Arizona Department of Transportation

Environmental Planning

Draft Project-Level Particulate Matter (PM_{10}) Consultation Document

US 95, Wellton-Mohawk Canal to Imperial Dam Road

095-B(220)
095 YU 038 F0608 01C

September 13, 2024

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.

Project-Level Particulate Matter Interagency Consultation

Project Setting and Description

The Arizona Department of Transportation (ADOT) has initiated a project in Yuma County, Arizona, to widen US 95 from the Wellton-Mohawk Canal to Imperial Dam Road from a two-lane undivided roadway to a four-lane divided and undivided highway from Milepost (MP) 38.44 to MP 43.76 (about 5.3 miles).

The project would be constructed on existing ADOT ROW, and easements from a number of agencies including the Bureau of Land Management (BLM), Bureau of Reclamation (BOR), Department of Defense (DOD), Yuma Proving Ground (YPG), Arizona State Land Department (ASLD), Yuma County, and the Wellton Mohawk Irrigation & Drainage District, among others. The project is located about 10 miles northeast of the City of Yuma, and about 60 miles south of Interstate 10 (I-10) in Yuma County, Arizona. The project location is shown in **Figure 1** and the proposed alignment is shown in Figure **2a and 2b**.

As the major north-south route north of Yuma, US 95 provides access to employers, economic generators, and regional connectivity to Phoenix and other parts of Arizona. The existing two-lane rural highway has insufficient capacity for current traffic volumes and travelers frequently experience delays. US 95 serves as an important north-south link between Interstate 8 (I-8) and I-10 and provides access to YPG. The existing highway has insufficient capacity for the current level of heavy truck traffic and large recreational vehicles. The purpose of the project is to widen the highway to add one additional thru lane in each direction to increase traffic capacity and improve operational efficiency and safety.

Elements of the project important to air quality considerations include:

- Widen the US 95 roadway to two lanes in each direction with a two-way left turn lane (or paved median), and shoulders from 0.6 miles north of the Wellton-Mohawk Canal to Dome Valley Road.
- Widen the US 95 roadway to provide a divided four-lane highway with two lanes in in each direction, an unpaved median, and shoulders from Dome Valley Road to 0.5 miles south of Imperial Dam Road.
- Construct a new grade-separated tank crossing for YPG near MP 42.6
- Construct new grade separated wildlife crossings near MP 40.3, MP 41.0, and MP 41.8
- Realign the Adair Park Road and Dome Valley Road intersections

The proposed project is in Yuma County currently designated as a nonattainment area for the National Ambient Air Quality Standards (NAAQS) for, eight-hour ozone, and particulate matter less than or equal to ten microns in diameter (PM_{10}).

The primary sources of PM_{10} in the nonattainment area include dust from unpaved roads, construction dust, windblown dust, dust from unpaved farm roads, and cross border emissions from Mexico (https://azdeq.gov/yuma-particulate-matter-pm-10-nonattainment-

area, accessed April 19, 2024).

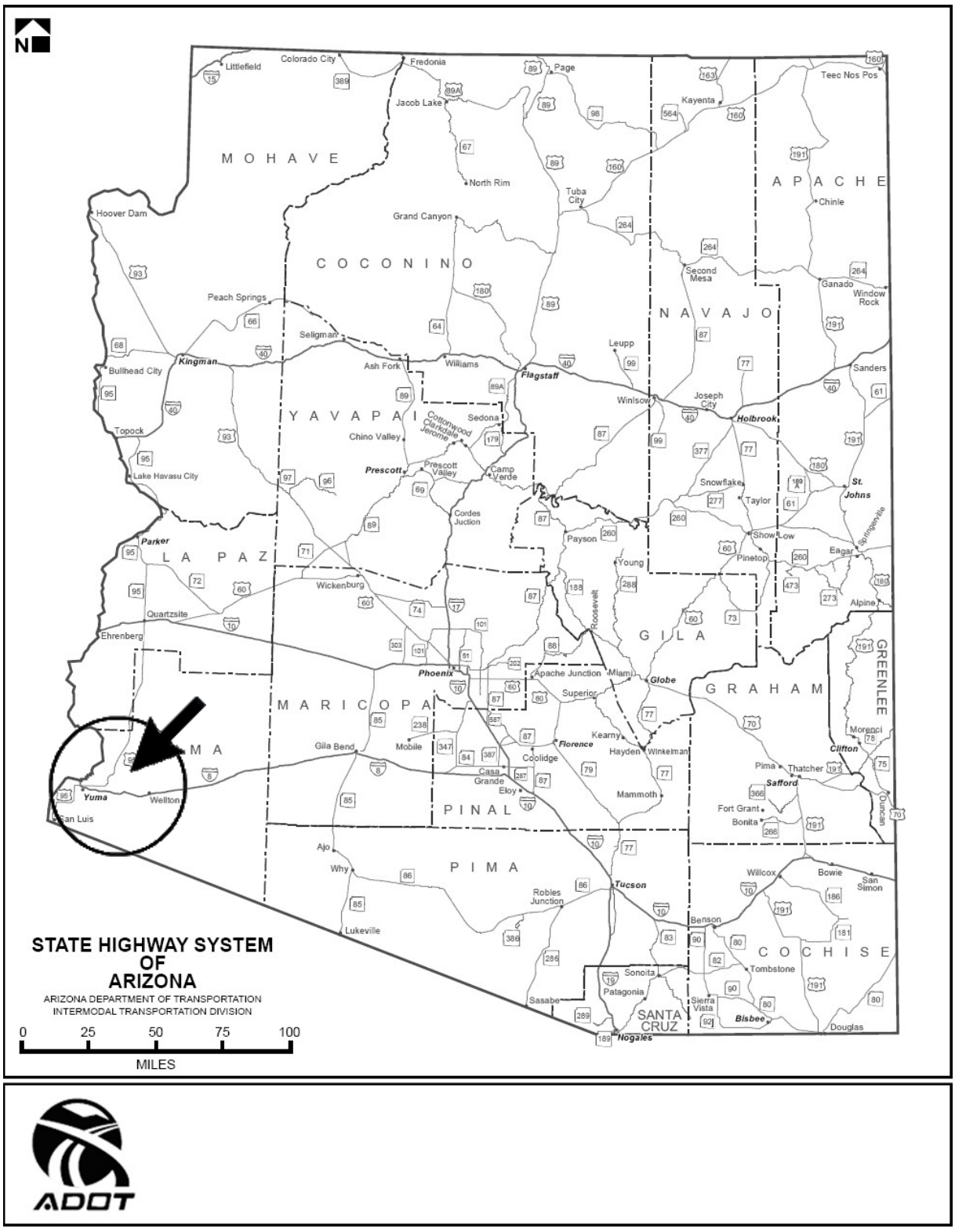
The project is included in the Yuma Metropolitan Planning Organization 2022 – 2045 Long-Range Transportation Plan Update [ID-26, US 95 Widening: Welton-Mohawk Canal to Aberdeen Road] (YMPO, 2021). This specific project, US-95: Wellton-Mohawk Canal to Imperial Dam Road is included in the Fiscal Year 2022-2026 Yuma Metropolitan Planning Organization Transportation Improvement Program [DOT-24-01D, Widen Road – Design] (YMPO, 2024).

On August 30, 2021, FHWA issued a Finding of Conformity for the FY 2022-2045 YMPO Long Range Regional Transportation Plan (LRTP) and FY 2022-2026 Transportation Improvement Program (TIP). Since that conformity determination, the EPA rescinded its previously issued clean data determination (CDD) for the 1987 24-hour PM_{10} NAAQS (effective June 17, 2022).

An "Air Quality Conformity Determination for the 2022-2045 LRTP Amendment #1" was completed in February 2024 and concluded that the projected PM_{10} emission levels based on projects included in the 2022-2045 LRTP Update Amendment #1 (including the US 95: Wellton-Mohawk Canal to Imperial Dam Road project) met the applicable conformity tests.

A formal request for a finding of transportation conformity was submitted to FHWA by the YMPO on April 8, 2024.

Figure 1. Project Location Map



ADOT Environmental Planning

Figure 2a. Project Study Area (MP 38.44 to MP 42)

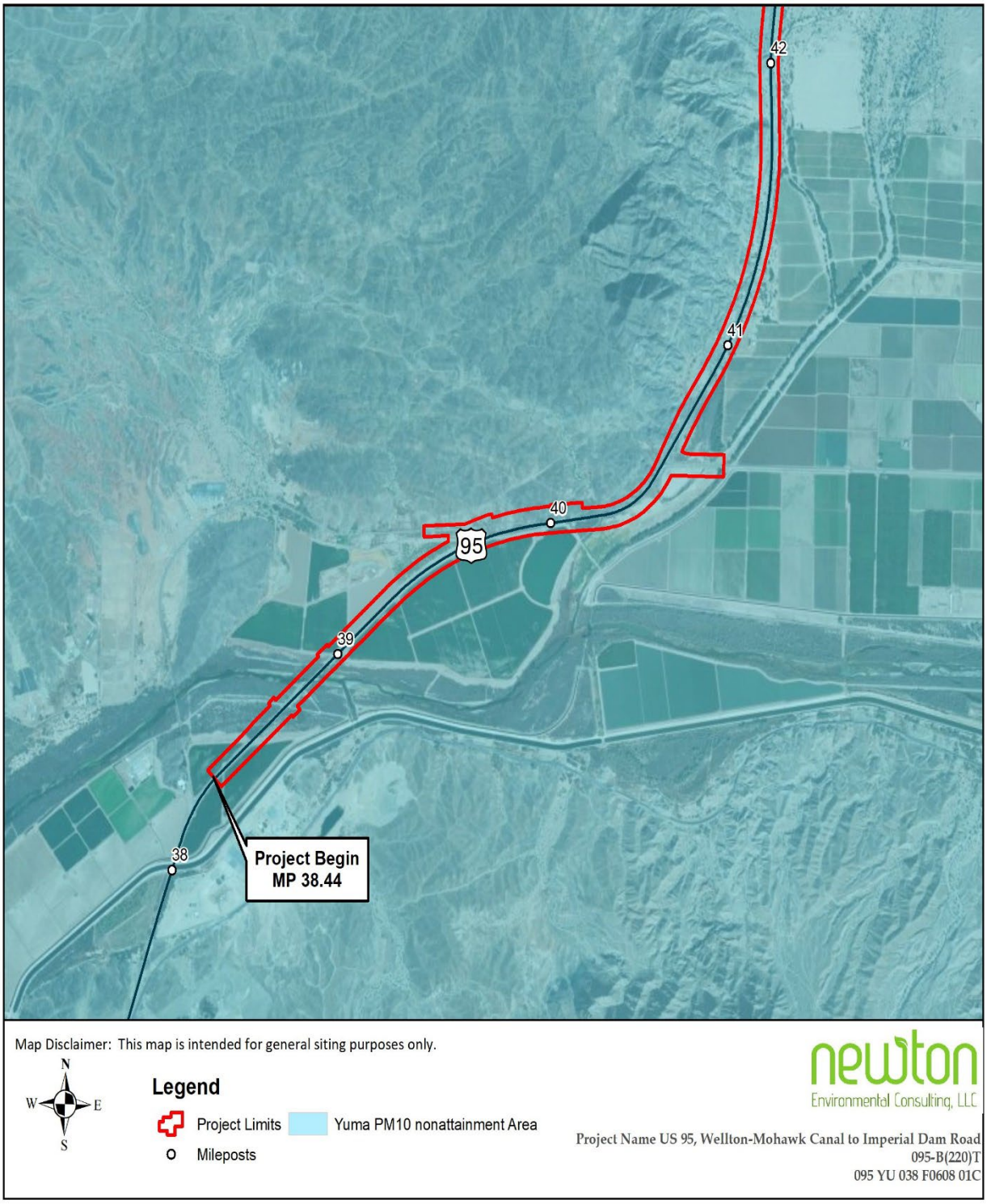
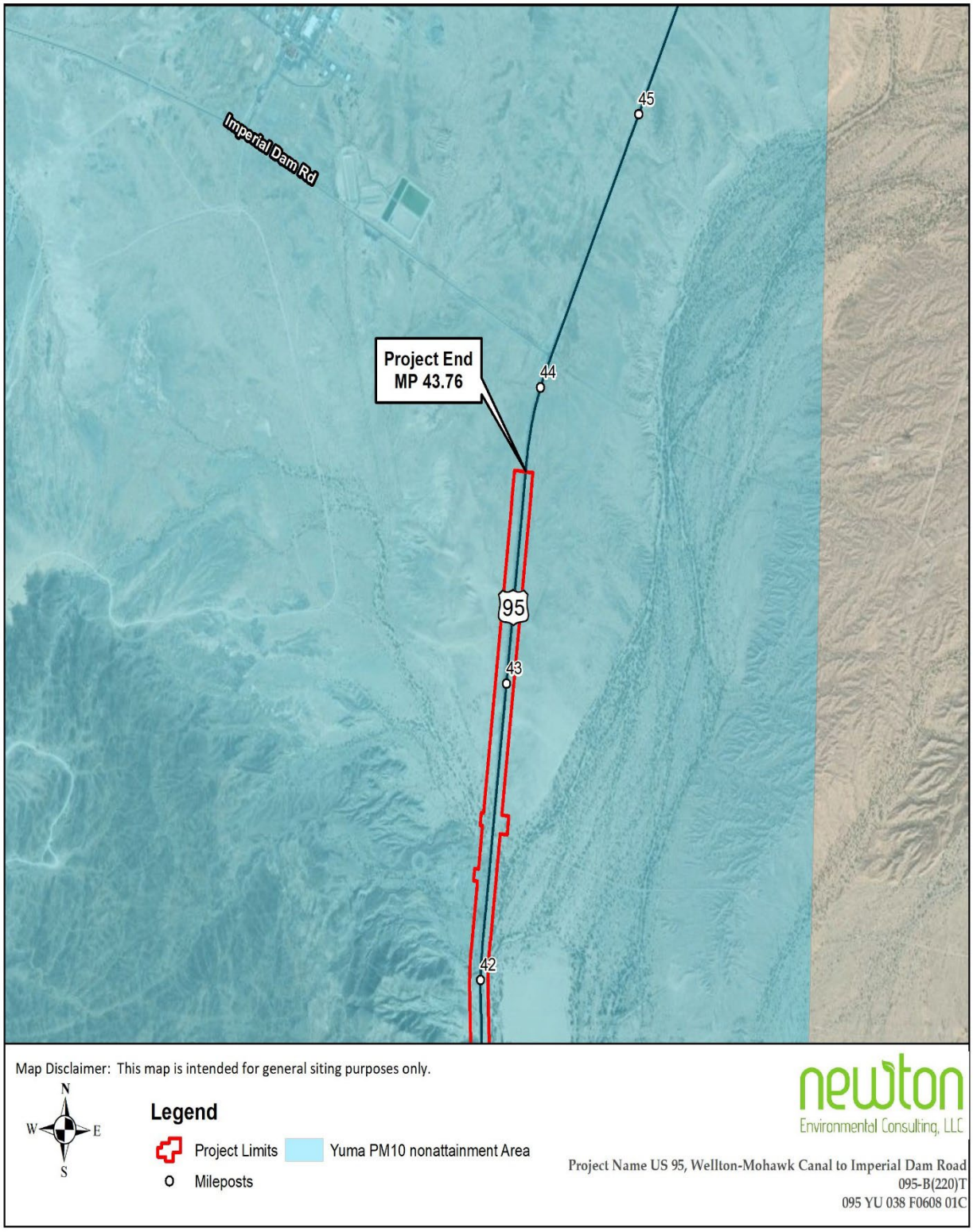


Figure 2b. Project Study Area (MP 42 to Project End MP 43.76)



Project Level PM_{10} Consultation Project of Air Quality Concern

PM10 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 with 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;" While these examples were provided in the rulemaking, interagency consultation will be used to determine if a project is a of air quality concern.

New Highway Capacity

Is this a new highway project that has a significant number of diesel vehicles?

NO - The proposed project is not a new highway project.

Expanded Highway Capacity

Is this an expanded highway projects that have a significant increase in the number of diesel vehicles?

NO – The proposed project is not an expanded highway capacity project that has a significant increase in the number of diesel-fueled vehicles related to the project. As shown in Table 1, under 2023 Existing Conditions the average daily traffic (ADT) volumes on US 95 in the project corridor are less than 8,000 vehicles per day (vpd). Under the 2050 Build Alternative, ADT volumes are less than 13,000 vpd.

Compared to the 2023 Existing Conditions, the total truck ADT increases by less than 500 trucks per day as a result of the project. In addition, the total truck volumes shown in Table 1 include both medium- and heavy-duty trucks, not all of which would be diesel-fueled. The combined medium- and heavy-duty truck ADT represents a worst-case condition when considering if the increase in truck volumes represents a significant increase in the number of diesel-fueled vehicles resulting from the project.

Table 1. Average Daily Traffic and Truck Volumes

	2023 Existing				2050 No-Build				2050 Build				Total Truck ADT Difference (Build minus No-Build)[1]
Roadway Segment	**ADT**	**Total Truck ADT (8%)**	**MT Volume (1%)**	**HT Volume (7%)**	**ADT**	**Total Truck ADT (8%)**	**MT Volume (1%)**	**HT Volume (7%)**	**ADT**	**Total Truck ADT (8%)**	**MT Volume (1%)**	**HT Volume (7%)**	
US 95, south of Dome Valley Rd (County 3rd Street)	7,521	602	75	526	12,837	1,027	128	899	12,837	1,027	128	899	0
US 95, north of Dome Valley Rd (County 3rd Street)	6,585	527	66	461	11,240	899	112	787	11,240	899	112	787	0

[1] Proposed project improves roadway geometry from a two-lane to a four-lane roadway. Traffic volumes for the No-Build and Build alternatives are the same as no additional traffic generators are anticipated as a result of the project

Source: Traffic volumes provided by Kimley Horn, derived from data and analysis documented in US 95 Improvements: Wellton-Mohawk Canal to Aberdeen Road – Draft Technical Analysis Technical Memorandum, (Kimley--Horn, April, 2024).

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?

NO – This is not a project that affects a congested intersection at LOS D or that will change to LOS D (or greater) because of a significant increase in the number of diesel-fueled trucks resulting from the project.

As shown in Table 2, the US 95/Dome Valley Road intersection would operate at LOS C or better under both 2023 Existing Conditions and the 2050 Build Alternative with the recommended intersection geometry.

Total truck volumes at the US 95/Dome Valley Road intersection increase by less than 60 trucks per hour in both the AM and PM peak hours compared to 2023 Existing Conditions.

The total truck volumes at the US 95/Dome Valley Road intersection are not deemed to constitute a significant number of diesel-fueled vehicles or represent a significant increase in the volume of diesel-fueled vehicles related to the project.

Table 2. US 95 Intersection Level of Service and Peak-Hour Volumes									
Intersection	**2023 Existing Conditions**				**2050 Build (Recommended Geometry)**				
	LOS[1] (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)**	**Total Truck Volume Difference (Build - Existing, vph)[3]**
US 95 / Dome Valley Rd[2]	AM: B (15) PM: C (18)	AM: 383 PM: 1,008	AM: 4 PM: 10	AM: 27 PM: 71	AM: B (12) PM: B (10)	AM: 654 PM: 1,722	AM: 7 PM: 17	AM: 46 PM: 121	AM: 22 PM: 57

[1] Stop-Controlled delay on intersecting minor street under 2023 Existing Conditions.
[2] Recommended Green T intersection in the 2050 Build Alternative.
[3] Truck Volume Difference includes both MT and HT
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: Email from Jennifer Simpkins (Kimley-Horn) to Curt Overcast (Newton Environmental Consultants), F0608 AQ Status (July 11, 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 – The proposed project does not involve construction of 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 – The proposed project does not involve an existing bus or intermodal terminal.

Project of Air Quality Concern Determination

Under the 2050 Build Alternative, traffic volumes on US 95 are less than 13,000 ADT (Table 1). The increase in diesel-fueled truck volumes due to the project are also low; less than 500 ADT compared to 2023 Existing Conditions and include both medium- and heavy-duty trucks, not all of which are diesel-fueled (that is, the truck volumes represent a worst-case condition and likely overstate the number of diesel-fueled trucks in the project area). While overall traffic volumes are expected to increase, the project does not significantly increase diesel-fueled total truck volumes.

The March 2006 final rule also provided examples of projects that would not be covered by 40 CFR 93.123(b)(1) and would not require a PM2.5 or PM10 hot-spot analysis (71 FR 12491). This project clearly fits as "any new or expanded highway project that primarily services gasoline vehicle traffic (i.e., does not involve a significant number or increase in the number of diesel vehicles), including such projects involving congested intersections operating at Level-of-Service D, E, or F." As shown in Table 2, the US 95/Dome Valley Road intersection would operate at LOS C or better under both 2023 Existing Conditions and the 2050 Build Alternative. Therefore, the proposed improvements on US 95 from the Wellton-Mohawk Canal to Imperial Dam Road are NOT of Air Quality Concern and will not require a PM hot-spot analysis.

Appendix: Supporting Traffic Information

US 95 IMPROVEMENTS: WELLTON-MOHAWK CANAL TO ABERDEEN ROAD

DRAFT TRAFFIC ANALYSIS TECHNICAL MEMORANDUM

Date: April 12, 2024

Subject: Traffic Analysis for US 95 Improvements

Introduction

The US 95 Improvements, as shown in **Figure 1** is between Wellton-Mohawk Canal and Imperial Dam Road, located near Yuma, Arizona. This project consists of widening US 95 to include two lanes in each direction separated by a raised median or two-way center turn lane, and intersection improvements to accommodate the roadway expansion.

This traffic analysis technical memorandum (tech memo or memo) documents the existing and future traffic conditions along the study section of US 95, the traffic control and intersection geometry for US 95 at Dome Valley Road/County 3rd Street. Portions of the data presented in this memo will be used to complete the Noise Report and the Air Quality Report for the project.

Figure 1 – Project Location

Purpose

The purpose of this technical memorandum is to document the traffic analysis for the US 95 Improvements between Wellton-Mohawk Canal and Aberdeen Road project, which includes:

- Verifying that the proposed four-lane principal arterial cross-section can accommodate projected 2050 traffic volumes;
- Evaluating the proposed intersection geometry alternatives (3 total) at Dome Valley Road/County 3rd Street level of service (LOS) with 2050 volume projections;
- Conducting a crash analysis with the most recent 5-year crash data;
- Generating traffic projections and vehicle classification data for the Noise Report; and
- Generating traffic projections and resulting vehicle LOS for the Air Quality Concern Questionnaire.

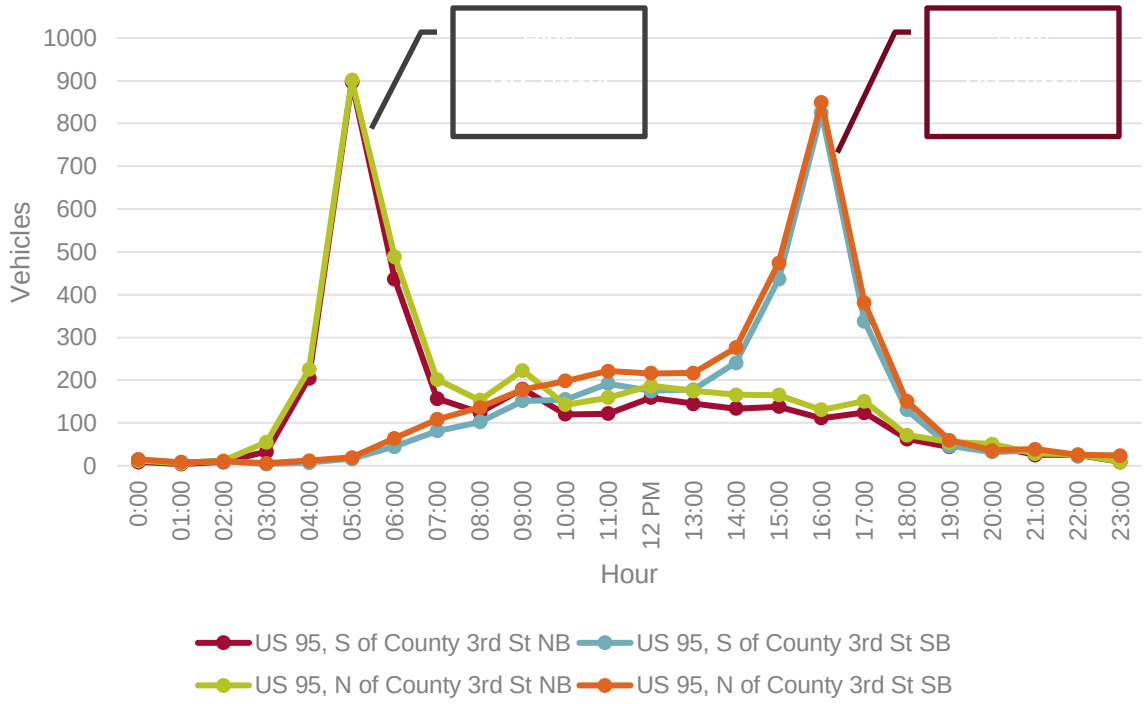
Traffic Volumes

24-hour bi-directional traffic volume and vehicle classification counts and AM and PM peak hour turning movement counts were obtained by Field Data Services, Inc. on Thursday, December 7, 2023. Weekday 24-hour traffic counts were collected north and south of Dome Valley Road/County 3rd Street. **Figure 2** shows the hourly traffic volume distribution along US 95, **Table 1** shows the bi-directional traffic data for these locations, and bi-directional counts are provided in **Appendix A**. As shown in **Figure 2**, there is a high directional demand along this road. With heavy northbound movement in the AM peak and southbound movement in PM peak.

Table 1: 2023 Traffic Volume Count

Count Location	Daily Traffic Volume (Vehicles)
US 95 South of Dome Valley Road/County 3rd Street	7,521
US 95 North of Dome Valley Road/County 3rd Street	6,585

Figure 2 – Hourly Distribution of Traffic Volumes



Weekday peak hour turning movement counts (TMCs) were collected in fifteen-minute intervals during the AM (6:30 AM – 8:30 AM) and PM (4:00 PM – 6:00 PM) peak periods. The intersection geometry was obtained from the Nearmap, an aerial map tool that provides quality and current aerial view maps. The TMCs and existing intersection geometry, are shown in **Figure 3**. The collected TMC data is provided in **Appendix B**.

Figure 3 - Existing Traffic Volumes and Lane Configuration

Existing Conditions Analysis

LEVEL OF SERVICE ANALYSIS

The study intersections were analyzed using Highway Capacity Manual 6th Edition (HCM 6) methodology to determine the intersection level of service (LOS), delay and queueing at turn lanes. The LOS criteria for signalized intersection are shown **Table 2**.

Table 2: Level of Service Criteria for Signalized Intersections

Level of Service (LOS)	Unsignalized Intersection Average Total Delay (seconds/vehicle)
A	≤10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	>50

The existing volumes, intersection geometry and control, shown in **Figure 2** were used to obtain the LOS and delay. The results of this analysis are shown in **Table 2**. *Synchro* reports are included in **Appendix C**.

Table 3: 2023 Existing Level of Service: Unsignalized Intersections

LOS/Delay	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
US 95 & Dome Valley Road/County 3rd Street (stop controlled)												
AM Peak				B/15				A/0		A/9		
PM Peak				C/18				A/0		A/9		
Queue (ft)				50'				-		-		

All movements at the stop-controlled intersection operates at an acceptable LOS (LOS D or better). Under existing conditions, the unsignalized intersections operate at an acceptable LOS overall.

CRASH ANALYSIS

Crash data was obtained from ADOT's Arizona Crash Information System. The data was collected for the most recent 5 years of data, between January 1, 2019 and December 31, 2023. A total of 58 crashes have been reported along the study segment in the last 5 years. The crash data is summarized as follows:

- 2 fatal crashes and 1 suspected serious injuries were reported.

- One fatal crash was reported as a single-vehicle crash, and the other was reported as a rear-end crash;
- All fatal and suspected serious injury crashes occurred during daylight conditions;
- 53% of crashes were single-vehicle crashes (31of 58 crashes);
- 16% of crashes were sideswipe same-direction crashes (9 of 58 crashes);
- 12% of crashes were rear-end crashes (7 of 58 crashes);
- 16% of crashes, including one of the fatal crashes, occurred around 5 am (9 of 58 crashes),
- 43% of crash violations were “No Improper Action” (25 of 58 crashes)
- 19% of crash violations were “Speed Too Fast for Conditions” (11 of 58 crashes);
- 9% of crash violations were “Failed to Keep in Proper Lane” (5 of 58 crashes);
- 53% of crashes occurred in daylight conditions (31 of 58 crashes).

Figure 4 depicts the location of crashes along the roadway segment by crash severity/

Figure 4 – Injury Severity by Location

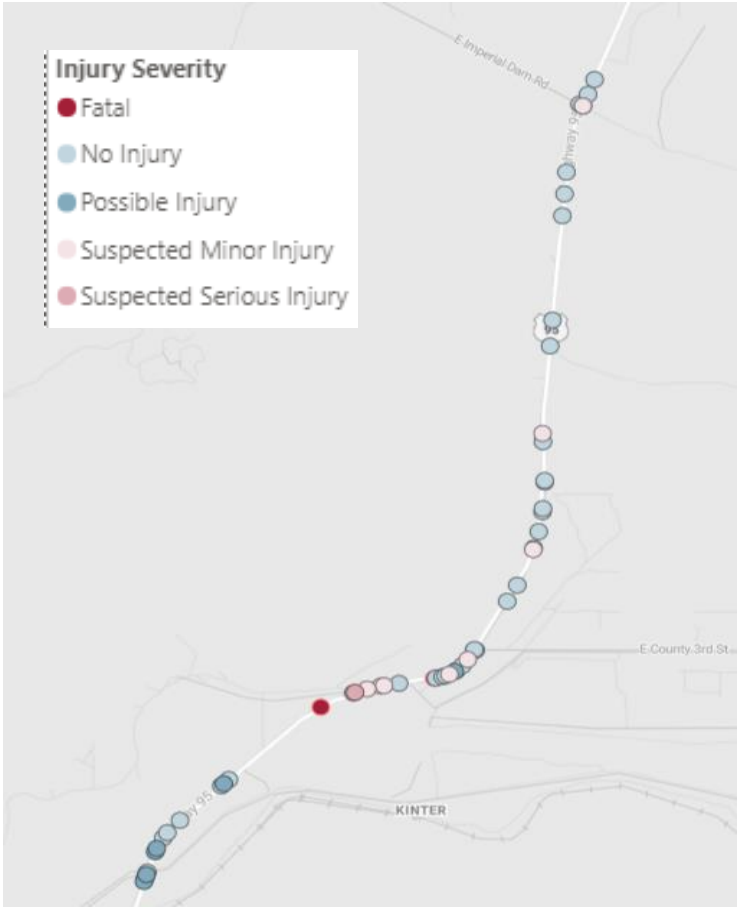


Figure 5 to Figure 7 graphically summarize the crashes by year, injury severity, and collision manner.

Figure 5 - Total Crashes by Year

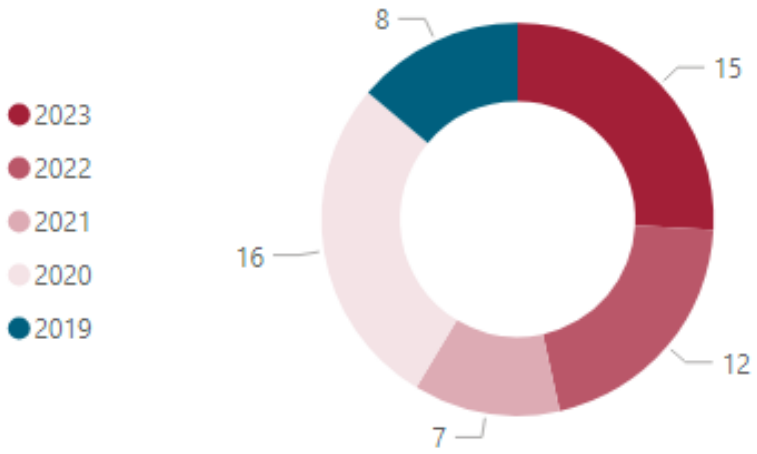


Figure 6 - Total Crashes by Injury Severity

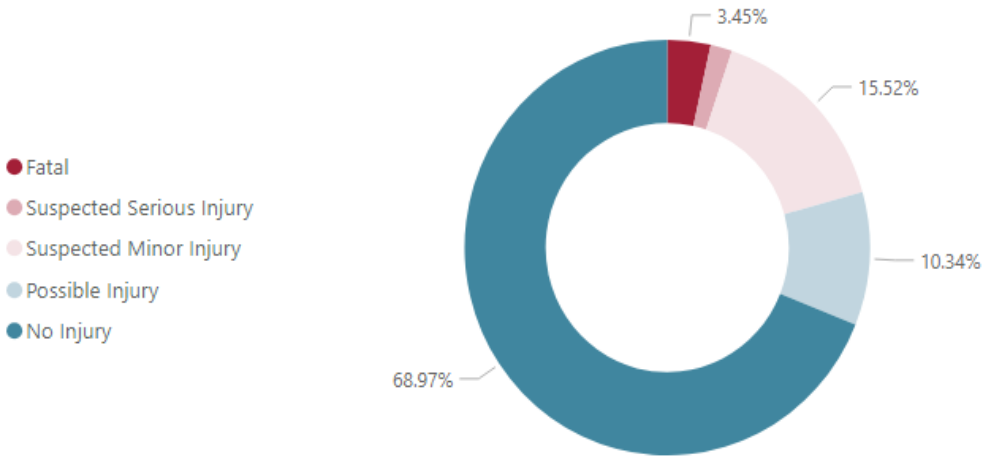
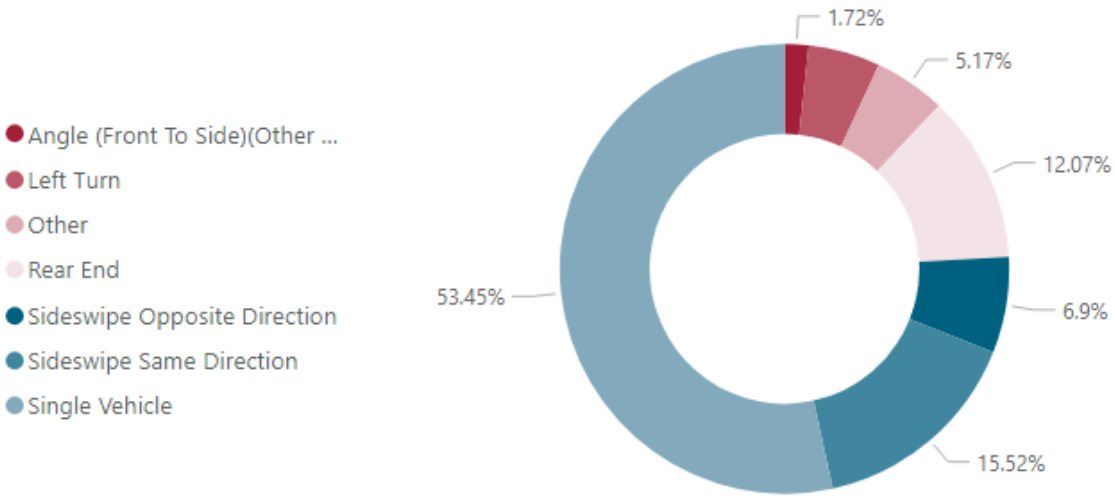


Figure 7 - Total Crashes by Collision Manner



Projected Traffic

GROWTH RATES

To determine the growth rate to be used for 2050 volume projections, historical 2020 ADT traffic volumes provided by the Yuma Metropolitan Planning Organization (YMPO) Traffic Data Management System (TDMS) were used to compare against the 2022 historical ADT traffic volumes and collected 2023 daily traffic volumes. **Table 5** shows the daily volume comparison between historical volumes and collected volumes.

Table 4: Daily Traffic Volume Comparison

Roadway Segment	Daily Traffic Volumes				
	2020	2022	2023*	Percent Increase (2020 to 2022)	Percent Increase (2020 to 2023)
US 95 South of Dome Valley Road/County 3rd Street	3,601	4,143	7,521	+7.26%	+27.83%
Us 96 North of Dome Valley Road/County 3rd Street	4,954	5,699	6,585	+7.26%	+9.95%

*Collected traffic volumes

Based on the comparison of historical and collected traffic volumes, there was a drastic increase in volume within the past 3 years. The YMPO Long Range Transportation Plan (LRTP) projects that daily traffic volumes along US 95 within our study segment is 5,001-10,000 vehicles per day. Therefore, the continuous aggressive growth in volumes is not expected to continue throughout the next 20-30 years as our daily traffic volumes are near the LRTP projected volumes for 2045. To determine the projected volumes in 2050, an annual growth rate of 2% was used.

For the purposes of this report and to remain conservative, the No-Build and Build traffic volumes are assumed to be the same as there is no existing capacity constraint preventing vehicles from using the study segments of US 95. **Table 6** provides the resulting 2050 No-Build and Build daily traffic volumes.

Table 5: Calculated 2050 No-Build and Build Average Daily Traffic Volumes

Roadway Segment	2050 Daily Traffic Volume (vehicles)
US 95 South of Dome Valley Road/County 3rd Street	12,837
Us 96 North of Dome Valley Road/County 3rd Street	11,240

The growth rates shown in **Table 6** were also applied to the existing TMC peak hour volumes at each intersection to estimate 2050 intersection peak hour volumes. The 2050 intersection peak hour and daily segment volumes are shown in **Figure 7.**

Figure 8 - 2050 No-Build and Build

Roadway Improvements

Roadway improvements associated with this project include the following:

- Widening of US-95 to two lanes in each direction with a two-way left-turn lane, creating a five-lane roadway.

Roadway Cross-Section Level of Service

The level of service for the proposed cross-section was determined using HCM 6 for existing 2024 conditions. No-Build and Build conditions using 2050 projected volumes. The results are provided in **Table 7.**

Table 6: HCM Cross-Section LOS

Roadway Segment	2023 Volume	HCM LOS for 2-Lane section	2050 Volume	HCM LOS for 2-Lane section	HCM LOS for 4-Lane section
South of Dome Valley Road/County 3rd Street	3,601	A	12,837	D	B
North of Dome Valley Road/County 3rd Street	4,954	A	11,240	D	B

Intersection Control Analysis

SIGNAL WARRANT ANALYSIS

This section documents the signal warrant analyses for the intersection of US 95 and Dome Valley Road/County 3rd Street in accordance with 2009 MUTCD standards for the 2023 Existing Year, 2050 No-Build and 2050 Build conditions. The 2050 No-Build conditions is performed using 2050 volumes assuming with existing intersection geometry and field conditions. The 2050 Build condition is performed using 2050 volumes, and assuming the roadway will be built with two travel lanes in each direction.

According to the 2009 MUTCD, a traffic signal is warranted at a given intersection if the conditions at the intersection meet at least one (1) of the MUTCD signal warrants. For this signal warrant analysis, the following warrants were considered appropriate for evaluation at the intersection:

- Warrant 1 – Eight-Hour Vehicular Volume
- Warrant 2 – Four-Hour Vehicular Volume
- Warrant 3 – Peak Hour

As 24-hour turning movement count data was not collected as part of this project for peak hour turning movement count data at the intersections was adjusted based on methodology in ADOT Traffic Guidelines and Processes (TGP) Figure 611-A that outlines adjustment

factors for the 1st, 4th, and 8th hourly volumes given an estimated AADT for volumes on County 3rd Street. . Ratios between the peak hour to the 4th and 8th hourly volumes were developed to estimate up to eight-hour vehicle volume for these warrant studies. 24-hour daily traffic volumes collected along US 95 and were used for north-south volumes.

Signal Warrant Results

A 2009 MUTCD Signal Warrant Analysis was performed for the intersection of US 95 and Dome Valley Road/County 3rd Street. Existing traffic volumes were utilized for existing conditions and future 2050 volumes for future 2050 no-build and build conditions.

Signal warrants are *not* met in existing conditions. If existing conditions were to remain (no-build), a traffic signal would be warranted at the intersection by 2050. In 2050 build conditions, the Eight-Hour Vehicular Volume and the Four-Hour Vehicular Volume Warrants were *not* met, while the Peak Hour Volume Warrant was met. However, due to this intersection existing in a rural area with a relatively small average daily traffic volume, no signal is recommended at this intersection. Signal warrant analysis results summarized in **Table 8** and are included in **Appendix D**.

Table 7: 2009 MUTCD Signal Warrant Analysis Results

Warrant No.	Name	Satisfied		
		2023 Existing	2050 No-Build	2050 Build
1	Eight-Hour Vehicular Volume	No	Yes	No
2	Four-Hour Vehicular Volume	No	Yes	No
3	Peak Hour Volume	No	Yes	Yes

ALTERNATIVE INTERSECTION GEOMETRY

Along with a no-build assessment, the following section summarizes the alternative geometry evaluated for the intersection of Dome Valley Road/County 3rd Street. Signal warrants were not met in 2050 Build conditions, therefore a signal was not analyzed for this intersection.

Alternative 1 Stop Controlled: This alternatives assumes, two-northbound through lanes and one right-turn lane, two southbound lanes and exclusive left-turn lane. The westbound approach will continue to be the stop-controlled approach of this intersection with one shared right/left turn lane. **Figure 9** provides shows the intersection configuration and control.

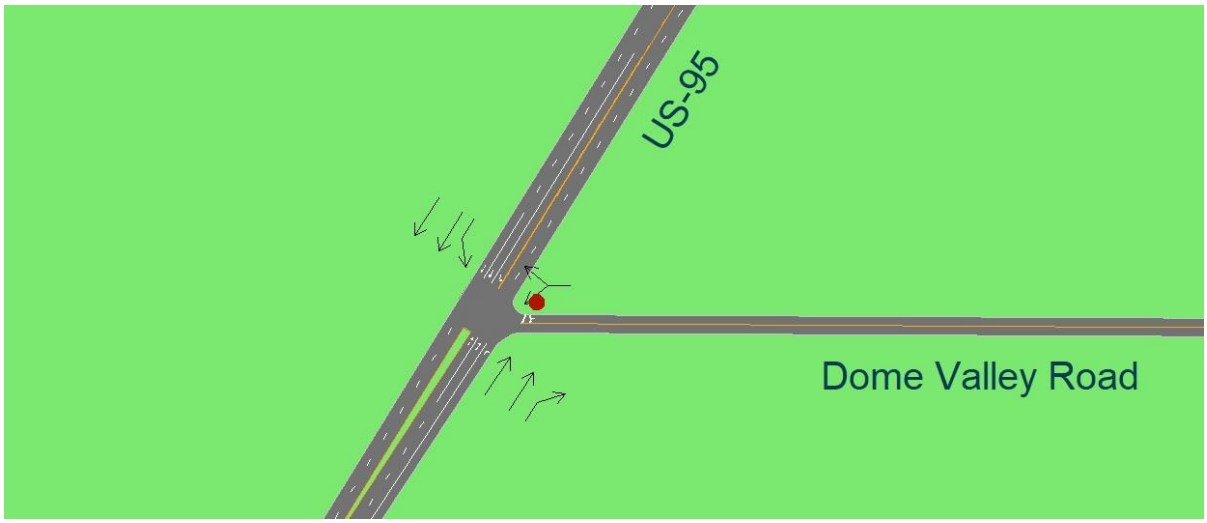


Figure 9 - Alternative 1 – Stop Controlled Intersection

Alternative 2 Green-T Intersection: To develop the Green-T geometry, the geometry for Alternative 1 is modified to provide an exclusive acceleration lane in the inside median of the southbound lane, south of Dome Valley Road. This lane will provide sufficient distance for traffic turning left-turning traffic from Dome Valley Road to accelerate and merge with southbound traffic on US 95. For this option the westbound approach of Dome Valley Road will continue to operate with a stop sign, and will stop only for northbound through traffic and southbound left-turn from US 95 traffic. For this option, the westbound approach was assumed to provide one left-turn lane and one right-turn lane.

The westbound approach would find a gap in oncoming northbound traffic and southbound left turning traffic *only* to perform an egress movement. The westbound left turning traffic would travel on a dedicated acceleration lane and then merge with southbound traffic. **Figure 10** provides the intersection configuration and control.

Figure 10 - Alternative 2- Green T Intersection

Alternative 3 Roundabout: The third alternative is two-lane roundabout. The northbound and southbound approaches will provide two lanes and the westbound approach will operate with one shared left/right lane. **Figure 11** provides the intersection configuration and control.

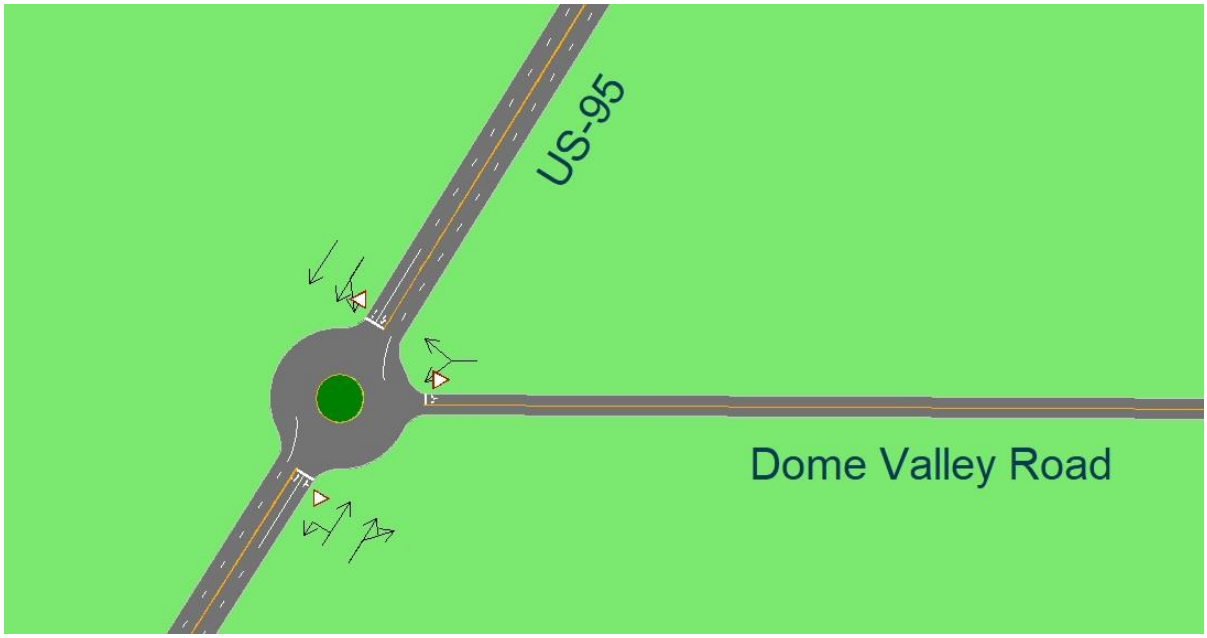


Figure 11 - Alternative 2

Future Conditions Alternatives Analysis

This section evaluates the level of service at the study intersection under future conditions. Final recommendations include revised geometry and phasing to accommodate the volumes projected in this analysis. Synchro reports are provided in **Appendix E.**

2050 NO-BUILD

Table 9 provides the LOS and queues assuming that no improvements are made to the intersection control or configuration with 2050 projected volumes.

Table 8: 2050 No-Build Level of Service & Queues

LOS/Delay	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
No-Build												
AM Peak				B/13				-	-	A/9	-	
PM Peak				F/175				-	-	A/8	-	
Queue (ft)				155’				-	-	25’	-	

The 2050 no-build scenario shows the westbound approach will operate at LOS F in the PM peak hour. The increase in through volumes on US 95 causes delay on the minor approach, Dome Valley Rd/ County 3rd St, since vehicles will have a more difficult time finding a gap in through traffic to safely make a turn.

2050 BUILD ALTERNATIVES

Table 10 provides the LOS and queues for each of the alternatives described in the "Intersection Build Alternatives" section with 2050 projected volumes.

Table 9: 2050 Horizon Level of Service & Queues

LOS/Delay	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Build Alternative 1 – Stop Controlled												
AM Peak				B/13				-	-	A/9	-	
PM Peak				D/30				-	-	A/8	-	
Queue (ft)				50'				-	-	25'	-	
Build Alternative 2 – Green - T												
AM Peak				B/12		A/10		-	-	-	-	
PM Peak				B/10		A/9		-	-	-	-	
Queue (ft)				25'		25'		-	-	-	-	
Build Alternative 3 - Roundabout												
AM Peak				A/4			A/4	A/4		A/3	A/3	
PM Peak				A/4			A/4	A/4		B/10	B/11	

All the movements for every build alternative result in acceptable LOS (LOS D or better) for a 2050 Horizon year. The no-build scenario results in an unacceptable LOS F for the westbound movement during the PM Peak hour.

PREFERRED ALTERNATIVE

Although all alternatives analyzed will operate at an acceptable level of service, a brief evaluation of these intersection configuration alternatives from a traffic operations, safety and cost perspective follows.

- **Alternative 1 Stop Controlled:** A stop controlled intersection will operate with acceptable LOS during peak periods and likely during off-peak times. However, there are safety concerns with the egress movement of vehicles from Dome Valley Road/County 3rd St making a left turn across a 4-lane divided roadway with high speeds. With an increase in traffic volumes on US95, vehicles will find it challenging to find an acceptable gap in traffic to perform a left turn lane. A two-stage left-turn lane may not be viable if the median width is not wide enough to provide refuge to passenger cars and especially heavy vehicles. Therefore, a stop-controlled intersection **is not recommended.**

- **Alternative 2 Green T:** Green - T, intersection will operate with acceptable LOS during peak periods and likely during off-peak times. As previously mentioned, the

westbound approach would need to find a gap in oncoming northbound traffic and southbound left turning traffic *only* to perform an egress movement, resulting in less conflict points. The westbound left turning traffic would travel on a dedicated lane to accelerate and merge with southbound traffic downstream. With this alternative, the westbound left-turning volumes will have to assess gaps along the northbound traffic stream only. There is sufficient median width to provide sufficient acceleration lane to allow for traffic to accelerate and merge with the southbound traffic. This option will not create delays or stops for southbound US 95 traffic. Therefore, a Florida T intersection **is recommended**.

- **Alternative** 3 **Roundabout:** Optimum operations at a roundabout occurs when there is a balanced demand at all approaches of the roundabout. As shown in volume distribution layout, there is a heavy demand in northbound approach in the AM, and heavy demand in the southbound approach in the PM peak, with consistent demand in the westbound approach. Although there are no safety concerns with a roundabout, as a roundabout has the least amount of conflict points of the alternatives considered. This alternative will, slow down the southbound traffic during the peak hour, and will require lane acquisition for additional right-of-way to build a two-lane roundabout with a radius wide enough to accommodate heavy vehicle traffic. From a cost perspective, the consideration of a roundabout at this intersection is not cost effective. Therefore, a roundabout **is not recommended.**

Conclusion

This technical memorandum documents the traffic analysis findings for the Lindsay Road Improvements project between Hunt Highway and Ocotillo Road. These analysis findings are summarized below:

- The existing two-lane cross section on US 95 will operate at LOS D with future 2050 traffic volumes;
- The proposed four-lane cross-section on US 95 will accommodate calculated 2050 traffic volumes and operate at an acceptable LOS B;
- The 2023 Existing Conditions capacity analysis showed the study intersection operates at LOS B during the AM peak hour and LOS D during the PM peak hour;
- The 2050 no-build scenario, which uses projected 2050 volumes in existing lane configuration and control, showed that the study intersection will operate at LOS F in the PM peak hour; and
- It is recommended that the US 95 and Dome Valley Rd/County 3rd St be constructed as a Florida T, stop controlled intersection in the 2050 Build conditions.

Traffic Volume Results for the Noise Report

The Arizona Department of Transportation (ADOT) requires a Noise Report as a part of the Environmental Planning process which includes documentation of the following traffic volumes and vehicle classification percentages:

- Existing;
- No-Build; and
- Build (Improving US-95 to a four-lane principle arterial).

Average Daily Traffic

The 24-hour bi-directional volume data shown in **Table 1** was used as the 2023 Existing Average Annual Daily Traffic (AADT) volume for each study roadway segment. The calculated 2050 daily volumes shown in **Table 6** were used as the 2050 Build AADT volumes for every alternative. The 2023 Existing and 2050 No-Build and Build AADT volumes are shown in **Table 11**.

Peak Hour Volumes

The peak hour volumes shown in **Figure 3** and **Figure 8** were used as the peak hour volume shown in **Table 11** for 2023 Existing and 2050 No-Build and Build volumes, respectively. Peak hour vehicle classifications were subsequently calculated using the method described below.

Vehicle Classifications

For the purposes of this analysis, the 24-hour bi-directional volumes, which also included vehicle classification data, were divided into the following three vehicle classification categories:

- Passenger cars;
- Medium trucks; and
- Heavy trucks.

Traffic volumes along the entire study corridor were categorically classified using the Federal Highway Administration (FHWA) 13-Class classification scheme, where passenger cars are vehicles in FHWA Classes 1-4, medium trucks are vehicles in FHWA Class 5, and heavy trucks are vehicles in FHWA Classes 6-13. The percentage of each vehicle type was calculated for the study corridor as a whole, with passenger cars comprising 92% of all vehicles, medium trucks comprising 1% of all vehicles, and heavy trucks comprising 7% of all vehicles. These percentages were applied to the peak hour volumes for each study roadway segment to estimate the volume for each vehicle classification on each segment. No change in vehicle classification percentages is anticipated between 2023 and 2050.

The vehicle type percentages and resulting peak hour volumes are shown in **Table 11**.

Table 10: Noise Report Traffic Volume Data

Summary of Results - 2023 Existing					
Segment	AADT Volume	Peak Hour Volume	Cars (92%)	Med (1%)	Heavy (7%)
US - 95 North of County 3rd St	6,585	291	268	3	20
US - 95 South of County 3rd St	7,521	825	759	8	58
Summary of Results - 2050 (No-Build and Build)					
Segment	AADT Volume	Peak Hour Volume	Cars (92%)	Med (1%)	Heavy (7%)
US - 95 North of County 3rd St	11,240	497	457	5	35
US - 95 South of County 3rd St	12,837	1,408	1,296	14	99

Air Quality Report Methodology & Results

Arizona Department Of Transportation (ADOT) requires an Air Quality Report as a part of the Environmental Planning process, which includes documentation of traffic projections and LOS analysis for the 2023 Existing (also known as 2023 Base), and 2050 Build scenarios.

Traffic Projections

The existing 2023 total average daily traffic (ADT) volumes (all vehicles combined), truck ADTs, and truck percentages for each study roadway segment were taken directly from the collected 2024 24-hour bi-directional volumes and FHWA vehicle classifications. The calculated 2050 ADTs for the Build scenarios were taken from **Table 6**. The 2024 truck percentages were applied to the 2050 ADTs to estimate the 2050 truck ADTs for the Build scenarios for each study roadway segment. The 2024 Existing, and 2050 Build results for each study roadway segment are shown in **Table 12**.

Table 11: Traffic Volumes and Truck Percentages for the Air Quality Report

	2023 Existing	2050 Build
North of Co. 3rd St.		
Total ADT	6,585	11,240
Truck ADT	446	761
Truck %	6.8%	6.8%
South of Co. 3rd St.		
Total ADT	7,521	12,837
Truck ADT	775	1,323
Truck %	10.3%	10.3%

While the overall truck percentage for the corridor is approximately 8% per the FHWA classification schema, it should be noted that the 8% value is comprised of 1% medium trucks and 7% heavy vehicle trucks. Medium trucks are defined as two-axle, six-tire vehicles, which include small single-unit delivery trucks as well as pick-up trucks with dual sets of back tires (known as a “dually”). Heavy trucks are defined as vehicles with three-axle to greater than six-axle vehicle commonly known as “freight trucks”. US 95 serves as a commercial or freight truck route that provides access between Interstate 8 (I-8) and I-10 and is built to accommodate heavy vehicles. Heavy vehicle percentages are consistent with the type of vehicle that is expected along this route.

Kimley»Horn

Appendix A –2023 24-Hour Bi-Directional Traffic Volume Counts and Vehicle Classifications Data

Field Data Services of Arizona, Inc.
31894 Whitetail Ln.
Temecula, CA 92592
(520) 316-6745

Site Code: Thurs 12/07/23
Station ID: 23-1574-002
US-95 north of County 3rd St
32.773487, -114.387509
Latitude: 0' 0.0000 Undefined

Northbound

Start Time	Bikes	Cars & Tlrs	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total	Truck Total
12/07/23	0	3	0	0	0	0	0	0	6	0	0	0	0	9	6
01:00	0	1	0	0	0	0	0	0	3	0	0	0	0	4	3
02:00	0	3	0	0	0	0	0	0	6	0	0	0	0	9	6
03:00	0	29	0	0	0	0	0	0	4	0	0	0	0	33	4
04:00	0	193	0	0	2	1	0	0	9	0	0	0	0	205	12
05:00	0	888	1	3	1	1	0	0	2	1	0	0	0	897	8
06:00	0	421	2	3	4	1	0	0	6	0	0	0	0	437	14
07:00	0	141	3	2	1	1	3	1	5	0	0	0	0	157	13
08:00	0	110	2	0	4	0	3	0	5	0	0	0	0	124	12
09:00	0	151	2	3	8	1	3	4	7	0	0	0	0	179	26
10:00	2	91	6	4	3	1	1	2	7	0	2	0	1	120	21
11:00	0	103	5	3	1	0	0	3	6	1	0	0	0	122	14
12 PM	1	134	5	1	3	2	0	1	10	1	1	0	0	159	19
13:00	1	129	3	2	1	1	0	1	6	0	0	1	0	145	12
14:00	1	118	2	1	1	0	0	2	9	0	0	0	0	134	13
15:00	0	111	5	7	2	0	0	1	11	1	0	0	0	138	22
16:00	1	103	0	3	1	0	0	0	3	0	0	0	0	111	7
17:00	1	110	1	1	0	0	0	0	11	0	0	0	0	124	12
18:00	0	58	0	0	0	0	0	0	4	1	0	0	0	63	5
19:00	0	38	0	0	1	0	0	0	5	0	0	0	0	44	6
20:00	0	39	0	0	0	1	0	0	6	0	0	0	0	46	7
21:00	0	21	0	0	1	0	0	0	3	0	0	0	0	25	4
22:00	0	18	0	0	0	0	0	0	7	0	0	0	0	25	7
23:00	0	5	0	0	0	0	0	0	4	0	0	0	0	9	4
Total	7	3018	37	33	34	10	10	15	145	5	3	1	1	3319	257
Percent	0.2%	90.9%	1.1%	1.0%	1.0%	0.3%	0.3%	0.5%	4.4%	0.2%	0.1%	0.0%	0.0%		7.7%
AM Peak	10:00	05:00	10:00	10:00	09:00	04:00	07:00	09:00	04:00	05:00	10:00		10:00	05:00	09:00
Vol.	2	888	6	4	8	1	3	4	9	1	2		1	897	26
PM Peak	12:00	12:00	12:00	15:00	12:00	12:00		14:00	15:00	12:00	12:00	13:00		12:00	15:00
Vol.	1	134	5	7	3	2		2	11	1	1	1		159	22
Grand Total	7	3018	37	33	34	10	10	15	145	5	3	1	1	3319	257
Percent	0.2%	90.9%	1.1%	1.0%	1.0%	0.3%	0.3%	0.5%	4.4%	0.2%	0.1%	0.0%	0.0%		7.7%

Field Data Services of Arizona, Inc.
31894 Whitetail Ln.
Temecula, CA 92592
(520) 316-6745

Site Code: Thurs 12/07/23
Station ID: 23-1574-002
US-95 north of County 3rd St
32.773487, -114.387509
Latitude: 0' 0.0000 Undefined

Southbound

Start Time	Bikes	Cars & Tlrs	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total	Truck Total
12/07/23	0	7	0	2	0	0	0	0	5	0	0	0	0	14	7
01:00	0	5	0	0	1	0	0	0	1	0	0	0	0	7	2
02:00	0	9	0	0	0	0	0	0	1	0	0	0	0	10	1
03:00	0	1	0	0	0	0	0	0	3	0	0	0	0	4	3
04:00	0	5	0	0	0	0	0	0	2	0	0	0	0	7	2
05:00	0	15	0	0	0	0	0	0	1	0	0	0	0	16	1
06:00	0	35	0	3	1	0	0	0	6	0	0	0	0	45	10
07:00	1	75	1	2	0	0	0	0	2	0	0	0	0	81	4
08:00	2	86	3	2	1	1	1	0	6	0	0	0	0	102	11
09:00	0	125	3	1	6	3	3	1	10	0	0	0	0	152	24
10:00	1	119	7	7	3	1	6	2	9	0	0	0	0	155	28
11:00	0	166	3	6	6	1	0	3	7	0	0	0	0	192	23
12 PM	1	149	3	5	2	0	1	3	11	0	0	0	0	175	22
13:00	0	152	3	1	3	0	0	1	15	1	2	0	0	178	23
14:00	6	200	8	7	4	1	0	2	13	0	0	0	0	241	27
15:00	6	399	7	6	3	0	0	1	14	0	0	0	0	436	24
16:00	3	804	3	3	2	0	0	1	9	0	0	0	0	825	15
17:00	3	321	1	3	2	2	0	1	5	0	0	0	0	338	13
18:00	0	117	1	0	3	3	0	1	4	1	1	0	0	131	13
19:00	0	39	2	0	0	0	0	0	5	0	0	0	0	46	5
20:00	0	30	0	0	1	0	0	0	1	0	0	0	0	32	2
21:00	0	30	0	0	1	0	0	0	5	0	0	0	0	36	6
22:00	0	21	0	0	0	0	0	0	1	0	0	0	0	22	1
23:00	0	18	0	0	0	0	0	0	3	0	0	0	0	21	3
Total	23	2928	45	48	39	12	11	16	139	2	3	0	0	3266	270
Percent	0.7%	89.7%	1.4%	1.5%	1.2%	0.4%	0.3%	0.5%	4.3%	0.1%	0.1%	0.0%	0.0%		8.3%
AM Peak	08:00	11:00	10:00	10:00	09:00	09:00	10:00	11:00	09:00					11:00	10:00
Vol.	2	166	7	7	6	3	6	3	10					192	28
PM Peak	14:00	16:00	14:00	14:00	14:00	18:00	12:00	12:00	13:00	13:00	13:00			16:00	14:00
Vol.	6	804	8	7	4	3	1	3	15	1	2			825	27
Grand Total	23	2928	45	48	39	12	11	16	139	2	3	0	0	3266	270
Percent	0.7%	89.7%	1.4%	1.5%	1.2%	0.4%	0.3%	0.5%	4.3%	0.1%	0.1%	0.0%	0.0%		8.3%

Field Data Services of Arizona, Inc.
31894 Whitetail Ln.
Temecula, CA 92592
(520) 316-6745

Site Code: Thurs 12/07/23
Station ID: 23-1574-002
US-95 north of County 3rd St
32.773487, -114.387509
Latitude: 0' 0.0000 Undefined

Northbound, Southbound

Start Time	Bikes	Cars & Tlrs	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total	Truck Total
12/07/23	0	10	0	2	0	0	0	0	11	0	0	0	0	23	13
01:00	0	6	0	0	1	0	0	0	4	0	0	0	0	11	5
02:00	0	12	0	0	0	0	0	0	7	0	0	0	0	19	7
03:00	0	30	0	0	0	0	0	0	7	0	0	0	0	37	7
04:00	0	198	0	0	2	1	0	0	11	0	0	0	0	212	14
05:00	0	903	1	3	1	1	0	0	3	1	0	0	0	913	9
06:00	0	456	2	6	5	1	0	0	12	0	0	0	0	482	24
07:00	1	216	4	4	1	1	3	1	7	0	0	0	0	238	17
08:00	2	196	5	2	5	1	4	0	11	0	0	0	0	226	23
09:00	0	276	5	4	14	4	6	5	17	0	0	0	0	331	50
10:00	3	210	13	11	6	2	7	4	16	0	2	0	1	275	49
11:00	0	269	8	9	7	1	0	6	13	1	0	0	0	314	37
12 PM	2	283	8	6	5	2	1	4	21	1	1	0	0	334	41
13:00	1	281	6	3	4	1	0	2	21	1	2	1	0	323	35
14:00	7	318	10	8	5	1	0	4	22	0	0	0	0	375	40
15:00	6	510	12	13	5	0	0	2	25	1	0	0	0	574	46
16:00	4	907	3	6	3	0	0	1	12	0	0	0	0	936	22
17:00	4	431	2	4	2	2	0	1	16	0	0	0	0	462	25
18:00	0	175	1	0	3	3	0	1	8	2	1	0	0	194	18
19:00	0	77	2	0	1	0	0	0	10	0	0	0	0	90	11
20:00	0	69	0	0	1	1	0	0	7	0	0	0	0	78	9
21:00	0	51	0	0	2	0	0	0	8	0	0	0	0	61	10
22:00	0	39	0	0	0	0	0	0	8	0	0	0	0	47	8
23:00	0	23	0	0	0	0	0	0	7	0	0	0	0	30	7
Total	30	5946	82	81	73	22	21	31	284	7	6	1	1	6585	527
Percent	0.5%	90.3%	1.2%	1.2%	1.1%	0.3%	0.3%	0.5%	4.3%	0.1%	0.1%	0.0%	0.0%		8.0%
AM Peak	10:00	05:00	10:00	10:00	09:00	09:00	10:00	11:00	09:00	05:00	10:00		10:00	05:00	09:00
Vol.	3	903	13	11	14	4	7	6	17	1	2		1	913	50
PM Peak	14:00	16:00	15:00	15:00	12:00	18:00	12:00	12:00	15:00	18:00	13:00	13:00		16:00	15:00
Vol.	7	907	12	13	5	3	1	4	25	2	2	1		936	46
Grand Total	30	5946	82	81	73	22	21	31	284	7	6	1	1	6585	527
Percent	0.5%	90.3%	1.2%	1.2%	1.1%	0.3%	0.3%	0.5%	4.3%	0.1%	0.1%	0.0%	0.0%		8.0%

Field Data Services of Arizona, Inc.
31894 Whitetail Ln.
Temecula, CA 92592
(520) 316-6745

Site Code: Thurs 12/07/23
Station ID: 23-1574-003
US-95 south of County 3rd St
32.771163, -114.389267
Latitude: 0' 0.0000 Undefined

Northbound

Start Time	Bikes	Cars & Tlrs	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total	Truck Total
12/07/23	0	3	0	0	0	0	0	1	8	0	0	0	0	12	9
01:00	0	3	0	0	0	0	0	0	3	0	0	0	0	6	3
02:00	0	6	0	0	0	0	0	0	6	0	0	0	0	12	6
03:00	0	50	0	1	0	0	0	0	4	0	0	0	0	55	5
04:00	0	200	0	9	2	1	0	0	12	0	0	1	0	225	25
05:00	0	884	1	6	1	2	0	0	2	1	2	2	0	901	16
06:00	0	459	2	8	6	4	0	1	7	0	1	1	0	489	28
07:00	0	171	3	3	4	2	5	1	5	0	3	5	0	202	28
08:00	0	127	2	0	4	1	8	0	4	0	3	4	0	153	24
09:00	0	172	2	5	10	1	8	5	8	0	4	8	0	223	49
10:00	2	101	7	4	5	1	7	3	7	0	4	1	1	143	33
11:00	0	125	4	3	4	1	5	5	6	1	3	2	0	159	30
12 PM	1	146	4	2	5	2	6	2	13	5	1	0	0	187	36
13:00	2	142	3	3	5	0	5	2	10	3	0	0	0	175	28
14:00	1	139	2	1	2	1	0	4	12	4	0	0	0	166	24
15:00	0	127	5	7	3	1	0	2	18	2	0	0	0	165	33
16:00	1	115	0	4	4	0	0	1	4	2	0	0	0	131	15
17:00	1	130	1	1	1	0	0	1	15	1	0	0	0	151	19
18:00	0	63	0	0	1	0	1	0	6	1	0	0	0	72	9
19:00	0	46	0	0	1	1	0	0	6	0	1	0	0	55	9
20:00	0	42	0	0	0	0	0	0	8	0	1	0	0	51	9
21:00	0	23	0	0	1	0	0	0	4	0	0	0	0	28	5
22:00	0	20	0	0	0	0	0	0	7	0	0	0	0	27	7
23:00	0	5	0	0	0	0	0	0	4	0	0	0	0	9	4
Total	8	3299	36	57	59	18	45	28	179	20	23	24	1	3797	454
Percent	0.2%	86.9%	0.9%	1.5%	1.6%	0.5%	1.2%	0.7%	4.7%	0.5%	0.6%	0.6%	0.0%		12.0%
AM Peak	10:00	05:00	10:00	04:00	09:00	06:00	08:00	09:00	04:00	05:00	09:00	09:00	10:00	05:00	09:00
Vol.	2	884	7	9	10	4	8	5	12	1	4	8	1	901	49
PM Peak	13:00	12:00	15:00	15:00	12:00	12:00	12:00	14:00	15:00	12:00	12:00			12:00	12:00
Vol.	2	146	5	7	5	2	6	4	18	5	1			187	36
Grand Total	8	3299	36	57	59	18	45	28	179	20	23	24	1	3797	454
Percent	0.2%	86.9%	0.9%	1.5%	1.6%	0.5%	1.2%	0.7%	4.7%	0.5%	0.6%	0.6%	0.0%		12.0%

Field Data Services of Arizona, Inc.
31894 Whitetail Ln.
Temecula, CA 92592
(520) 316-6745

Site Code: Thurs 12/07/23
Station ID: 23-1574-003
US-95 south of County 3rd St
32.771163, -114.389267
Latitude: 0' 0.0000 Undefined

Southbound

Start Time	Bikes	Cars & Tlrs	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total	Truck Total
12/07/23	0	7	0	2	0	0	0	0	6	0	0	0	0	15	8
01:00	0	6	0	0	1	0	0	0	1	0	0	0	0	8	2
02:00	0	9	0	0	0	0	0	0	1	0	0	0	0	10	1
03:00	0	2	0	0	0	0	0	0	4	0	0	0	0	6	4
04:00	0	9	0	0	0	0	0	0	3	0	0	0	0	12	3
05:00	0	15	0	0	0	1	0	0	2	0	0	1	0	19	4
06:00	0	48	0	4	1	0	0	0	6	0	1	4	0	64	16
07:00	1	93	0	4	0	0	0	0	2	0	3	5	0	108	14
08:00	2	104	3	3	3	1	6	0	6	0	3	5	0	136	27
09:00	0	135	3	3	6	4	9	1	9	0	5	3	0	178	40
10:00	1	142	7	8	4	2	11	2	9	0	4	8	0	198	48
11:00	0	183	3	7	6	1	5	4	8	0	2	2	0	221	35
12 PM	1	173	3	7	4	0	7	3	13	3	2	0	0	216	39
13:00	3	175	3	1	3	2	6	2	17	2	3	0	0	217	36
14:00	6	223	8	14	5	2	0	2	14	2	0	0	0	276	39
15:00	4	427	7	7	4	1	0	4	16	2	2	0	0	474	36
16:00	4	819	2	6	5	1	0	3	9	0	1	0	0	850	25
17:00	3	358	1	3	5	3	0	1	7	0	0	0	0	381	19
18:00	0	131	3	0	4	3	0	3	4	2	1	0	0	151	17
19:00	0	46	2	1	1	1	0	1	6	0	2	0	0	60	12
20:00	0	30	1	0	2	0	0	1	2	0	0	0	0	36	5
21:00	0	30	0	0	1	2	0	0	6	0	0	0	0	39	9
22:00	0	21	0	0	1	1	0	0	2	0	0	0	0	25	4
23:00	0	19	0	0	1	0	0	0	4	0	0	0	0	24	5
Total	25	3205	46	70	57	25	44	27	157	11	29	28	0	3724	448
Percent	0.7%	86.1%	1.2%	1.9%	1.5%	0.7%	1.2%	0.7%	4.2%	0.3%	0.8%	0.8%	0.0%		12.0%
AM Peak	08:00	11:00	10:00	10:00	09:00	09:00	10:00	11:00	09:00		09:00	10:00		11:00	10:00
Vol.	2	183	7	8	6	4	11	4	9		5	8		221	48
PM Peak	14:00	16:00	14:00	14:00	14:00	17:00	12:00	15:00	13:00	12:00	13:00			16:00	12:00
Vol.	6	819	8	14	5	3	7	4	17	3	3			850	39
Grand Total	25	3205	46	70	57	25	44	27	157	11	29	28	0	3724	448
Percent	0.7%	86.1%	1.2%	1.9%	1.5%	0.7%	1.2%	0.7%	4.2%	0.3%	0.8%	0.8%	0.0%		12.0%

Field Data Services of Arizona, Inc.
31894 Whitetail Ln.
Temecula, CA 92592
(520) 316-6745

Site Code: Thurs 12/07/23
Station ID: 23-1574-003
US-95 south of County 3rd St
32.771163, -114.389267
Latitude: 0' 0.0000 Undefined

Northbound, Southbound

Start Time	Bikes	Cars & Tlrs	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axl Double	5 Axle Double	>6 Axl Double	<6 Axl Multi	6 Axle Multi	>6 Axl Multi	Total	Truck Total
12/07/23	0	10	0	2	0	0	0	1	14	0	0	0	0	27	17
01:00	0	9	0	0	1	0	0	0	4	0	0	0	0	14	5
02:00	0	15	0	0	0	0	0	0	7	0	0	0	0	22	7
03:00	0	52	0	1	0	0	0	0	8	0	0	0	0	61	9
04:00	0	209	0	9	2	1	0	0	15	0	0	1	0	237	28
05:00	0	899	1	6	1	3	0	0	4	1	2	3	0	920	20
06:00	0	507	2	12	7	4	0	1	13	0	2	5	0	553	44
07:00	1	264	3	7	4	2	5	1	7	0	6	10	0	310	42
08:00	2	231	5	3	7	2	14	0	10	0	6	9	0	289	51
09:00	0	307	5	8	16	5	17	6	17	0	9	11	0	401	89
10:00	3	243	14	12	9	3	18	5	16	0	8	9	1	341	81
11:00	0	308	7	10	10	2	10	9	14	1	5	4	0	380	65
12 PM	2	319	7	9	9	2	13	5	26	8	3	0	0	403	75
13:00	5	317	6	4	8	2	11	4	27	5	3	0	0	392	64
14:00	7	362	10	15	7	3	0	6	26	6	0	0	0	442	63
15:00	4	554	12	14	7	2	0	6	34	4	2	0	0	639	69
16:00	5	934	2	10	9	1	0	4	13	2	1	0	0	981	40
17:00	4	488	2	4	6	3	0	2	22	1	0	0	0	532	38
18:00	0	194	3	0	5	3	1	3	10	3	1	0	0	223	26
19:00	0	92	2	1	2	2	0	1	12	0	3	0	0	115	21
20:00	0	72	1	0	2	0	0	1	10	0	1	0	0	87	14
21:00	0	53	0	0	2	2	0	0	10	0	0	0	0	67	14
22:00	0	41	0	0	1	1	0	0	9	0	0	0	0	52	11
23:00	0	24	0	0	1	0	0	0	8	0	0	0	0	33	9
Total	33	6504	82	127	116	43	89	55	336	31	52	52	1	7521	902
Percent	0.4%	86.5%	1.1%	1.7%	1.5%	0.6%	1.2%	0.7%	4.5%	0.4%	0.7%	0.7%	0.0%		12.0%
AM Peak	10:00	05:00	10:00	06:00	09:00	09:00	10:00	11:00	09:00	05:00	09:00	09:00	10:00	05:00	09:00
Vol.	3	899	14	12	16	5	18	9	17	1	9	11	1	920	89
PM Peak	14:00	16:00	15:00	14:00	12:00	14:00	12:00	14:00	15:00	12:00	12:00			16:00	12:00
Vol.	7	934	12	15	9	3	13	6	34	8	3			981	75
Grand Total	33	6504	82	127	116	43	89	55	336	31	52	52	1	7521	902
Percent	0.4%	86.5%	1.1%	1.7%	1.5%	0.6%	1.2%	0.7%	4.5%	0.4%	0.7%	0.7%	0.0%		12.0%

Kimley»Horn

Appendix B – 2023 Turning Movement Count Data

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	US-95	DATE:	12/07/23	LOCATION:	Yuma
E-W STREET:	County 3rd St	DAY:	THURSDAY	PROJECT#	23-1574-001

ALL VEHICLES

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	0	0	0	1	0	
6:00 AM													
6:15 AM													
6:30 AM	0	89	18	0	9	0	0	0	0	7	0	2	125
6:45 AM	0	58	14	0	17	0	0	0	0	4	0	1	94
7:00 AM	0	37	5	1	11	0	0	0	0	3	0	0	57
7:15 AM	0	53	17	1	28	0	0	0	0	8	0	0	107
7:30 AM	0	44	9	2	20	0	0	0	0	15	0	0	90
7:45 AM	0	23	14	1	17	0	0	0	0	6	0	0	61
8:00 AM	0	33	8	0	20	0	0	0	0	14	0	2	77
8:15 AM	0	29	8	3	32	0	0	0	0	12	0	1	85
8:30 AM													
8:45 AM													
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	0	366	93	8	154	0	0	0	0	69	0	6	696
Approach %	0.00	79.74	20.26	4.94	95.06	0.00	####	####	####	92.00	0.00	8.00	
App/Depart	459	/	372	162	/	223	0	/	101	75	/	0	

AM Peak Hr Begins at: 630 AM

PEAK													
Volumes	0	237	54	2	65	0	0	0	0	22	0	3	383
Approach %	0.00	81.44	18.56	2.99	97.01	0.00	####	####	####	88.00	0.00	12.00	
PEAK HR. FACTOR:		0.680			0.578			0.000			0.694		0.766

CONTROL: 1-Way Stop (WB)
COMMENT 1: 0
GPS: 32.772282, -114.388405

HOURS:

	FROM:		TO:	
AM	700	AM	900	AM
NOON				
PM	400	PM	600	PM

FIELD DATA SERVICES OF ARIZONA, INC.
520.316.6745

veracitytrafficgroup

N-S STREET:	US-95 0	DATE:	12/07/23	LOCATION:	Yuma
E-W STREET:	County 3rd St	DAY:	THURSDAY	PROJECT#	23-1574-001

ALL VEHICLES

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	1	0	0	1	0	0	0	0	0	1	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	0	24	7	4	151	0	0	0	0	13	0	1	200
4:15 PM	0	33	3	4	153	0	0	0	0	7	0	2	202
4:30 PM	0	23	7	9	327	0	0	0	0	10	0	0	376
4:45 PM	0	26	8	5	172	0	0	0	0	17	0	2	230
5:00 PM	0	26	10	1	139	0	0	0	0	10	0	0	186
5:15 PM	0	27	8	3	88	0	0	0	0	10	0	1	137
5:30 PM	0	29	6	1	61	0	0	0	0	16	0	0	113
5:45 PM	0	41	4	1	44	0	0	0	0	13	0	0	103
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
Volumes	0	229	53	28	1135	0	0	0	0	96	0	6	1547
Approach %	0.00	81.21	18.79	2.41	97.59	0.00	####	####	####	94.12	0.00	5.88	
App/Depart	282	/	235	1163	/	1231	0	/	81	102	/	0	

PM Peak Hr Begins at: 400 PM

PEAK													
Volumes	0	106	25	22	803	0	0	0	0	47	0	5	1008
Approach %	0.00	80.92	19.08	2.67	97.33	0.00	####	####	####	90.38	0.00	9.62	
PEAK HR. FACTOR:		0.910			0.614			0.000			0.684		0.670

CONTROL: 1-Way Stop (WB)
COMMENT 1: 0
GPS: 32.772282, -114.388405

HOURS:

	FROM:		TO:	
AM	630	AM	830	AM
NOON	0	0	0	0
PM	400	PM	600	PM

Kimley»Horn

Appendix C –Existing Synchro Reports

Intersection	
Int Delay, s/veh	2.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	115	10	397	90	3	109
Future Vol, veh/h	115	10	397	90	3	109
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	315	350	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	11	432	98	3	118

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	556	432	0	0	530	0
Stage 1	432	-	-	-	-	-
Stage 2	124	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	492	624	-	-	1037	-
Stage 1	655	-	-	-	-	-
Stage 2	902	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	491	624	-	-	1037	-
Mov Cap-2 Maneuver	491	-	-	-	-	-
Stage 1	655	-	-	-	-	-
Stage 2	899	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.9	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	500	1037	-
HCM Lane V/C Ratio	-	-	0.272	0.003	-
HCM Control Delay (s)	-	-	14.9	8.5	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	1.1	0	-

Intersection	
Int Delay, s/veh	2.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	96	6	106	25	22	803
Future Vol, veh/h	96	6	106	25	22	803
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	315	350	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	104	7	115	27	24	873

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1036	115	0	0	142	0
Stage 1	115	-	-	-	-	-
Stage 2	921	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	256	937	-	-	1441	-
Stage 1	910	-	-	-	-	-
Stage 2	388	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	252	937	-	-	1441	-
Mov Cap-2 Maneuver	252	-	-	-	-	-
Stage 1	910	-	-	-	-	-
Stage 2	381	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	28.3	0	0.2
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	263	1441	-
HCM Lane V/C Ratio	-	-	0.422	0.017	-
HCM Control Delay (s)	-	-	28.3	7.5	-
HCM Lane LOS	-	-	D	A	-
HCM 95th %tile Q(veh)	-	-	2	0.1	-

Appendix D – Signal Warrant Analyses

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS (2009 MUTCD)

MAJOR STREET: **US 95** NB SB # OF APPROACH LANES: **1**

MINOR STREET: **Dome Valley Road/Count** EB WB # OF APPROACH LANES: **1**

CITY, STATE: **Yuma, Arizona**

COMMENTS: 2024

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): **Y**

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N) **Y**

			MAJOR ST TWO-WAY TRAFFIC	MINOR ST TRAFFIC HEAVY LEG	WARRANT 1 - Condition A, Part 1			WARRANT 1 - Condition B, Part 1			WARRANT 1 - Condition A, Part 2			WARRANT 1 - Condition B, Part 2			WARRANT 2 Four-Hour	WARRANT 3 Peak Hour
					MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET		
THRESHOLD VALUES					**350**	**105**		**525**	**53**		**280**	**84**		**420**	**42**			
06:00 AM	TO	07:00 AM	912	48	Y			Y			Y			Y	Y	**Y**		
07:00 AM	TO	08:00 AM	484	50	Y						Y			Y	Y	**Y**		
08:00 AM	TO	09:00 AM	437	89	Y				Y		Y	Y	**Y**	Y	Y	**Y**		
09:00 AM	TO	10:00 AM	641	80	Y			Y	Y	**Y**	Y			Y	Y	**Y**		
10:00 AM	TO	11:00 AM	510	73	Y				Y		Y			Y	Y	**Y**		
11:00 AM	TO	12:00 PM	600	65	Y			Y	Y	**Y**	Y			Y	Y	**Y**		
12:00 PM	TO	01:00 PM	619	59	Y			Y	Y	**Y**	Y			Y	Y	**Y**		
01:00 PM	TO	02:00 PM	603	65	Y			Y	Y	**Y**	Y			Y	Y	**Y**		
02:00 PM	TO	03:00 PM	696	72	Y			Y	Y	**Y**	Y			Y	Y	**Y**	**Y**	
03:00 PM	TO	04:00 PM	1,027	73	Y			Y	Y	**Y**	Y			Y	Y	**Y**	**Y**	
04:00 PM	TO	05:00 PM	1,633	80	Y			Y	Y	**Y**	Y			Y	Y	**Y**	**Y**	**Y**
05:00 PM	TO	06:00 PM	835	77	Y			Y	Y	**Y**	Y			Y	Y	**Y**	**Y**	
06:00 PM	TO	07:00 PM	347	0							Y							
07:00 PM	TO	08:00 PM	173	0														
08:00 PM	TO	09:00 PM	143	0														
09:00 PM	TO	10:00 PM	110	0														
			9,770	831	12	0	**0**	9	10	**8**	13	1	**1**	12	12	**12**	**4**	**1**
					8 HOURS NEEDED			8 HOURS NEEDED			8 HOURS NEEDED for both Condition A & B						4 HRS NEEDED	1 HR NEEDED
					NOT SATISFIED			**SATISFIED**			**NOT SATISFIED**						**SATISFIED**	**SATISFIED**

04/08/24

Kimley-Horn and Associates

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS (2009 MUTCD)

MAJOR STREET: **US 95** NB SB # OF APPROACH LANES: **2**

MINOR STREET: **Dome Valley Road/Count** EB WB # OF APPROACH LANES: **1**

CITY, STATE: **Yuma, Arizona**

COMMENTS: 2024

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): **Y**

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N) **Y**

			MAJOR ST TWO-WAY TRAFFIC	MINOR ST TRAFFIC HEAVY LEG	WARRANT 1 - Condition A, Part 1			WARRANT 1 - Condition B, Part 1			WARRANT 1 - Condition A, Part 2			WARRANT 1 - Condition B, Part 2			WARRANT 2 Four-Hour	WARRANT 3 Peak Hour
					MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET		
THRESHOLD VALUES					**420**	**105**		**630**	**53**		**336**	**84**		**504**	**42**			
06:00 AM	TO	07:00 AM	912	48	Y			Y			Y			Y	Y	**Y**		
07:00 AM	TO	08:00 AM	484	50	Y						Y				Y			
08:00 AM	TO	09:00 AM	437	89	Y				Y		Y	Y	**Y**		Y			
09:00 AM	TO	10:00 AM	641	80	Y			Y	Y	**Y**	Y			Y	Y	**Y**		
10:00 AM	TO	11:00 AM	510	73	Y				Y		Y			Y	Y	**Y**		
11:00 AM	TO	12:00 PM	600	65	Y				Y		Y			Y	Y	**Y**		
12:00 PM	TO	01:00 PM	619	59	Y				Y		Y			Y	Y	**Y**		
01:00 PM	TO	02:00 PM	603	65	Y				Y		Y			Y	Y	**Y**		
02:00 PM	TO	03:00 PM	696	72	Y			Y	Y	**Y**	Y			Y	Y	**Y**		
03:00 PM	TO	04:00 PM	1,027	73	Y			Y	Y	**Y**	Y			Y	Y	**Y**	**Y**	
04:00 PM	TO	05:00 PM	1,633	80	Y			Y	Y	**Y**	Y			Y	Y	**Y**	**Y**	**Y**
05:00 PM	TO	06:00 PM	835	77	Y			Y	Y	**Y**	Y			Y	Y	**Y**	**Y**	
06:00 PM	TO	07:00 PM	347	14							Y							
07:00 PM	TO	08:00 PM	173	14														
08:00 PM	TO	09:00 PM	143	15														
09:00 PM	TO	10:00 PM	110	16														
			9,770	890	12	0	**0**	6	10	**5**	13	1	**1**	10	12	**10**	**3**	**1**
					8 HOURS NEEDED **NOT SATISFIED**			8 HOURS NEEDED **NOT SATISFIED**			8 HOURS NEEDED for both Condition A & B **NOT SATISFIED**						4 HRS NEEDED **NOT SATISFIED**	1 HR NEEDED **SATISFIED**

04/08/24

Kimley-Horn and Associates

Appendix E – 2050 Synchro Reports

No Build

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	38	5	405	92	4	111
Future Vol, veh/h	38	5	405	92	4	111
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	315	350	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	41	5	440	100	4	121

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	569	440	0	0	540	0
Stage 1	440	-	-	-	-	-
Stage 2	129	-	-	-	-	-
Critical Hdwy	6.5	6.3	-	-	4.2	-
Critical Hdwy Stg 1	5.5	-	-	-	-	-
Critical Hdwy Stg 2	5.5	-	-	-	-	-
Follow-up Hdwy	3.59	3.39	-	-	2.29	-
Pot Cap-1 Maneuver	470	601	-	-	989	-
Stage 1	633	-	-	-	-	-
Stage 2	878	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	468	601	-	-	989	-
Mov Cap-2 Maneuver	468	-	-	-	-	-
Stage 1	633	-	-	-	-	-
Stage 2	874	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.3	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	480	989	-
HCM Lane V/C Ratio	-	-	0.097	0.004	-
HCM Control Delay (s)	-	-	13.3	8.7	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Int Delay, s/veh	9.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	80	9	181	43	43	1371
Future Vol, veh/h	80	9	181	43	43	1371
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	315	350	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	87	10	197	47	47	1490

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1781	197	0	0	244	0
Stage 1	197	-	-	-	-	-
Stage 2	1584	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	90	844	-	-	1322	-
Stage 1	836	-	-	-	-	-
Stage 2	185	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	87	844	-	-	1322	-
Mov Cap-2 Maneuver	87	-	-	-	-	-
Stage 1	836	-	-	-	-	-
Stage 2	178	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	174.6	0	0.2
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	96	1322	-
HCM Lane V/C Ratio	-	-	1.008	0.035	-
HCM Control Delay (s)	-	-	174.6	7.8	-
HCM Lane LOS	-	-	F	A	-
HCM 95th %tile Q(veh)	-	-	6.1	0.1	-

Alternative 1: Stop-Controlled

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	38	5	405	92	4	111
Future Vol, veh/h	38	5	405	92	4	111
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	315	350	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10
Mvmt Flow	41	5	440	100	4	121

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	509	220	0	0	540	0
Stage 1	440	-	-	-	-	-
Stage 2	69	-	-	-	-	-
Critical Hdwy	7	7.1	-	-	4.3	-
Critical Hdwy Stg 1	6	-	-	-	-	-
Critical Hdwy Stg 2	6	-	-	-	-	-
Follow-up Hdwy	3.6	3.4	-	-	2.3	-
Pot Cap-1 Maneuver	474	760	-	-	971	-
Stage 1	594	-	-	-	-	-
Stage 2	922	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	472	760	-	-	971	-
Mov Cap-2 Maneuver	472	-	-	-	-	-
Stage 1	594	-	-	-	-	-
Stage 2	918	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	494	971	-
HCM Lane V/C Ratio	-	-	0.095	0.004	-
HCM Control Delay (s)	-	-	13	8.7	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Int Delay, s/veh	1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	80	9	181	43	43	1371
Future Vol, veh/h	80	9	181	43	43	1371
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	315	350	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	87	10	197	47	47	1490

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1036	99	0	0	244	0
Stage 1	197	-	-	-	-	-
Stage 2	839	-	-	-	-	-
Critical Hdwy	6.84	6.94	-	-	4.14	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-	2.22	-
Pot Cap-1 Maneuver	227	937	-	-	1319	-
Stage 1	817	-	-	-	-	-
Stage 2	384	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	219	937	-	-	1319	-
Mov Cap-2 Maneuver	219	-	-	-	-	-
Stage 1	817	-	-	-	-	-
Stage 2	370	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	30.3	0	0.2
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	237	1319	-
HCM Lane V/C Ratio	-	-	0.408	0.035	-
HCM Control Delay (s)	-	-	30.3	7.8	-
HCM Lane LOS	-	-	D	A	-
HCM 95th %tile Q(veh)	-	-	1.9	0.1	-

Alternative 2:
Green T

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	38	5	405	92	4	0
Future Vol, veh/h	38	5	405	92	4	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	315	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	5	440	100	4	0

Major/Minor	Minor1		Major1	
Conflicting Flow All	440	220	0	0
Stage 1	440	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.84	6.94	-	-
Critical Hdwy Stg 1	5.84	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-
Pot Cap-1 Maneuver	545	784	-	-
Stage 1	616	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	545	784	-	-
Mov Cap-2 Maneuver	545	-	-	-
Stage 1	616	-	-	-
Stage 2	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	11.8	0
HCM LOS	B	

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2
Capacity (veh/h)	-	-	545	784
HCM Lane V/C Ratio	-	-	0.076	0.007
HCM Control Delay (s)	-	-	12.1	9.6
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.2	0

Intersection	
Int Delay, s/veh	2.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	80	9	181	42	43	0
Future Vol, veh/h	80	9	181	42	43	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	315	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	87	10	197	46	47	0

Major/Minor	Minor1		Major1	
Conflicting Flow All	197	99	0	0
Stage 1	197	-	-	-
Stage 2	0	-	-	-
Critical Hdwy	6.84	6.94	-	-
Critical Hdwy Stg 1	5.84	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	3.52	3.32	-	-
Pot Cap-1 Maneuver	773	937	-	-
Stage 1	817	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %			-	-
Mov Cap-1 Maneuver	773	937	-	-
Mov Cap-2 Maneuver	773	-	-	-
Stage 1	817	-	-	-
Stage 2	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	10.1	0
HCM LOS	B	

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2
Capacity (veh/h)	-	-	773	937
HCM Lane V/C Ratio	-	-	0.112	0.01
HCM Control Delay (s)	-	-	10.2	8.9
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	0.4	0

Alternative 3: Roundabout

Intersection	
Intersection Delay, s/veh	4.1
Intersection LOS	A

Approach	WB	NB	SB
Entry Lanes	1	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	46	540	125
Demand Flow Rate, veh/h	47	551	127
Vehicles Circulating, veh/h	449	4	42
Vehicles Exiting, veh/h	106	165	454
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	4.2	4.3	3.1
Approach LOS	A	A	A

Lane	Left	Left	Right	Left	Right
Designated Moves	LR	LT	TR	LT	TR
Assumed Moves	LR	LT	TR	LT	TR
RT Channelized					
Lane Util	1.000	0.470	0.530	0.472	0.528
Follow-Up Headway, s	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	47	259	292	60	67
Cap Entry Lane, veh/h	970	1345	1415	1299	1370
Entry HV Adj Factor	0.979	0.980	0.980	0.976	0.986
Flow Entry, veh/h	46	254	286	59	66
Cap Entry, veh/h	949	1318	1388	1267	1351
V/C Ratio	0.048	0.193	0.206	0.046	0.049
Control Delay, s/veh	4.2	4.3	4.3	3.2	3.0
LOS	A	A	A	A	A
95th %tile Queue, veh	0	1	1	0	0

Intersection	
Intersection Delay, s/veh	9.1
Intersection LOS	A

Approach	WB	NB	SB
Entry Lanes	1	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	97	244	1537
Demand Flow Rate, veh/h	99	249	1568
Vehicles Circulating, veh/h	201	48	89
Vehicles Exiting, veh/h	96	1609	211
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	3.8	3.5	10.4
Approach LOS	A	A	B

Lane	Left	Left	Right	Left	Right
Designated Moves	LR	LT	TR	LT	TR
Assumed Moves	LR	LT	TR	LT	TR
RT Channelized					
Lane Util	1.000	0.470	0.530	0.470	0.530
Follow-Up Headway, s	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.328	4.645	4.328	4.645	4.328
Entry Flow, veh/h	99	117	132	737	831
Cap Entry Lane, veh/h	1197	1292	1363	1244	1317
Entry HV Adj Factor	0.980	0.980	0.980	0.980	0.980
Flow Entry, veh/h	97	115	129	722	815
Cap Entry, veh/h	1173	1266	1336	1219	1291
V/C Ratio	0.083	0.091	0.097	0.593	0.631
Control Delay, s/veh	3.8	3.6	3.5	10.1	10.6
LOS	A	A	A	B	B
95th %tile Queue, veh	0	0	0	4	5