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

Project Setting and Description

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, carried out by ADOT pursuant to 23 U.S.C. 326 and a Memorandum of Understanding dated January 3, 2018, and executed by FHWA and ADOT. ADOT, proposes to reconstruct the two existing traffic interchanges (TI), crossroads, ramps, and frontage roads at I-17 and Pinnacle Peak Road and I-17 and Happy Valley Road from MP 216.7 to MP 218.4 (Figure 1). Proposed improvements at Pinnacle Peak Road include a new diamond interchange configuration similar to the existing facility and the construction of a new underpass bridge that would span the ultimate I-17 lane configuration of five general purpose lanes and one high occupancy vehicle lane in each direction of travel. At Happy Valley Road, the proposed improvements include a new diverging diamond interchange configuration and the construction of a new underpass bridge that would span the ultimate I-17 lane configuration of five general purpose lanes and one high occupancy vehicle lane in each direction of travel. In addition to the two new TIs, the proposed improvements will also include the addition of one general purpose lane northbound and southbound from the Pinnacle Peak Road TI to the Happy Valley Road TI and a new overlay of AR-ACFC on I-17 from MP 216.7 to MP 218.4.

In recent years, the residential and commercial development to the east and west of I-17 in this area has resulted in more traffic demand on the I-17 corridor and increased congestion and travel delays at both the Pinnacle Peak Road TI and the Happy Valley Road TI. Future development in Maricopa County will place additional demand on the system.

To meet the needs of the area's continued population growth and increased traffic demand, the reconstruction of the existing TIs is proposed to improve regional travel east and west of Pinnacle Peak Road and Happy Valley Road. The Pinnacle Peak Road TI and Happy Valley Road TI improvements are intended to accommodate future traffic demand on the mainline of the I-17 facility by lengthen in the bridges at the TIs to accommodate future I-17 widening.

The proposed project is located in the Maricopa County (Phoenix) Non-Attainment Area for particulates 10-microns in diameter or less (PM_{10}). The Maricopa Association of Governments (MAG) issued the 2012 Five Percent Plan for the Maricopa County Nonattainment Area, and the Arizona Department of Environmental Quality (ADEQ) submitted it to the US Environmental Protection Agency (EPA) on May 25, 2012. The US EPA approved this State Implementation Plan (SIP) Revision on May 30, 2014.

The following agencies would be included on interagency consultation and provide input to the POAQC Questionnaire: EPA, ADEQ, MAG and Maricopa Air Quality Department.

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 non-attainment 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 CO, PM violations, increase the frequency of severity of any existing CO, PM violations, or delay the timely attainment of any NAAQS or any required emission reductions or milestones in CO, PM10 and PM2.5 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.

Project Area Map

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).

NO – This is not a new highway or expressway.

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 – There is not a significant increase in the percentage of diesel trucks in the design year 2040 Build scenario. The projected Maximum Design Year (2040) ADT for the Build Alternative is 246,910 vehicles per day (vpd) between Pinnacle Peak Road and Happy Valley Road. The projected maximum vpd for the 2040 No Build scenario for this segment is 231,754 with 17,071 representing truck volumes. Total traffic will increase by 15,156 vpd in the 2040 Build scenario with a very small increase of trucks volumes of only 512. In the current situation there are three lanes of traffic on I-17 and a fair amount on congestion within this section of 1-17. With the addition of the new lane, local commuter traffic will increase slightly, this change alters the expected fleet mix of the traffic flow. Table 1 shows the total percent of trucks for Medium Duty, and Heavy Duty Trucks as a conservative estimate, it is assumed that ALL medium and heavy duty vehicle volumes provided by the MAG model are diesel trucks. The improvements in the facility do not include changing accesses points to major commercial, industrial or other land use activities that typically impact commercial freight traffic. Thus, no substantive increase in the overall truck or diesel truck volumes would occur in the Build condition compared to the No Build condition (Table 1).

Table 1. Traffic Data for I-17 Between Pinnacle Peak and Happy Valley (area widening)

Parameter	2015 Existing Condition	2040 No Build	2040 Build	Difference Build and No Build
ADT Volumes	104,774	231,754	246,910	15,156
% Diesel trucks (M,H)	7.3%	7.4%	7.1%	*-.3%*
Diesel truck volume	7,666	17,071	17,583	512

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 increase traffic volumes for significant number of diesel trucks related to the project?

NO – This project will not affect an existing congested intersection that has a significant number of diesel trucks. Level of Service (LOS) calculations were completed for 2015 and the 2040 Build scenarios at the west and east intersections on Pinnacle Peak Road and Happy Valley Road.

In 2015, the exiting intersection of Pinnacle Peak Road operates at LOS C in the AM Peak hours and LOS E in the PM peak hours (Table 2), and the west intersection operates at LOS C or better for both the AM and PM peak hours (Table 2). In the 2040 Build Scenario, both the east and west intersections at Pinnacle Peak Road operates at LOS B in both the AM and PM peak hours (Table 2). In 2015, the existing east intersection of Happy Valley Road operates at LOS C in the AM Peak hours and LOS E in the PM peak hours (Table 2), and the west intersection operates at LOS C in the AM Peak hours and LOS E in the PM peak hours (Table 2). In the 2040 Build Scenario, both the east and west intersections at Happy Valley Road operate at LOS B or better in both the AM and PM peak hours (Table 2).

Table 2: I-17 and Pinnacle Peak TI & I-17 and Happy Valley TI Traffic Analysis Results		
Summary of Pinnacle Peak (PP) TI 2015 and 2040 AM/PM Peak LOS		
2015	**AM Peak LOS**	**PM Peak LOS**
PP West Intersection	C	C
PP East Intersection	C	E
2040	**AM Peak LOS**	**PM Peak LOS**
PP West Intersection	B	B
PP East Intersection	B	B
Summary of Happy Valley (HV) TI 2015 and 2040 AM/PM Peak LOS		
2015	**AM Peak LOS**	**PM Peak LOS**
HV West Intersection	B	F
HV East Intersection	F	F
2040	**AM Peak LOS**	**PM Peak LOS**
HV West Intersection	B	B
HV East Intersection	B	B

In addition, the 2040 Build scenario does not significantly increase the diesel truck traffic at either TI and the existing conditions do not have significant number of trucks HV at 386vpd. At Pinnacle Peak Road TI, the 2040 Build scenario diesel truck traffic is 1,157 of the total traffic compared to 927 of total traffic in the 2040 No Build scenario, an increase of 230 trucks. At Happy Valley Road TI, the 2040 Build scenario diesel truck traffic is 969 of the total traffic compared to 563of total traffic in the 2040 No Build scenario, an increase of 406 trucks. With the project all intersections will improve the LOS to a LOS B compared to the current conditions greater than LOS D.

Table 3. Traffic Data for Pinnacle Peak Rd between east and west terminals				
Parameter	**2015 Existing Condition**	**2040 No Build**	**2040 Build**	**Difference Build and No Build**
ADT Volumes	22,761	25,733	28,281	2,548
Diesel Truck Volume	1,821	927	1,157	230
% Trucks (M,H)	8.0%	3.6%	4.1%	.5%

Table 4. Traffic Data for Happy Valley Rd between east and west terminals				
Parameter	**2015 Existing Condition**	**2040 No Build**	**2040 Build**	**Difference Build and No Build**
ADT Volumes	12,849	27,646	42,356	14,710
Diesel Truck Volume	386	563	969	406
% Trucks (M,H)	3.0%	2.0%	2.3%	.3%

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 – These facilities are not included in the project.

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 – These facilities are not included in the project.

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 closest violation of the 24-hour PM_{10} standard occurred at the Glendale monitoring station. This site of potential violation is located approximately 9.7 miles southeast of the project area; it experienced two violations in 2013.

POAQC Determination

This project is not a Project of Air Quality Concern. The expanded highway capacity that results from the proposed changes does not increase the total truck traffic from the 2040 Build scenario compared to the 2040 No Build scenario and does not create a LOS D or greater with significant truck traffic. No substantive increase in the overall diesel truck volumes would occur in the 2040 Build condition compared to the 2040 No Build condition.

The project has been modeled to determine if there are congested intersections within the project area. The project, when modeled for LOS in the 2040 Build scenario does not show any decrease in LOS at either Pinnacle Peak Road TI or Happy Valley Road TI intersections and all the intersections have a LOS B and do not significantly increase the number of trucks in the project area. The intersections do not create an air quality concern for the project, the project improves circulation and LOS which is an improvement in air quality and congestion.

Therefore, ADOT is presenting this project for interagency consultation per 40 CFR 93.105, as a Project that is NOT of Air Quality Concern and thereby will not require a PM10 hot-spot analysis. While this project does not require a hot-spot analysis, other conformity provisions apply and will be addressed in the project clearance.

Interagency Consultation Results

On February 7th, 2018 ADOT provided a copy of this questionnaire, to the following consultation parties, the Environmental Protection Agency (EPA), MAG, ADEQ, and Maricopa County Air Quality Department as the local air agency in Maricopa County. There were no objections to the project determination and on February 22nd, 2018 ADOT concluded Interagency Consultation by notifying interested parties that this project will proceed as a project that does not require a quantitative PM10 hot-spot analysis under 40CFR 93.123(b).