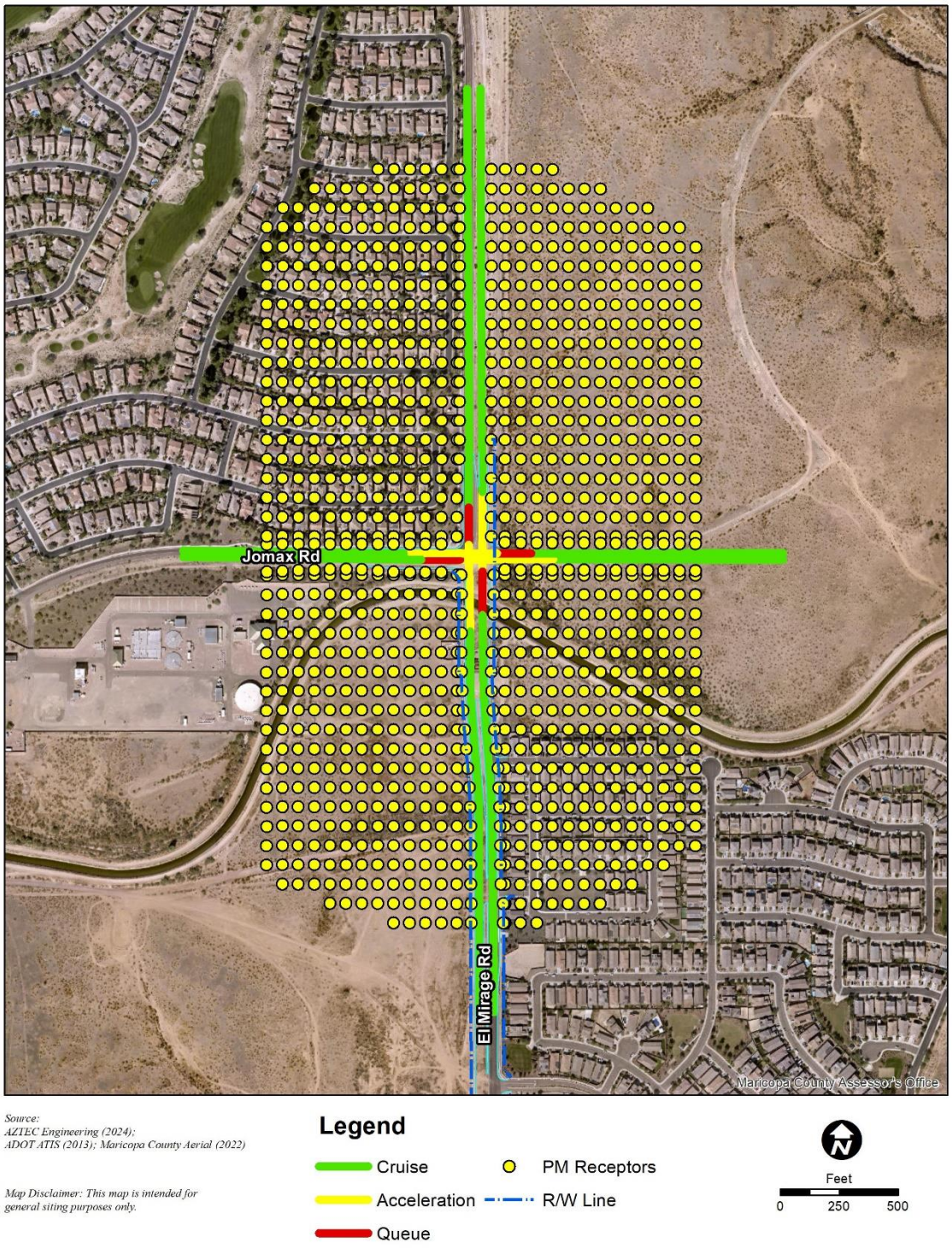


Figure 2. PM Links and Receptors Placement for Air Quality Modeling
(El Mirage Road and Happy Valley Road)

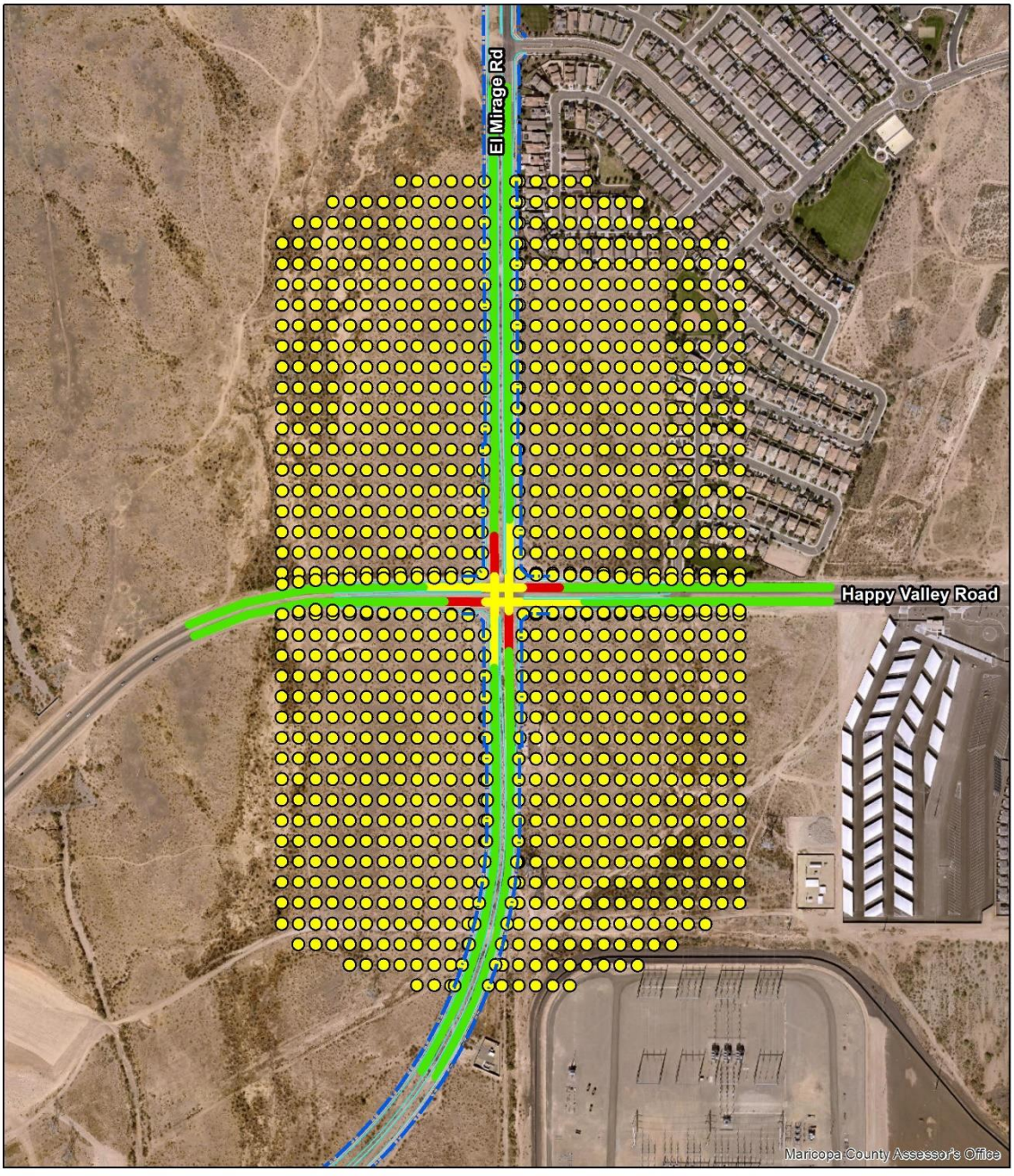
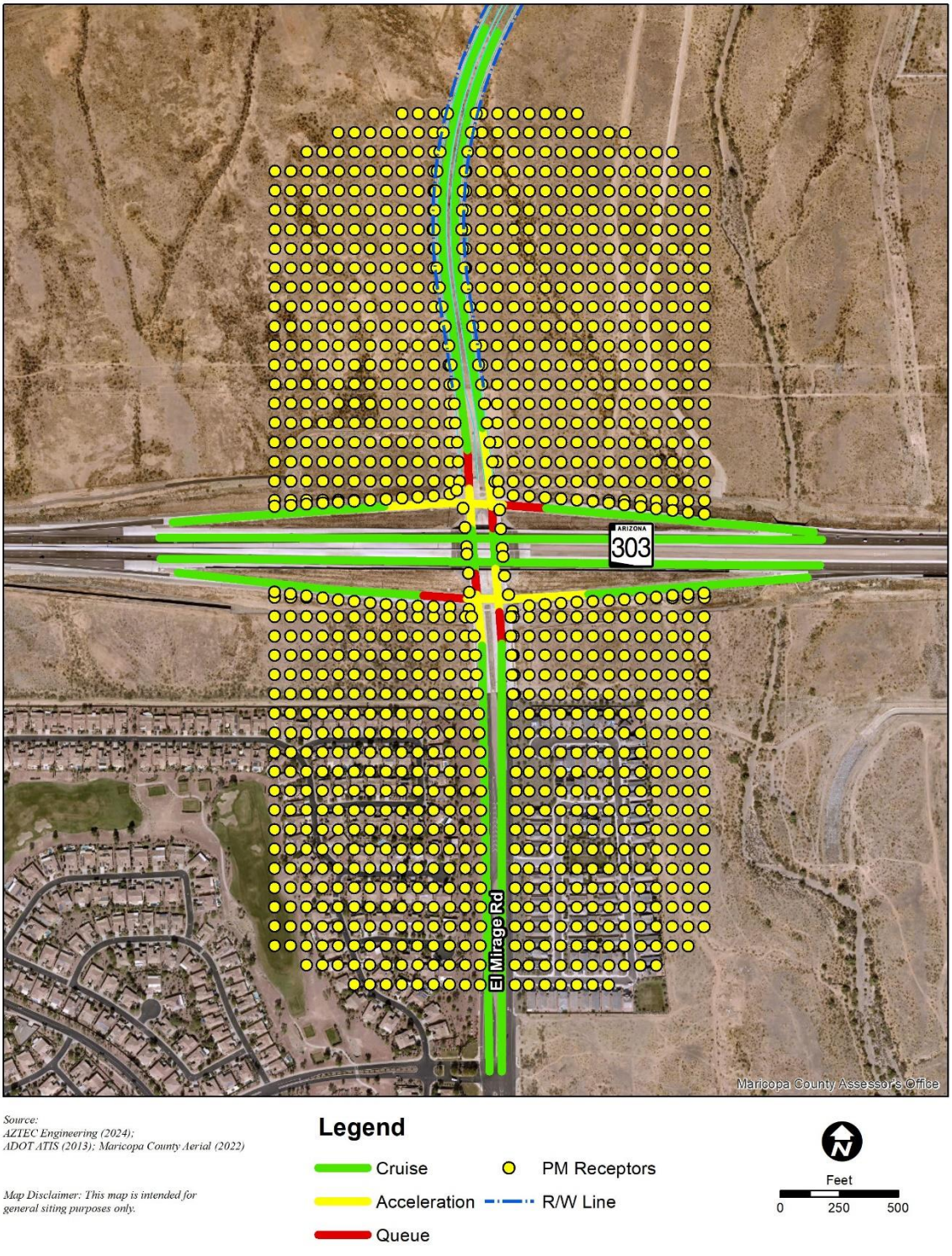
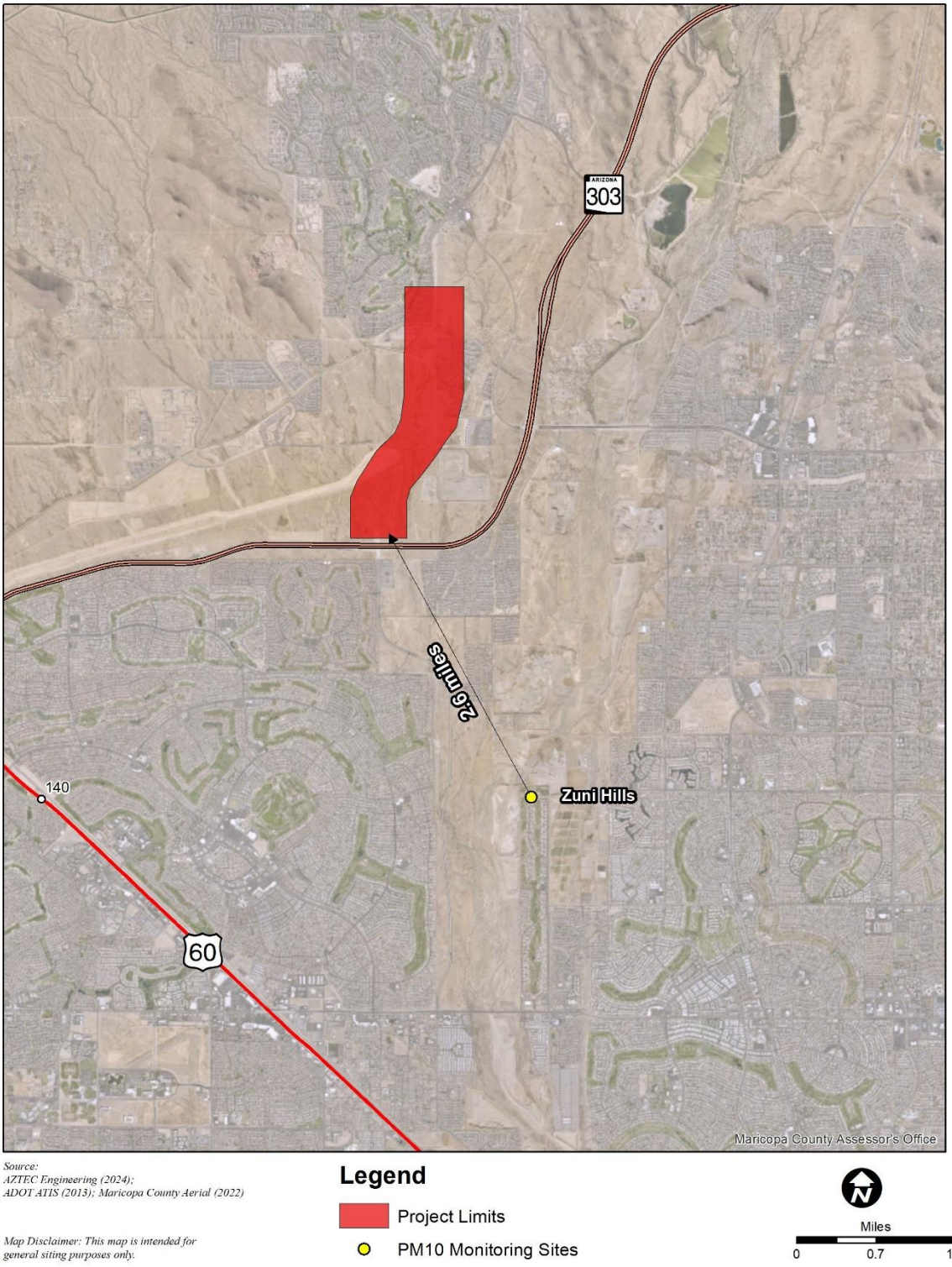


Figure 3. PM Links and Receptors Placement for Air Quality Modeling
(El Mirage Road and SR 303L WB&EB Ramp)



PM receptors were placed on the El Mirage Road sidewalks under the freeway mainline.

Figure 4. PM Monitoring Sites adjacent to the Project Area



Zuni Hills (ZH) (04-013-4016)

Site Location	109th Ave. & Deer Valley Rd., Phoenix
Spatial Scale	Neighborhood
Site Type	Population Exposure

Site Description: This site began operating in December 2009. This SLAMS location monitors for PM_{10}. Meteorological monitoring includes ambient temperature and wind speed/direction.

The station is located on the campus of the Zuni Hills Elementary School.

Number of complete monitoring days at Zuni Hills:

2019	2020	2021	Total
361	365	365	1091

4th Highest 24-hour readings at Zuni Hills **Without** removing atypical events (in red number):

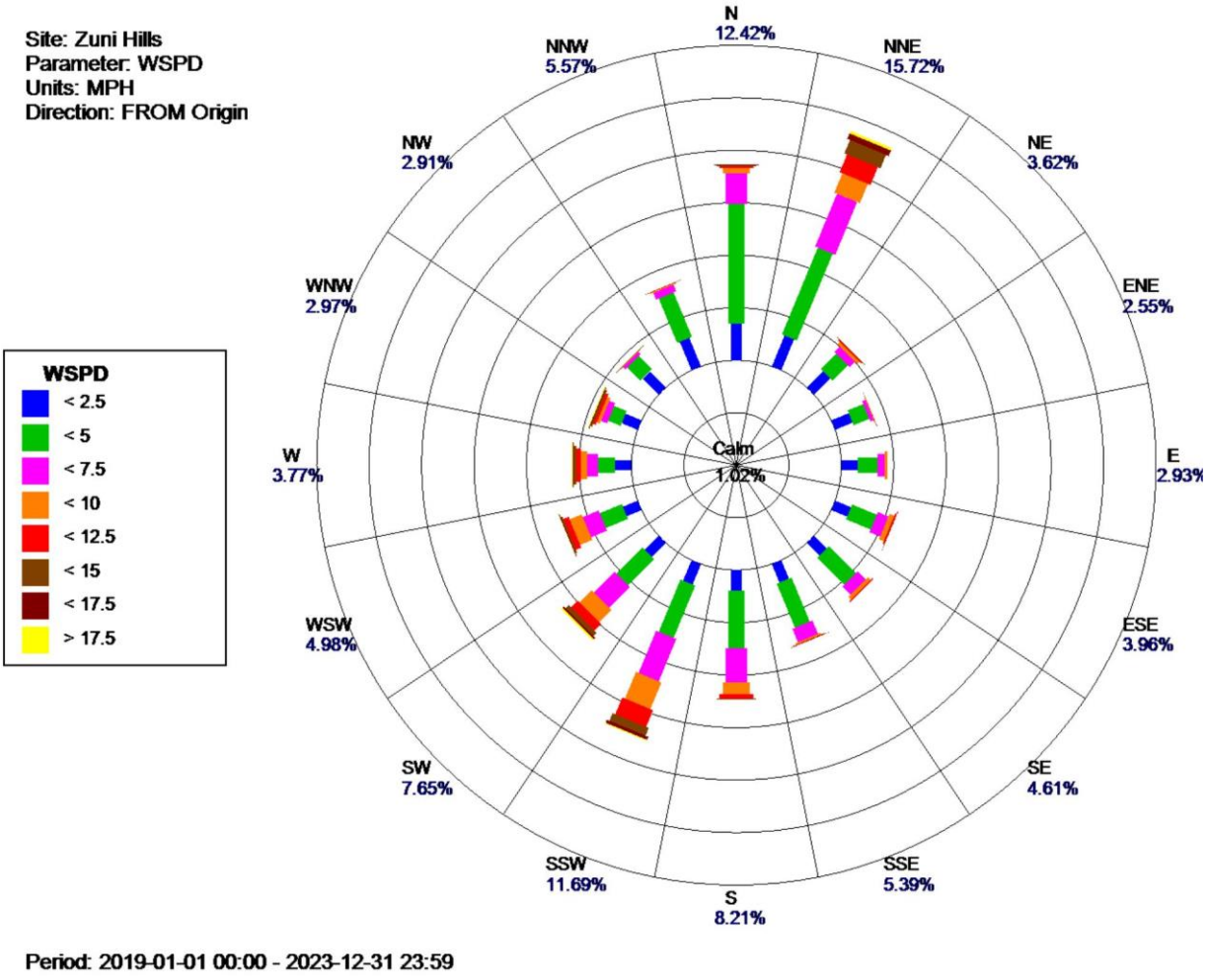
	2021	2022	2023
1	248	167	146
2	**142**	126	129
3	122	116	125
4	110	107	120

Based on the background PM10 concentrations and preliminary modeling results, the potential dates (subject to minor changes based on coordination with EPA) of the atypical events to be removed for Zuni Hills are: 7/10/2021; 10/12/2021; 10/11/2021; 9/2/2022; 10/3/2022; 8/31/2023; 7/21/2023; 7/26/2023. These dates have been flagged as atypical events because of PM10 exceedances at varies PM10 monitors per communication between Beverly Chenausky (ADOT) and Ron Pope (AQD) on April 5, 2024.

4th Highest 24-hour readings at Zuni Hills after removing atypical events (in red number). Pending EPA approval.

	2021	2022	2023
1	110	126	146
2	84	**107**	103
3	72	87	66
4	70	81	65

Source: https://www.epa.gov/outdoor-air-quality-data/download-daily-data



Source: email from Ron Pope (AQD) Friday, April 5, 2024

Agency and public comments:

No public comments received on consultation document

Air Quality

The ADOT Air Quality Group works to enhance air quality through congestion mitigation, air quality programs and National Environmental Policy Act (NEPA) planning activities to implement provisions required in the Clean Air Act to meet National Ambient Air Quality Standards throughout Arizona. (EPA Green Book)

Air Quality Documents Under Review

Documents for review will be posted below to provide reasonable public access to technical and policy information considered by the agency for transportation conformity determinations, and comments can be directed to ADOT Air Quality Staff.

- Project Conformity Consultation - El Mirage Road, SR303L - Jomax Road, comments requested by March 26th, 2025.
- Refer to the "Transportation Conformity" tab for prior documents.
- Refer to the "Project Development- Air Quality" tab for consultant resources and instructions.

Air Quality: Agency Contacts

Interagency Consultation: El Mirage Rd; L303 to Jomax Road

Created by: Beverly Chenausky · Your response: ✔Yes, I'm going

Time

1pm - 2pm (Mountain Standard Time - Phoenix)

Date

Thu Mar 20, 2025

Description

Discussions on the Modeling Assumptions provided February 24th, and response to comments. The associated draft modeling files are included in the Workfront Link below:

https://azdot.my.workfront.adobe.com/document/public/view?publicToken=Fa7B7fWsjzfHorSguNKC7lLnkzz4laPuImQfZZ5qIJSgvgIBQEc0G3VKFNQTH2H-KlzHLws3AImBmiZ0NKauQw==&endcap

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- ✔ Tricia Brown
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- Caitlyn Zaremba

My Notes

El Mirage Rd; L303 to Jomax Road PE0-0(231)T | T0428 03D

3.18.25 EPA Comments on Draft Consultation Documents & Modeling Files

1. El Mirage Road and SR 303L Westbound Ramp was listed as having the highest volumes of ADT, however El Mirage Road and SR 303L Eastbound Ramp has a higher total ADT and a higher truck ADT in the build alternative.
   a. There is a larger difference between build and no-build ADT in the westbound ramp, however we think that the total volumes are more relevant for PM production. Therefore we think the eastbound ramp should be chosen for analysis.
   b. We also suggest that, due to the relatively small size of this project and due to the proximity to housing developments, that all intersections be modeled.

   Response: Will include SR303 eastbound ramp intersection for analysis. All intersections within the project limits will be included for analysis. Vistancia Blvd intersection and Blue Sky Drive intersection are north of the project limit. No CAD files of design or topo are available. Therefore, these two intersections are not included in the analysis.

2. In Table 3- El Mirage Road and Blue Sky Drive AM peak is listed as having a LOS of “E (36.6)”. Is this supposed to read LOS D instead of E or was the wrong delay added in parenthesis?
   Response: Per discussion with the traffic engineer, the Blue Sky Intersection is an Unsignalized intersection which has a different criteria for Delay based LOS. The image below shows the thresholds for both signalized and unsignalized intersections.

LOS	Control Delay for signalized (sec/veh.)	Control Delay for unsignalized (sec/veh.)
A	≤ 10	≤10
B	10-20	10-15
C	20-35	15-25
D	35-55	25-35
E	55-80	35-50
F	≥ 80	≥ 50

3. The last regional conformity analysis was approved on February 28, 2025. We recommend using the most recent MOVES inputs from this most recent conformity determination.
   Response: Will include most recent MOVES inputs approved on February 28, 2025.

4. Please note that the MOVES3 grace period ends on September 12, 2025. You can continue to use MOVES3 until that time but I would recommend switching to MOVE4/MOVES5.
   Response: Will use MOVES3 till grace period ends.

5. We recommend expanding the project to include the blue lines below, as these intersections may have changes in their traffic from the proposed changes in this project.

   Response: Will include the roadways shown in the blue lines in the model.

3.12.25 FHWA Comments on Draft Consultation Documents & Modeling Files

1. Pg 6 – The selection of intersection/modeling domain seems to be following the criteria outlined in the EPA CO guideline. I think the intersections identified seem to make sense (based on a combination or volume and delay contributing to highest likely emissions). However, please use a discussion of these factors leading to your conclusion rather than a “ranking”. Also, the document seems to be suggesting that only peak hour volumes/speeds will be used, but it appears this was just used for the ranking process. The modeling files indicate period-

specific traffic data are used. Please clarify in the section that actual volumes are used for the modeling. Since we're evaluating to a 24-hr standard, the full emissions across the entire day at each of this should be considered rather than a peak hour.

Response: Will provide more detailed discussion of these factors leading to the selection conclusion. That is correct that we are evaluating to a 24-hr standard using projected future traffic volumes and average speed in the four periods of the day. The peak hour data was only used for intersection selection based on peak hour LOS and delay because the traffic report only analyzed the peak hour LOS and delay for worst case scenario consideration.

2. Pg – Please justify why the sections of the project in between the focus interchanges/intersections will have lower concentrations and do not need to be evaluated. By default, the entire project should be evaluated. Additional discussion is needed to support the exclusion of the in-between sections (e.g., add discussion of lower emissions density between interchanges which would certainly lead to lower concentrations).

   Response: Based on experience from PM hotspot modeling of projects done previously and modeling results of this project, it could be inferred that lower PM emissions concentrations would result along the middle section of the freeway/arterial mainline between adjacent two interchanges/intersections. This is mainly because high PM concentrations normally occur adjacent to the intersections due to greater traffic volumes, worse LOS and delay, and proximity to public (like intersection corner or cross street sidewalk).

   Section 3.3.2 of EPA's PM Hot Spot Guidance indicates the geographic area to be covered by a PM hot-spot analysis is to be determined on a case-by-case basis. The guidance states that it may be appropriate to focus the PM hot-spot analysis only on locations of highest air quality concentrations, and that if conformity requirements are met at such locations, then it can be assumed that conformity is met throughout the project area.

   Specifically, for Jomax Rd intersection, the highest PM concentration would occur on the intersection sidewalk area at the northwest corner, which is approximately 20 ug/m3. The PM concentration at the middle section of El Mirage Rd between Jomax Rd and Happy Valley Road would decrease to approximately 10 ug/m3, much less than that on the intersection sidewalk area.

   For Happy Valley Rd intersection, the highest PM concentration would occur on the intersection sidewalk area at the northeast corner, which is approximately 22 ug/m3. The PM concentration along the El Mirage Rd 1500 feet south of Happy

Valley Rd intersection would decrease to approximately 8 ug/m3, much less than that on the intersection sidewalk area.

For SR303 WB Ramp intersection, the highest PM concentration would occur on the El Mirage sidewalk under SR303 mainline, which is approximately 28 ug/m3. The PM concentration along the El Mirage Rd 1500 feet north of SR303 WB Ramp intersection would decrease to approximately 8 ug/m3, much less than that on the intersection sidewalk area.

3. Pg 9 – Just noting that MOVES3 is quite outdated at this point in terms of vehicle standards, in-use vehicle emissions, fuels, and fleet assumptions. Our preference would be to transition to MOVES5 (or at least MOVES4). However, since we're still in the MOVES4 grace period, you're fine still using MOVES3 for conformity until September.
   Response: Thanks for the info. Will use MOVES3 for conformity until September.

4. Pg 10 – No need to provide I/M program (no PM benefit given in MOVES)
   Response: Will remove I/M program if EPA also concurs with it.

5. Pg 10 – Might as well note that the fuels (AVFT) assumes no electric vehicles since MOVES3 and default AVFT is being used. This is a conservative assumption for tailpipe emissions as the region has a significant fraction of EVs currently in operation, and likely even more in the analysis year. (Though added EVs with higher weights may contribute more to road dust).
   Response: Thanks for the info. Currently we use MOVES default fuel per EPA's direction.

6. Pg 10 – Please describe how the linksourcetype distribution was determined. Are different mixes used for highway and non-highway and what is this based on? Are the mixes consistent with the truck/non-truck data in tables 1 and 2? Also, the linksource tables are showing much higher fractions for passenger car vs. passenger truck. As we've noted on other projects, the typical modern distribution is skewed towards passenger trucks.
   Response: Linksourcetype distribution was calculated using latest MAG MOVES files for PM conformity for 2050, see detailed approach and steps in the "Link_Source_Types" folder in the provided modeling files package. Generally, there are different mixes used for highway and non-highway, which is based on MAG MOVES output from PM conformity analysis. The mixes are consistent with the truck/non-truck data in tables 1 and 2.

7. Pg 11 – Note in the document that all although the project includes roads at multiple heights, sources were modeled at 0 elevation and that this is a conservative assumption (adding exact elevations would lower concentrations).
   Response: Thanks for the info. We use flat terrain model to be conservative.

8. Pg 11 – In the modeling files package, can you include the table where initsigZ values were calculated for each roadway (presumably based on link LD/HD traffic splits). Also, show how release height and initsigY are calculated.
   Response: Will include in the next modeling package.

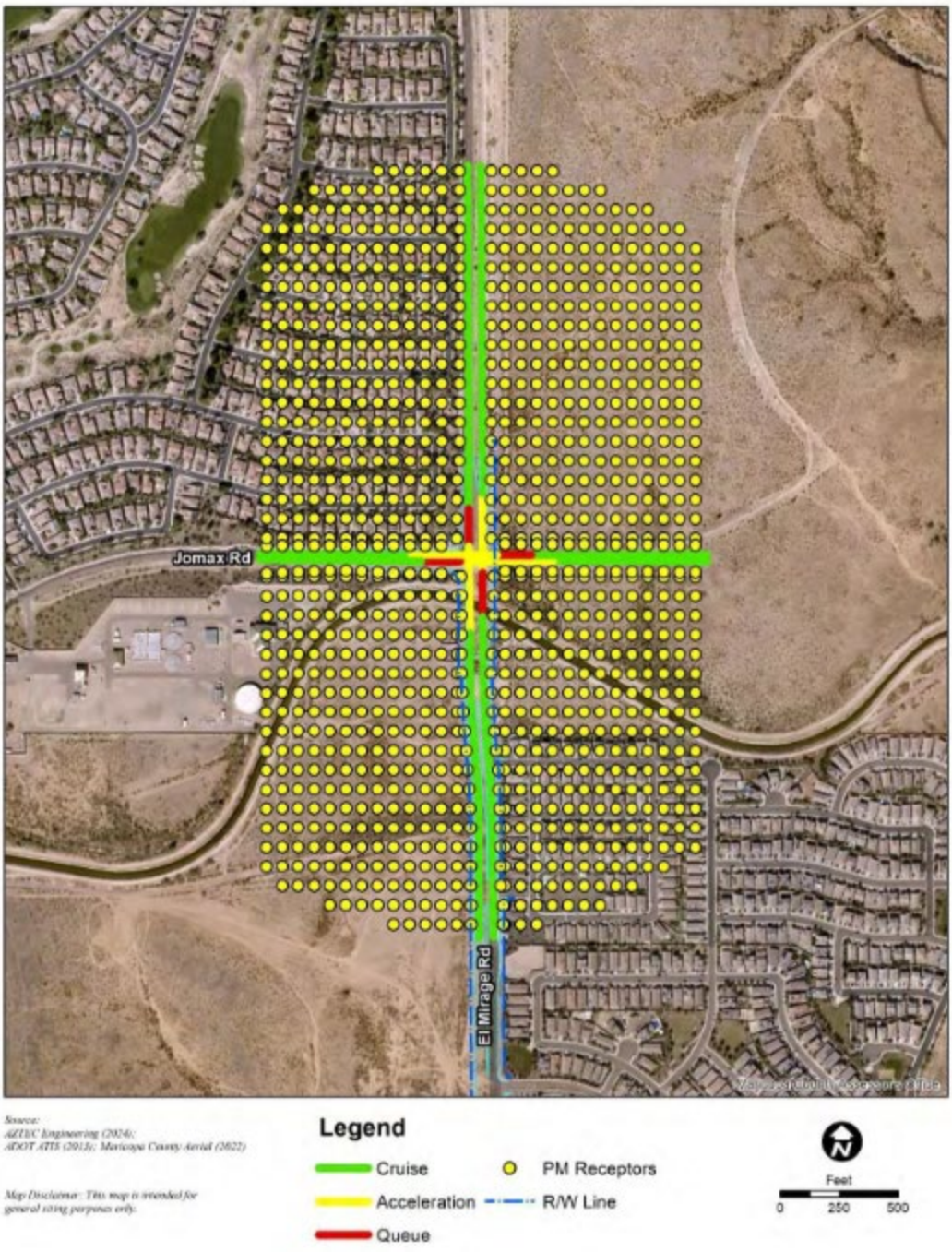
9. Pg 12 – Are there any sidewalks closer than 5 meters where receptors should be placed? (note EPA's 2024 FAQ on receptor placement which now recommends receptors at locations closer than 5 meters if there's a sidewalk.) From the AERMOD files, it looks like these locations were considered. Just confirming.
   Response: There are some sidewalks that may be closer than 5 meters. Per previous Interagency Consultation with EPA, we place receptors on sidewalks for worst case scenario consideration.

10. Pg 17 – For the Jomax/El Mirage area, why are receptors and sources not considered for the southern part of the interchange?

    Response: As discussed earlier, it can be inferred that lower PM emissions concentrations would result along the middle section of the freeway/arterial mainline between adjacent two interchanges/intersections. This is mainly because high PM concentrations normally occur adjacent to the intersections due to greater traffic volumes, worse LOS and delay, and close proximity to public (like intersection corner or cross street sidewalk).

    For Jomax Rd intersection, the highest PM concentration would occur on the intersection sidewalk area at the northwest corner, which is approximately 20 ug/m3. The PM concentration at southern part of the intersection would decrease to approximately 10 ug/m3, much less than that on the intersection sidewalk area.

Figure 1. PM Links and Receptors Placement for Air Quality Modeling
(El Mirage Road and Jomax Road)



11. Pg 19 – I think the background monitor is appropriate for this project. However, can you also consider showing the other nearby monitors and add discussion about why they are not appropriate (e.g., further distance, non-similar land use)?

Response: will show another nearby Dysart monitor and add discussion about why it is not appropriate.

12. Pg 20 – Noting that the existing atypical report can be applied for this project. However, after May, 2025, the 2024 monitoring data will be certified and available. Future hot-spot analyses should rely on this new data – and if necessary, will need ADEQ's support in removing 2024 atypical events.
    Response: This has been discussed on 2/13/2025 monthly ADOT transportation conformity meeting. Because current Maricopa County 2024 monitoring data is not available yet, EPA and FHWA resource center were okay to remove the same atypical days identified from the SR303 project for this project.

General comments

13. How were the average speeds calculated for the various queue and acceleration links around the intersections? It's outlined in the traffic data how the link lengths are determined, but it would be helpful to see how the volumes/delay lead to the average speed used in the MOVES runs.
    Response: the approach to calculate the average speed for the queue and acceleration links will be provided in the next modeling package.

14. It's hard to tell from the AERMOD files plotted on top of existing aerial photos whether the receptor locations are in appropriate and reasonable locations. Can you add a figure showing the future design (with sidewalks and publicly accessible areas) and show where receptors will be located? It also appears there are some sidewalks not being covered with receptors (though it could be a map projection issue). We should go through the receptor placement on the next IAC call.
    Response: Receptors and design files will be exported to Google Earth KMZ files for review, so they can be zoomed for detailed review.

15. Confirmed calculations of AERMOD rates are accurate; appreciate the clear cross-walk.
    Response: Thanks for the confirmation.

16. Please check the volume source release heights - it looks like there are 0.0 release heights set for all volume sources. Also, the initsigZ values look low (0.47). Please confirm. (Sometimes AERMODview doesn't do this quite right).
    Response: Thanks for the check. Will double check and revise the source heights and submit the new AERMOD modeling files in the next package.

17. Generally, try to extend roadway sources roughly 100 meters beyond you receptor grid to ensure receptors concentrations reflect full impact.

    Response: will try to extend roadway source roughly 100 meters beyond the end receptors.