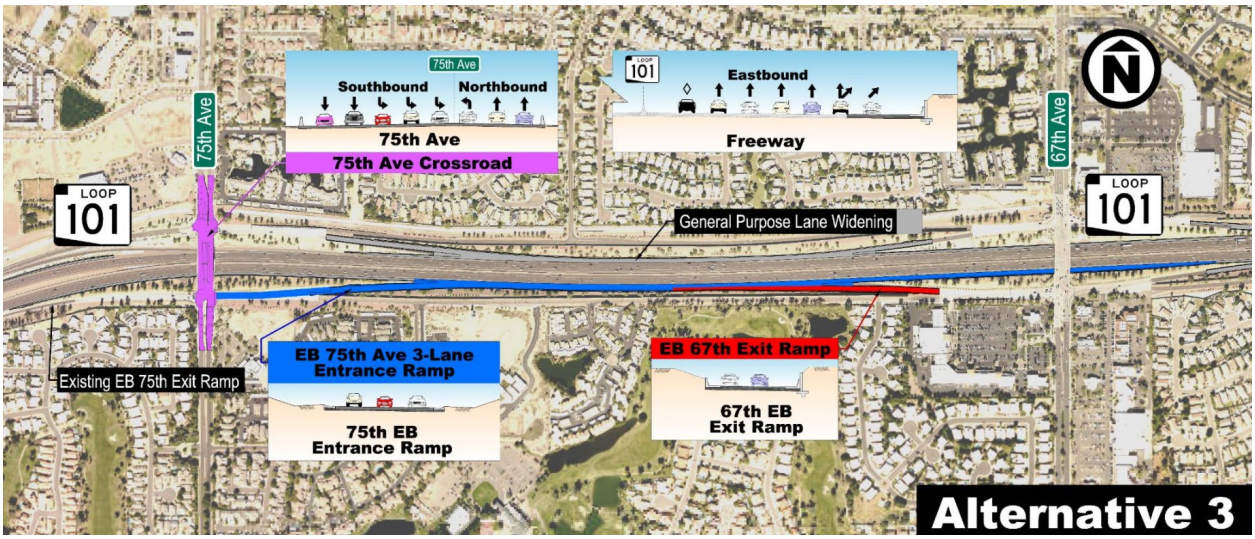
Project Level CO Hot-Spot Analysis Questionnaire

Project Setting and Description

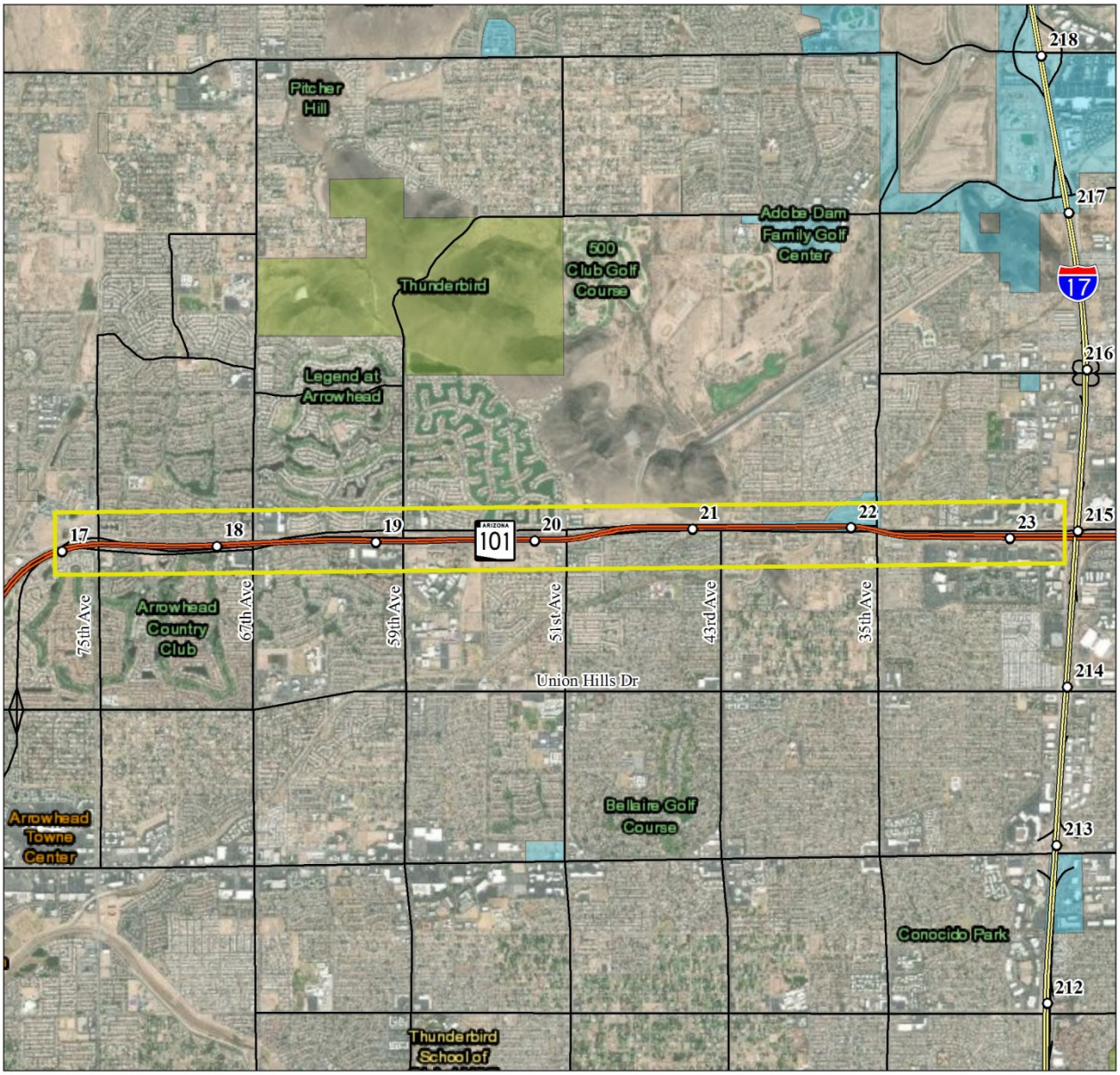
The Arizona Department of Transportation (ADOT), in association with the Maricopa Association of Governments (MAG) and in coordination with the cities of Phoenix and Glendale, has initiated a design concept study and related environmental studies to evaluate the addition of a new general purpose (GP) lane in both directions along SR 101L between 75th Avenue and Interstate 17 (I-17) in Glendale and Phoenix, Arizona. SR 101L is a regional "loop" freeway, extending from Interstate 10 (I-10) in the southwest Phoenix metropolitan area, north to the Beardsley Road alignment, east to approximately the Pima Road alignment in Scottsdale, then south to State Route 202 (SR 202L) (Santan Freeway) in Chandler. In the project area, SR 101L runs east-west with three or four GP lanes in each direction and an HOV lane. Figure 1 on next page shows the project vicinity map.

The selected Alternative 3 interchange design will improve the flow of southbound 75th Ave to eastbound Loop 101, reduce congestion and improve safety. Features include: Adding a third left turn lane from southbound 75th Ave to eastbound Loop 101. Adding a third lane to the eastbound Loop 101 on-ramp at 75th Avenue. Adding a second lane to the existing eastbound 67th Ave off-ramp. Adding a lane to eastbound Loop 101 between the eastbound 75th Avenue on-ramp and the eastbound 67th Avenue on-ramp to provide additional distance for traffic merging onto Loop 101. Modifying the existing 75th Avenue median islands, traffic signals, signing and pavement markings. Adding signalized ramp meters for traffic entering eastbound Loop 101. Adding freeway and ramp signing and pavement markings. No new right of way is required.



The project is within the Phoenix PM10 nonattainment area. The proposed project is included in the *Maricopa Association of Governments (MAG) 2040 Regional Transportation Plan (RTP) Update*. In addition, the project is included in the *FY 2020-2024 MAG Transportation Improvement Program*. The Conformity Analysis for the FY 2020-2024 MAG Transportation Improvement Program and the 2040 Regional Transportation Plan Update as amended, were most recently found to conform to the State Implementation Plan (SIP) by FHWA and FTA most recently on March 22, 2021.

Figure 1. Project Vincinity Map



Project Assessment – Part A

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

i) Projects in or affecting locations, areas, or categories of sites which are identified in the applicable implementation plan as sites of violation or possible violation;
ii) Projects affecting intersections that are at Level-of-Service D, E, or F, or those that will change to Level-of-Service D, E, or F because of increased traffic volumes related to the project;
iii) Any project affecting one or more of the top three intersections in the nonattainment or maintenance area with highest traffic volumes, as identified in the applicable implementation plan; and
iv) Any project affecting one or more of the top three intersections in the nonattainment or maintenance area with the worst level of service, as identified in the applicable implementation plan.

If the project matches one of the listed project types in 40 CFR 93.123(a)(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).

Project type ii) is relevant to this project because this project affects a congested intersection (LOS D or greater) that will change LOS to D or greater because of increased traffic volumes.

Projects Affecting CO Sites of Violation or Possible Violation

Does the project affect locations, areas or categories of sites that are identified in the CO applicable plan or implementation plan submissions, as appropriate, as sites of violation or potential violation?

NO – This project does not affect locations, areas or categories of sites that are identified in the MAG 2013 Carbon Monoxide Maintenance Plan for Maricopa County as sites of violation or potential violation.

Projects with Congested Intersections

Is this a project that affects a congested intersection (LOS D or greater) will change LOS to D or greater because of increased traffic volumes related to the project?

YES – Among the 14 intersections, there are 12 intersections in AM peak hour and 12 intersections in PM peak hour would result in LOS D or worse in the 2040 no build scenario. In the 2040 build scenario, there are 11 intersections in AM peak hour and 12 intersections in PM peak hour that would result in LOS D or worse. LOS at five intersections would become worse from 2040 no build scenario to 2040 build scenario. AADT volume increase at intersections range from -750 vehicles to 3,432 vehicles.

Table 1 – I-10 Mainline AADT and Truck AADT in Existing, No Build and Build Conditions

AADT and Truck Volumes		2020 Existing		2040 No-Build		2040 Build		Difference (Build - No- Build)	
		AADT	Truck (%)	AADT	Truck (%)	AADT	Truck (%)	AADT	Truck (%)
Mainline	75th Ave	108,674	7.2%	143,733	11.25%	146,056	11.27%	2,323	0.02%
	67th Ave	120,878	8.1%	161,430	11.04%	169,118	10.80%	7,688	-0.24%
	59th Ave	124,944	6.3%	176,516	10.63%	184,325	10.31%	7,809	-0.32%
	51st Ave	148,724	6.6%	185,293	10.41%	192,586	10.12%	7,293	-0.29%
	35th Ave	147,384	5.9%	190,396	10.34%	195,810	10.04%	5,414	-0.30%
	27th Ave	75,818	10.3%	109,232	11.92%	111,447	11.53%	2,215	-0.39%
Intersection	75th Ave & EB SR 101	39,184	N/A	38,571	5.21%	37,821	4.79%	-750	-0.42%
	75th Ave & WB SR 101	44,758	N/A	52,312	5.30%	55,744	5.31%	3,432	0.01%
	67th Ave & EB SR 101	53,303	N/A	50,617	3.89%	52,872	3.94%	2,255	0.05%
	67th Ave & WB SR 101	51,021	N/A	60,533	3.92%	61,295	3.83%	762	-0.09%
	59th Ave & EB SR 101	47,909	N/A	48,481	3.57%	49,290	3.68%	809	0.11%
	59th Ave & WB SR 101	45,417	N/A	46,350	3.82%	46,995	3.96%	645	0.14%
	51st Ave & EB SR 101	30,741	N/A	38,743	4.13%	39,872	3.98%	1,129	-0.15%
	51st Ave & WB SR 101	22,483	N/A	28,463	4.35%	29,024	4.20%	561	-0.15%
	35th Ave & EB SR 101	34,448	N/A	38,105	3.73%	38,589	3.75%	484	0.02%
	35th Ave & WB SR 101	32,956	N/A	38,217	3.72%	39,322	3.64%	1,105	-0.08%
	31st Ave & EB SR 101	20,095	N/A	12,731	3.85%	12,126	3.73%	-605	-0.12%
	31st Ave & WB SR 101	18,684	N/A	13,478	4.01%	12,746	3.29%	-732	-0.72%
	27th Ave & EB SR 101	35,609	N/A	38,453	5.71%	39,274	5.50%	821	-0.21%
	27th Ave & WB SR 101	35,366	N/A	34,299	5.89%	33,643	5.39%	-657	-0.50%

Note: Truck% include heavy truck and medium truck. AADT at intersections include volumes on approach lanes.
Source: MAG traffic demand model received from Stanley Consultants on August 26, 2020

Table 2 – Intersections LOS in the project area

Level of Service (LOS)		2020 Existing		2040 No-Build		2040 Build[1]	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
		LOS (delay)	LOS (delay)	LOS (delay)	LOS (delay)	LOS (delay)	LOS (delay)
Intersection LOS (overall, not for each link)	75th Ave & EB SR 101	D (47.0)	D (41.9)	E (66.5)	E (79.4)	D (45.7)	E (77.4)
	75th Ave & WB SR 101	C (28.6)	C (28.9)	D (52.9)	D (48.4)	C (33.7)	E (58.2)
	67th Ave & EB SR 101	F (192.6)	F (82.2)	E (68.6)	F (137.4)	F (414.7)	F (149.7)
	67th Ave & WB SR 101	D (37.5)	D (40.9)	D (35.7)	F (203.5)	D (42.9)	F (235.1)
	59th Ave & EB SR 101	D (51.3)	E (67.5)	D (45.7)	F (199.5)	F (120.8)	F (187.9)
	59th Ave & WB SR 101	D (45.4)	D (49.5)	D (46.1)	F (144.9)	D (41.0)	F (157.3)
	51st Ave & EB SR 101	D (51.8)	F (80.5)	E (60.4)	F (197.0)	F (88.8)	F (223.8)
	51st Ave & WB SR 101	B (18.4)	B (16.9)	B (17.5)	B (12.7)	C (24.1)	C (27.9)
	35th Ave & EB SR 101	D (43.0)	D (44.0)	D (40.9)	F (100.1)	D (36.3)	F (190.7)
	35th Ave & WB SR 101	D (37.7)	D (41.3)	D (41.9)	F (80.9)	D (41.0)	F (89.8)
	31st Ave & EB SR 101	E (57.7)	D (51.9)	D (39.9)	D (44.1)	D (36.5)	D (35.9)
	31st Ave & WB SR 101	D (54.8)	D (48.3)	C (31.4)	C (32.4)	C (33.7)	C (31.7)
	27th Ave & EB SR 101	C (31.7)	D (40.5)	E (65.3)	F (112.8)	F (530.9)	F (679.4)
	27th Ave & WB SR 101	D (42.6)	D (53.1)	E (73.9)	F (179.8)	D (42.8)	F (192.6)

Notes:
1. This set of results do not account for any intersection improvements.

Source: LOS data provided by Stanley Consultants. MAG traffic demand model received from Stanley Consultants on August 26, 2020

Projects Affecting Intersections with Highest Traffic Volumes

Does the project affect one or more of the top three intersections in the CO maintenance area with highest traffic volumes identified in the CO applicable implementation plan?

*Three Highest Intersections in Current Plans

MAG[1]
16th St & Camelback Rd
107th Ave & Grand Ave
Priest Dr & Southern Ave

[1]MAG 2013 Carbon Monoxide Maintenance Plan for the Maricopa County Area

NO. This project does not affect one or more of the top three intersection in the carbon monoxide maintenance area with the highest traffic volumes identified in the MAG 2013 Carbon Monoxide Maintenance Plan for Maricopa County.

Projects Affecting Intersections with the Worst Level of Services

Does the project affect one or more of the top three intersections in the CO maintenance area with the worst level of services identified in the CO applicable implementation plan?

NO – This project does not affect one or more of the top three intersections with the worst LOS in the MAG 2013 Carbon Monoxide Maintenance Plan for Maricopa County.

*Three Worst LOS Intersections in Current Plans

MAG[1]
7th Ave & Van Buren St
German Rd & Gilbert Rd
Thomas Rd & 27th Ave

[1]Same as above

Project Assessment – Part B

Hot-Spot Determination

Decide which type of hot-spot analysis is required for the project by choosing a category below.

☒ **If answered "Yes" to any of the questions in the Project Assessment – Part A**

- A quantitative CO hot-spot analysis is required under 40 CFR 93.123(a)(1).

☒ Check **If** a formal air quality report for conformity is required for this project.

- The applicable air quality models, data bases, and other requirements specified in 40 CFR part 51, Appendix W (Guideline on Air Quality Models) should be completed using **"Project Level CO Quantitative Hot-Spot Analysis – Consultation Document"** circulated through interagency consultation for review and comments for 30 days prior to commencing any modeling activities.

- **Or**

☐ Check **If** the project fits the condition of the "**CO Categorical Hot-Spot Finding"**. In the January 24, 2008, Transportation Conformity Rule Amendments, EPA included a provision at 40 CFR 93.123(a)(3) to allow the U.S. DOT, in consultation with EPA, to make categorical hot-spot findings in CO nonattainment and maintenance areas if appropriate modeling showed that a type of highway or transit project would not cause or contribute to a new or worsened air quality violation of the CO NAAQS or delay timely attainment of the NAAQS or required interim milestone(s), as required under 40 CFR 93.116(a). (Note: Any new CO hot-spot analyses for conformity purposes begun on or after January 9, 2023 may no longer rely on the July 2017 CO categorical hotspot finding.)

Projects Fitting the Condition of the CO Categorical Hot-Spot Finding
Do the project's parameters fall within the acceptable range of modeled parameters (Use "Table 1: Project Parameters and Acceptable Ranges for CO Categorical Hot-Spot Finding" or enter the project information into FHWA's web based tool: https://www.fhwa.dot.gov/environment/air_quality/conformity/policy_and_guidance/cmcf_2017/tool.cfm)?

NO – This project's parameters do not fall within the acceptable range of modeling parameters for a CO Categorical Hot-spot Finding in Appendix Table 1 on next page.

Table 1: Project Parameters and Acceptable Ranges for CO Categorical Hot-Spot Finding for Urban Intersection

Parameter	**Acceptable Range**
Analysis year	Greater than or equal to 2017
Angle of cross streets for intersection (degrees)	90
Maximum grade for the intersection (%)	Less than or equal to 2
Maximum grade on cross street for the intersection (%)	0
Number of through lanes	Less than or equal to 4
Number of left turn lanes	Less than or equal to 2
Lane width (ft)	12
Median width (ft)	0
Peak hour average approach speed (mph)	Greater than or equal to 25
Peak hour approach volume (vph)	Less than or equal to 2640
Peak hour Level of Service	A through E
Ambient temperature (ºF)	Greater than or equal to -10
Heavy-duty trucks (%)	Greater than or equal to 5
1-hour background CO concentrations (ppm)	Less than or equal to 32.6
8-hour background CO concentrations (ppm)	Less than or equal to 7.3
Persistence factor	Less than or equal to 0.7

☐ **If answered "No" to all of the questions in the Project Assessment – Part A**

- A qualitative CO analysis is required under 40 CFR 93.123(a)(2). The demonstrations required by 40 CFR 93.116 Localized CO, PM10, and PM2.5 violations (hot-spots) may be based on either:
- **(i) Quantitative methods that represent reasonable and common professional practice;**

  ☐ Check **If** an Air Quality Report includes CO modeling for NEPA EA/EIS use this report to satisfy option (i)

- **Or**

- **(ii) A qualitative consideration of local factors, if this can provide a clear demonstration that the requirements of 40 CFR 93.116 are met.**

  ☐ Check **If** there is an Air Quality Report that does not include CO modeling for NEPA EA/EIS use this report to satisfy (ii)

  ☐ Check **If** the project is a CE under NEPA that does not require Air Quality Report for NEPA EA/EIS use this Questionnaire to add additional justification to satisfy (ii)

This project requires a quantitative hot-spot analysis for carbon monoxide. The intersections to be modeled were determined using EPA's Guideline for Modeling Carbon Monoxide from Roadway Intersections (EPA, 1992). The intersections with the highest volumes and longest delays were identified for the 2040 build alternative. The top three intersections ranked by volume are as follows:

- 67th Ave & WB SR 101
- 75th Ave & WB SR 101
- 67th Ave & EB SR 101

The top three intersections ranked by LOS and delay are as follows:

- 67th Ave & EB SR 101
- 67th Ave & WB SR 101
- 27th Ave & EB SR 101

Two of the intersections are found on both groups, thus the intersection modeling analysis will be performed for the following four intersections:

- 67th Ave & WB SR 101
- 67th Ave & EB SR 101
- 75th Ave & WB SR 101
- 27th Ave & EB SR 101

Modeling will be performed for the AM and PM peak hour of existing, no build 2040, and build 2040. It is assumed that if the selected worst-case intersections do not show an exceedance of the NAAQS, none of the intersections will.

Interagency Consultation Results

On June 28th, 2021 ADOT provided a copy of this questionnaire, to the following consultation parties, EPA, MAG, Arizona Department of Environmental Quality (ADEQ), and Maricopa County Air Quality Department as the local air agencies in Maricopa County. There were no objections to the planning assumptions described for the quantitative analysis methods in accordance to 40 CFR 93.116(a) and the consultation requirements of 40 CFR 93.105(c)(1)(i). On August 3rd, 2021 ADOT concluded Interagency Consultation by notifying interested parties that this project will commence CO hot-spot conformity modeling required for transportation conformity in accordance to the latest planning assumptions and emissions model in place.

Interagency Consultation Email

Gmail

ADOTAirNoise - ADOT <adotairnoise@azdot.gov>

Re: Interagency Consultation F0316: SR 101, 75th 75th Ave to I-17
1 message

Beverly Chenausky <bchenausky@azdot.gov> Tue, Aug 3, 2021 at 11:46 AM
To: Lindy Bauer <lbauer@azmag.gov>, Transportationconformity <transportationconformity@azdeq.gov>, "Wamsley.Jerry" <wamsley.jerry@epa.gov>, "Johanna Kuspert (AQD)" <Johanna.Kuspert@maricopa.gov>
Cc: Morgan Ghods <mghods@azdot.gov>, Rashidul Haque <rhaque@azdot.gov>, Paul O'brien <POBrien@azdot.gov>, ADOTAirNoise - ADOT <adotairnoise@azdot.gov>, Clifton Meek <meek.clifton@epa.gov>, Karina O'Conner <oconnor.karina@epa.gov>, Dean Giles <dgiles@azmag.gov>

As there are no objections or requests for changes to the CO modeling assumptions provided June 28th, 2021, the project will commence with the CO hot-spot modeling for project level conformity August 3, 2021 utilizing the planning assumptions provided. The results of the CO hot-spot analysis will be included in a formal air quality report, additional notification will be provided when the draft analysis is available for review, any requested modeling files will be provided at that time. Additionally, as there are no objections to the project determination presented for PM10, interagency consultation is complete with the project identified as a project that does not require a quantitative hot-spot analysis as listed under 40 CFR 93.123(b), thank you.

Beverly T. Chenausky
Air & Noise Program Manager
MD EM02
205 South 17th Avenue
Phoenix, AZ 85007
C: 480.390.3417
azdot.gov

ADOT Environmental Planning

On Mon, Jun 28, 2021 at 12:03 PM Beverly Chenausky <bchenausky@azdot.gov> wrote:

ADOT is presenting the following project, **SR 101, 75th 75th Ave to I-17**, for interagency consultation, per 40 CFR 93.105 as a potential project that is **not** a project of Air Quality Concern and thereby **will not** require a PM10 hot-spot analysis. ADOT is requesting responses to the attached *F0316_PM10_Consultation_062821.pdf*. within **10 business days**; a non-response will be interpreted as concurrence that the project is not a project of air quality concern and does not require a hot-spot analysis. If any consulted party believes this project should be treated as a project of air quality concern that requires a Quantitative PM10 hot-spot analysis, please document the appropriate section under 40 CFR 93.123 (b) that applies to the project and describe why the project should be treated as a project of air quality concern.

Additionally, ADOT has determined that the project may require a quantitative hot-spot analysis only for CO, the modeling assumptions are attached in document *F0316_CO Hotspot Analysis_Consultation_062821.pdf*. The Purpose of this document is to describe the methods, models and assumptions used for a quantitative hot-spot analysis as required in 40 CFR 93.105(c)(1)(i), 93.123, 93.116, additional information on the receptor locations is also included (as zip file). It is requested that the consulted parties provide comments or questions on the methods, models and assumptions within **30 days**, a non-response will be interpreted as concurrence with the planning assumptions as described in the attached CO document.

If you have any additional questions or need additional information let me know, please note that my contact information has changed.

Beverly T. Chenausky
Air & Noise Program Manager
MD EM02
205 South 17th Avenue
Phoenix, AZ 85007
C: 480.390.3417
azdot.gov

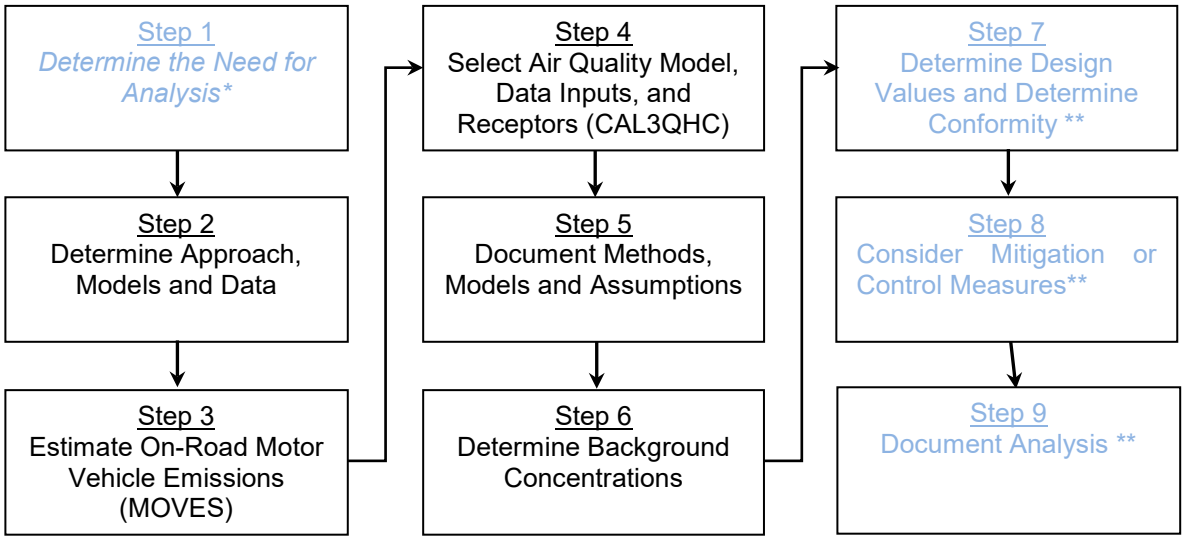
ADOT Environmental Planning

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. 326 and a Memorandum of Understanding dated January 4, 2021, and executed by FHWA and ADOT.

Project Level CO Quantitative Hot-Spot Analysis – Consultation Document

Completing a Carbon Monoxide (CO) Hot-Spot Analysis

The general steps required to complete a quantitative CO hot-spot analysis are outlined below and described in detail in the EPA Office of Transportation and Air Quality guidance document "Using MOVES2014 in Project-Level Carbon Monoxide Analyses" EPA-420-B-15-028, March 2015, and "Guideline for Modeling Carbon Monoxide from Roadway Intersections" EPA-454/R-92-005, November 1992.



* 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

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

Step 3: Estimate On-Road Motor Vehicle Emissions with MOVES

a. Generate RunSpec and enter project-specific data into Project Data Manager
b. Estimate on-road motor vehicle emissions.

Step 4: Select Air Quality Model, Data Inputs, and Receptors for CAL3QHC

a. Obtain and input required site data (e.g., meteorological).
b. Input MOVES outputs (emission factors).
c. Determine number and location of receptors, roadway links, and signal timing.

d. Run air quality dispersion model and obtain concentration results.

Step 5: Document Methods, Models and Assumptions

a. Summarize the methods, models and assumptions based on Step 3 & 4 (see the example in Table 1).
b. Submit the summary document to ADOT for review.

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 Values and Determine Conformity

a. Add step 5 results to background concentrations to obtain values for the Build scenario.
b. 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.*

Methods, Models and Assumptions for CO

Table 1. Methods, Models and Assumptions		
Estimate On-Road Motor Vehicle Emissions (Step 3)		
MOVES	**Description**	**Data Source**
Scale	*On road, Project, Inventory*	EPA Using MOVES2014 in Project-Level Carbon Monoxide Analyses, Section 2.3.2
Time Span	*Four unique model runs: For existing conditions, 2018, January, weekday, AM peak hour, and PM peak hour. For future conditions, 2040, January, weekday, AM peak hour, and PM peak hour.*	EPA Using MOVES2014 in Project-Level Carbon Monoxide Analyses, Section 2.3.3
Geographic Bounds	*Maricopa County*	EPA Using MOVES2014 in Project-Level Carbon Monoxide Analyses, Section 2.3.4
Vehicles Equipment	*All Fuels and Source Use Types will be selected*	EPA Using MOVES2014 in Project-Level Carbon Monoxide Analyses, Section 2.3.5
Road Type	*Urban Restricted and Urban Unrestricted access*	EPA Using MOVES2014 in Project-Level Carbon Monoxide Analyses, Section 2.3.6
Pollutants and Processes	*CO Running Exhaust, CO Crankcase Running Exhaust*	EPA Using MOVES2014 in Project-Level Carbon Monoxide Analyses, Section 2.3.7
Output	*Database will be created, Grams, Miles, Distance Traveled, Population will be selected. Emissions process will be selected in the Output Emissions Detail. Emission rates for each process can be appropriately summed to calculate aggregate CO emission rates for each link.*	EPA Using MOVES2014 in Project-Level Carbon Monoxide Analyses, Section 2.3.10
Project Data Manager	*Database will be created and MOVES2014b templates will be created to include local project data and information provided by MAG MOVES2014b input files and MAG TransCAD transportation network files used in the fall 2020 conformity analysis, which were approved by FHWA on 3/22/2020 (provided on ShareFile) MAG's I/M programs, Fuel and Age Distribution data which are consistent with the regional models. The average temperature and humidity in January will be used. Links and Link Source Type will be specific to project as provided by the traffic study, any missing information will use default MOVES2014b data. After running MOVES, the MOVES CO_CAL3QHC_EF post-processing script is run.*	See Table 2 below for details
Select Air Quality Model, Data Inputs, and Receptors (Step 4)		

CAL3QHC	Description	Data Source
Emissions Sources	*Emissions Rates in grams/mile, as described in MOVES2014b section. The free flow and queue links defined for modeling with MOVES2014b will be used as input into CAL3QHC.*	1992 Guideline for Modeling Carbon Monoxide from Roadway Intersections, EPA-454/R-92-005, November 1992. Section 5.2.3 of Appendix W to 40 CFR Part 51, CO screening analyses of intersection projects should use the CAL3QHC dispersion model.
Receptor Locations	*At least 3m from the roadways at a height of 1.8m, nearby occupied lot, vacant lot, sidewalks, and any locations near breathing height (1.8m) to which the general public has continuous access.*	1992 Guideline for Modeling Carbon Monoxide from Roadway Intersections, Section 2.2
Traffic and Geometric Design	*Lane Configuration, Lane Width, Signalization, Turning Movements, Median Width, Traffic Volume, Level of Service, Grade, % of Heavy-Duty Trucks, and Peak Hour Average Approach Speed.*	1992 Guideline for Modeling Carbon Monoxide from Roadway Intersections, Section 4.7.4
Meteorology	*The following meteorology options will be used as recommended in the CO Guidelines: a worst-case wind speed of 1 m/s, 5-degree wind direction intervals from 0 to 355 degrees, and a mixing height of 1000 m. Atmospheric stability class D will be used to represent an urban area.* *A surface roughness of 108 cm will be used, representing a suburban area.*	1992 Guideline for Modeling Carbon Monoxide from Roadway Intersections, Section 4.7.1
Persistence Factor	*Default persistence factor of 0.7.*	1992 Guideline for Modeling Carbon Monoxide from Roadway Intersections, Section 4.7.2
Determine Background Concentrations (Step 6)		
Background Monitor	*The CO monitor located at Frye Rd & Ellis St in Chandler has similar environment settings as the project corridor. Three years of monitoring data (2018--2020) show a maximum 8-hour value of 1.7 ppm. 2.4 ppm (which is the 8-hour concentration divided by a persistence factor of 0.7) will be added to the maximum modeled hourly concentration for comparison to the NAAQS. 1.7 ppm will be added to the maximum 8-hour modeled concentration. The same background values will be used for all analysis years.*	1992 Guideline for Modeling Carbon Monoxide from Roadway Intersections, Section 4.7.3 Recommended comparable background site, June 21 2021 email from Maricopa County Air Quality Department Monitoring staff.

Table 2. Project Data Manager Inputs

Input	Level of Detail/notes	Possible Data Source
Meteorology	*Same for build and no-build scenarios. A minimum of four hours (AM, PM, MD & ON), for one day (weekday) and for a winter month (January) is required. The average temperature and humidity in January will be used, according to the EPA guidance. Three years of hourly meteorological data were obtained for Phoenix International Airport.*	ADEQ, NOAA EPA Using MOVES2014 in Project-Level Carbon Monoxide Analyses, Section 2.4.1, 1992 Guideline for Modeling Carbon Monoxide from Roadway Intersections, Screening Analyses of Roadway Intersections
Age Distribution	*Same for build and no-build scenarios. Data from latest regional CO conformity analysis provided*	ADOT, MPO EPA Using MOVES2014 in Project-Level

	by MAG.	Carbon Monoxide Analyses, Section 2.4.2
Fuel	*Same for build and no-build scenarios. Data from latest regional CO conformity analysis provided by MAG.*	MPO, MOVES defaults EPA Using MOVES2014 in Project-Level Carbon Monoxide Analyses, Section 2.4.3
I/M Programs	*Same for build and no-build scenarios. Data from latest regional CO conformity analysis provided by MAG.*	MPO, MOVES defaults EPA Using MOVES2014 in Project-Level Carbon Monoxide Analyses, Section 2.4.4
Retrofit Data	*Not applicable for this project.*	Project specific modeling EPA Using MOVES2014 in Project-Level Carbon Monoxide Analyses, Section 2.4.7
Links	*Four selected intersections (67th Ave & SR101 WB, 67th Ave & SR101 EB, 75th Ave & SR101 WB, 27th Ave & SR101 EB) will be divided into links and each link's length (in miles), traffic volume (vehicle per hour), average speed (miles per hour) and road grade (percent) will be specified. Other roadway segments within 1000 feet of the intersection will be included. (See attachment for graphical representation of model setup)*	Project specific modeling, ADOT, MPO EPA Using MOVES2014 in Project-Level Carbon Monoxide Analyses, Section 2.4.6
Link Source Types	*Source type distribution will be determined using a combination of project data and regional fleet information from the latest regional CO conformity analysis provided by MAG.*	Project specific modeling, ADOT, MPO EPA Using MOVES2014 in Project-Level Carbon Monoxide Analyses, Section 2.4.5
Link Drive Schedules, Operating Mode Distribution	*Average speed and road type will be used in the Links Importer based on project-specific modeling.*	Project specific modeling, ADOT, MPO EPA Using MOVES2014 in Project-Level Carbon Monoxide Analyses, Section 2.4.8, 2.4.9
Off-Network, Hotelling	*Not applicable for this project.*	EPA Using MOVES2014 in Project-Level Carbon Monoxide Analyses, Section 2.4.9

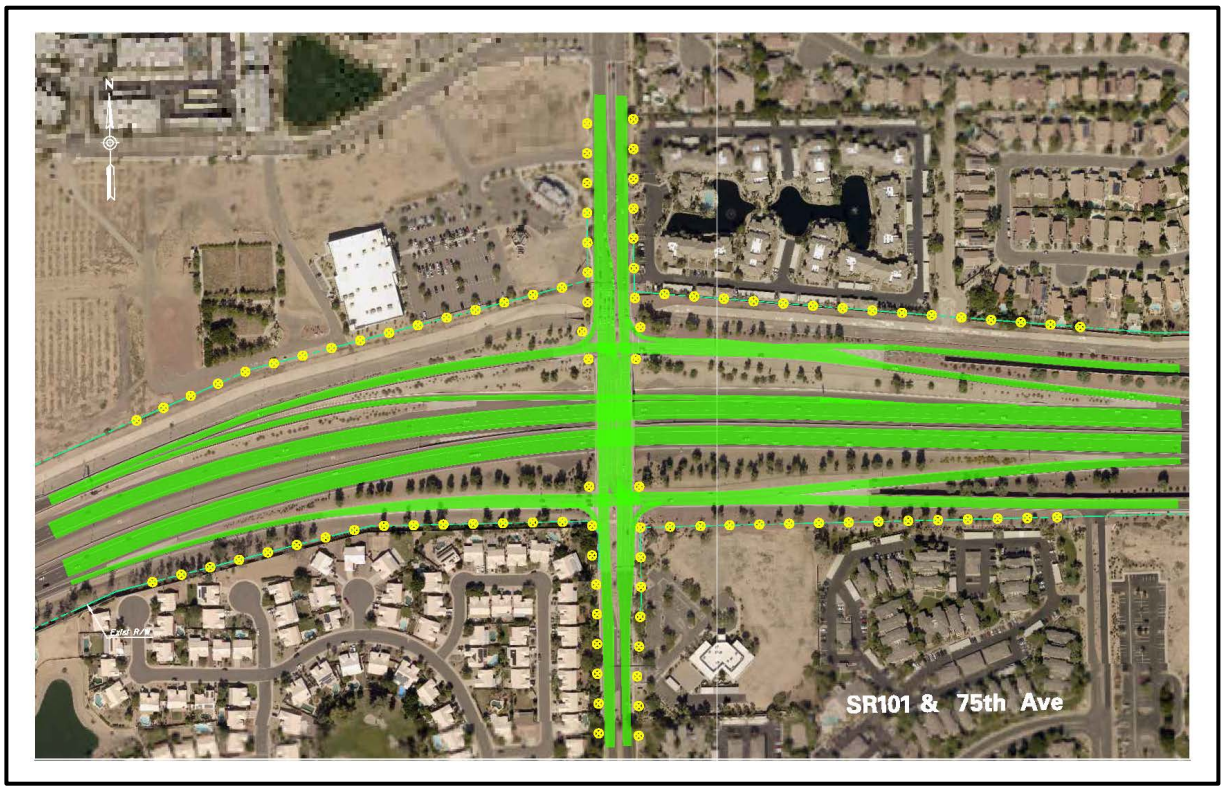
Table 3. Construction Emissions *(Only if Applicable)*		
Construction Emissions	*Construction Emissions will be addressed qualitatively because construction is not expected to last longer than 5 years at any individual site. In the context of CO, this is usually excess CO emissions due to traffic delay and/or detours.*	40CFR93.123(c)(5)"Each site which is affected by construction-related activities shall be considered separately, using established "Guideline" methods." If applicable, include analysis as an Appendix to the Air Quality Report.

Preliminary Link Configurations and Receptor Placements for CO Hot-Spot Analysis

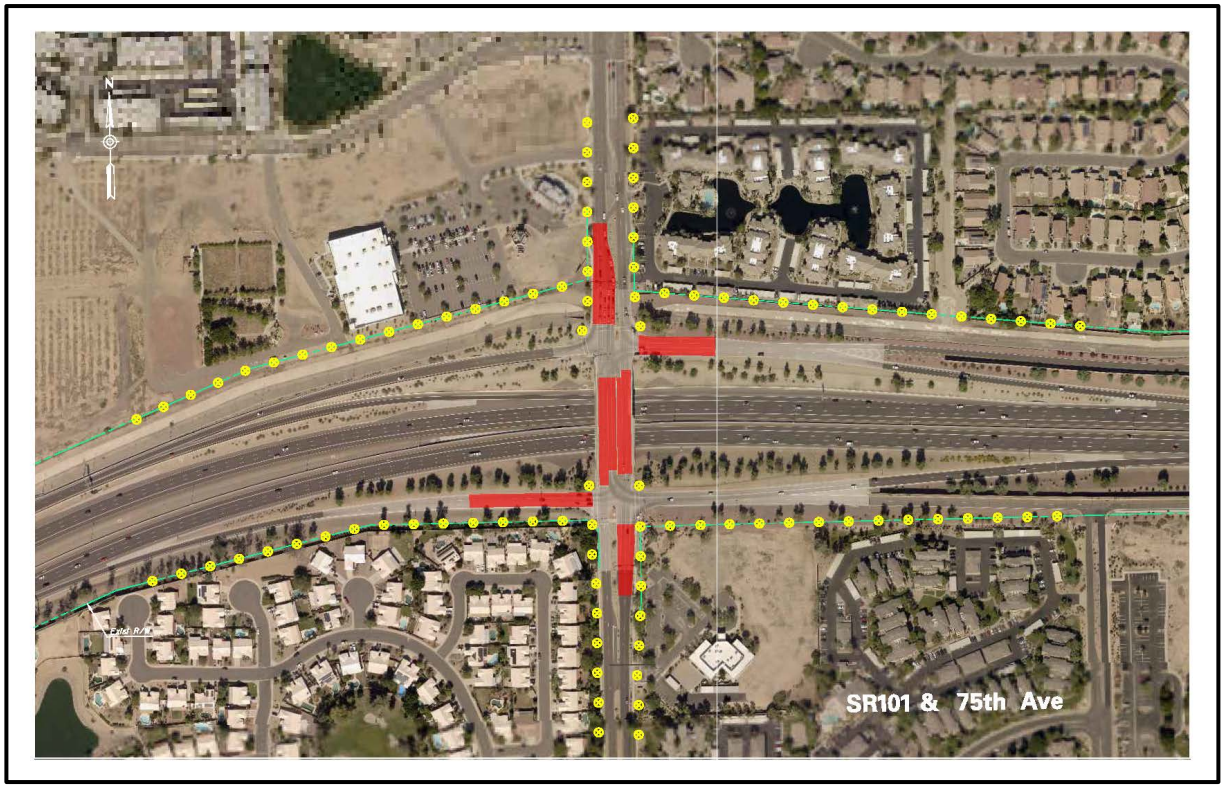
The following graphics present the preliminary link configurations and receptor placements for the four intersections that will be modeled as part of the CO hot-spot analysis in CAL3QHC. The following applies to all figures:

- Free flow links extend 1000 feet away from center of signalized intersection
- Graphic representation of free flow links includes 10 foot mixing zone
- Traffic activity within 1000 feet from intersections are included
- Yellow circles are receptors located on the existing R/W (more than 10 feet from the edge of roadway).
- Receptors are spaced at 25-meter intervals outside of the mixing zone.
- Receptor location coordinates will be provided by a separate file

75th Ave at SR101 EB & WB Build and No Build Scenarios
Free Flow Links:

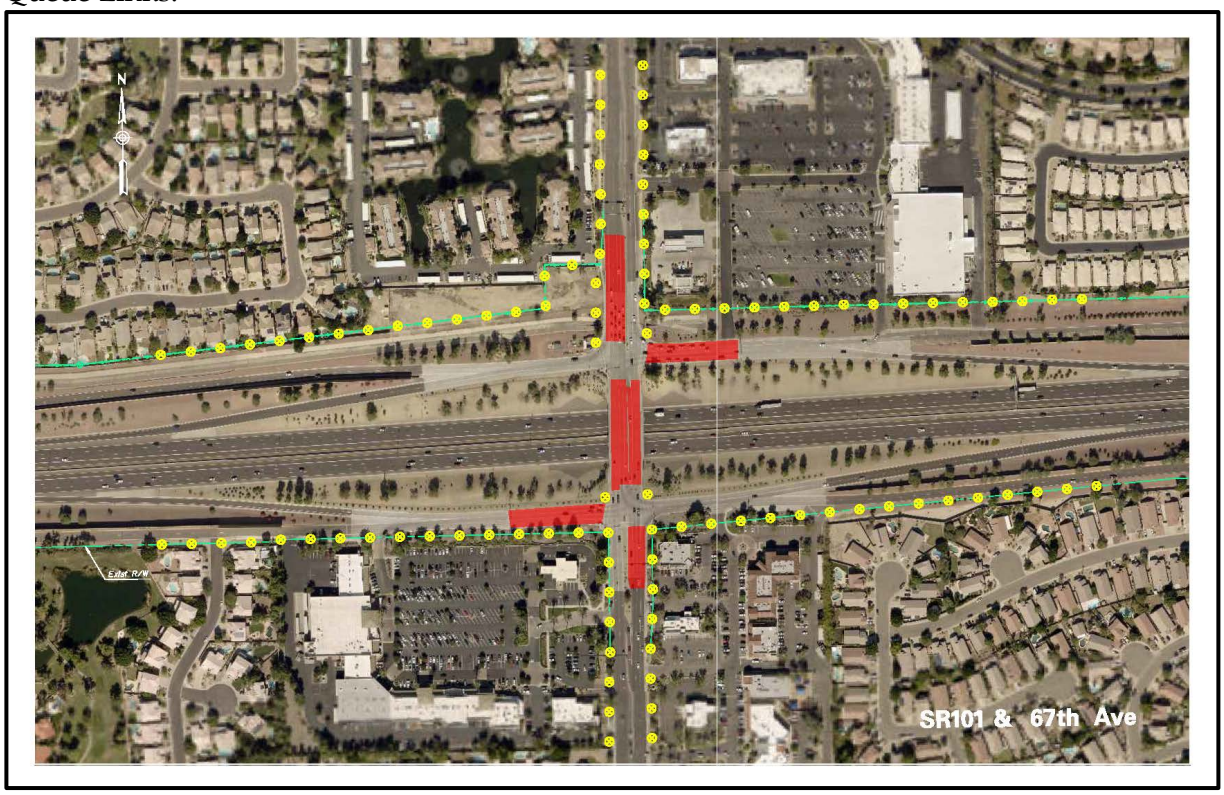


75th Ave at SR101 EB & WB Build and No Build Scenarios
Queue Links:

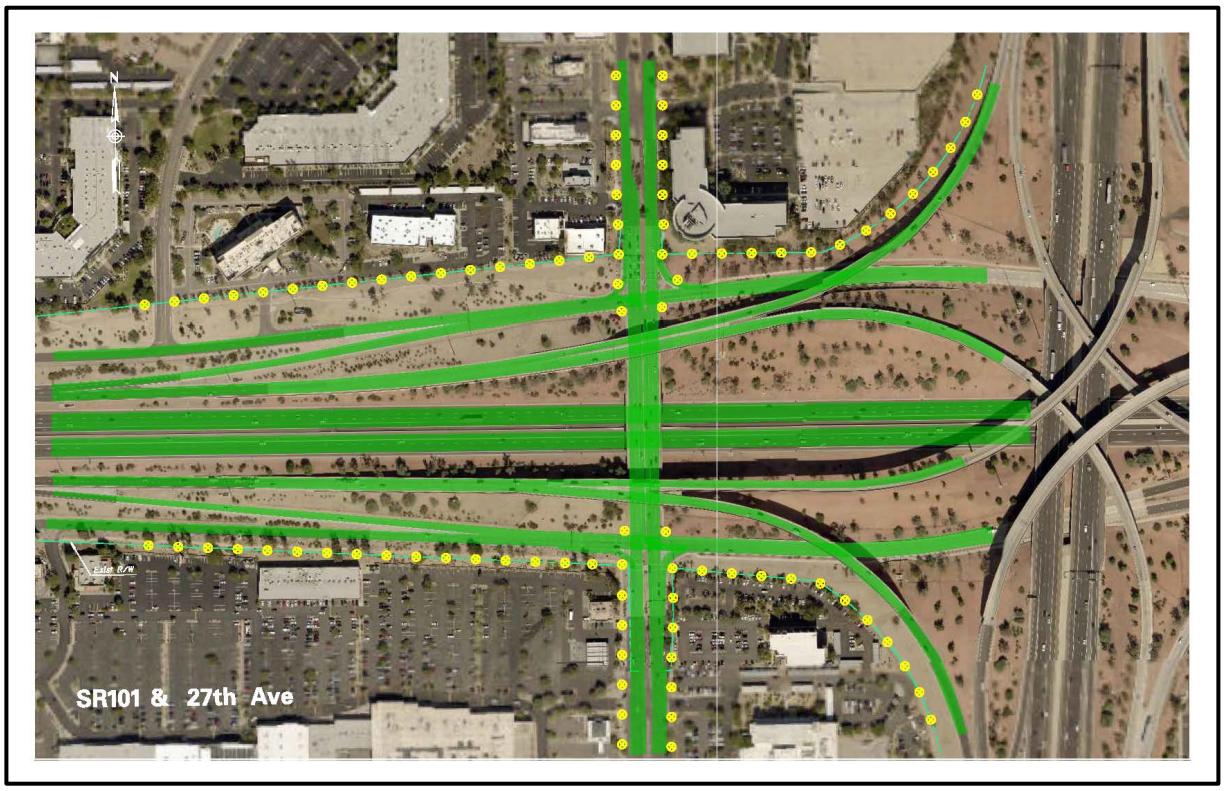


67th Ave at SR101 EB & WB Build and No Build Scenarios
Free Flow Links:

67th Ave at SR101 EB & WB Build and No Build Scenarios
Queue Links:



27th Ave at SR101 EB & WB Build and No Build Scenarios
Free Flow Links:



27th Ave at SR101 EB & WB Build and No Build Scenarios
Queue Links: